

# RELEASED MATHEMATICS ITEMS

This book contains the released Trends in International Mathematics and Science Study (TIMSS) 2003 grade 8 mathematics assessment items. This is not a complete set of all TIMSS 2003 assessment items because some items are kept confidential so that they may be used in subsequent cycles of TIMSS to measure trends.

#### How Can This Set of Released Items Be Used?

In teacher-designed assessments. The items in this book present different ways of measuring students' understanding in various content and cognitive domains. A teacher may use these items to create an assessment according to the needs of the class after reviewing the items and selecting items of interest.

For feedback on student understanding. Student responses can be scored according to the scoring information provided in the book. Items that coincide with concepts taught in class allow the teacher to gain feedback on the students' understanding of assessed concepts. For example, a teacher might decide to examine the incorrect or partially correct responses of the class. The teacher might use the items to identify particular difficulties or misconceptions experienced by individual students, which can serve as the basis for some remedial teaching or focused practice.

**To benchmark student performance.** The teacher might also compare the percent of students in the class who responded correctly to an item with the percent of students who responded correctly to the same item in other education systems or in the United States.

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This book contains the released items from TIMSS 2003. Due to slight revisions in terminology and released information between cycles, the format for the items in each cycle differs slightly. Each item appears on a single page and is accompanied by a number of descriptors.

#### 2003 Content Domains:

- Algebra
- Data
- Geometry
- Measurement
- Number

## 2003 Cognitive Domains:

- Knowing facts and procedures
- Using concepts
- Solving routine problems
- Reasoning

Looking at *Value of -3x given value of x*, the first item from TIMSS 2003, the content domain (*algebra*) and the cognitive domain (*knowing facts and procedures*) are also accompanied by the Main Topic (*algebraic expressions*).

**International item numbers** identify each item. This number appears just below the item box.

**Correct answers** are shown beneath each item. These correct answers take two forms:

- Letter code. This form is used for the correct response on multiple-choice items.
- **Scoring guide**. This form is used to assist in scoring write-in responses. In some cases, partial credit may be awarded and these items will provide guidelines for fully correct, partially correct, and incorrect responses.

**Sample student responses** are provided for some extended response items.

**International benchmarks** are provided in a table next to each item. These consist of statistics on the percentage of students in each country who answered the question correctly. The countries are ordered in terms of this percentage. The international average is included as well, and this display also indicates which countries scored significantly higher, significantly lower, and not significantly different from this international average.



Content Domain	Main Topic	Cognitive Domain
ALGEBRA	Algebraic Expressions	Knowing Facts and Procedures

# Value of -3x given value of x

If x = -3, what is the value of -3x?

(A) -9(B) -6(C) -1(D) 1(E) 9

Item Number: M012042

**Correct Response:** 

Ε

# **Overall Percent Correct**

Hong Kong, SAR	84	
Korea, Republic of	84	
Chinese Taipei	83	
Singapore	80	<b>A</b>
Estonia	77	
Japan	74	
Russian Federation	73	
Hungary	69	
Israel	67	
Serbia and Montenegro	65	
United States	65	
Belgium (Flemish)	63	
Armenia	62	
Latvia	61	
Lithuania	60	
Slovak Republic	58	<b>A</b>
Bulgaria	57	
Moldova, Republic of	54	
Netherlands	54	
Romania	51	0
Slovenia	51	0
Lebanon	49	0
International average	48	
Malaysia	48	0
	48 47	0
Malaysia		0
Malaysia Macedonia, Republic of	47	0 0 <b>V</b>
Malaysia Macedonia, Republic of Iran, Islamic Republic of	47 44	0 0 <b>V</b>
Malaysia Macedonia, Republic of Iran, Islamic Republic of Philippines	47 44 44	0
Malaysia Macedonia, Republic of Iran, Islamic Republic of Philippines Indonesia	47 44 44 43	<ul><li>○</li><li>○</li><li>▼</li><li>▼</li></ul>
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Malaysia Macedonia, Republic of Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus Australia Egypt England Italy New Zealand	47 44 44 43 41 40 38 37 37 37 37	<ul><li>0</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><l< td=""></l<></ul>
Malaysia Macedonia, Republic of Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus Australia Egypt England Italy New Zealand Botswana	47 44 43 41 40 38 37 37 37 37 35 30	<ul><li>0</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><l< td=""></l<></ul>
Malaysia Macedonia, Republic of Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus Australia Egypt England Italy New Zealand Botswana Sweden	47 44 43 41 40 38 37 37 37 37 35 30 28	O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O
Malaysia Macedonia, Republic of Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus Australia Egypt England Italy New Zealand Botswana Sweden Tunisia	47 44 43 41 40 38 37 37 37 37 35 30 28 26	O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O
Malaysia Macedonia, Republic of Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus Australia Egypt England Italy New Zealand Botswana Sweden Tunisia Palestinian Nat'l Auth.	47 44 44 43 41 40 38 37 37 37 35 30 28 26 25	O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O
Malaysia Macedonia, Republic of Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus Australia Egypt England Italy New Zealand Botswana Sweden Tunisia Palestinian Nat'l Auth. Morocco	47 44 44 43 41 40 38 37 37 37 37 35 30 28 26 25 24	O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O
Malaysia Macedonia, Republic of Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus Australia Egypt England Italy New Zealand Botswana Sweden Tunisia Palestinian Nat'l Auth. Morocco Scotland	47 44 44 43 41 40 38 37 37 37 35 30 28 26 25 24 24	O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O
Malaysia Macedonia, Republic of Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus Australia Egypt England Italy New Zealand Botswana Sweden Tunisia Palestinian Nat'l Auth. Morocco Scotland South Africa	47 44 44 43 41 40 38 37 37 37 35 30 28 26 25 24 24	<ul><li>0</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><li>V</li><l< td=""></l<></ul>
Malaysia Macedonia, Republic of Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus Australia Egypt England Italy New Zealand Botswana Sweden Tunisia Palestinian Nat'l Auth. Morocco Scotland South Africa Chile	47 44 44 43 41 40 38 37 37 37 35 30 28 26 25 24 24 16 15	O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O

Country average vs. International average:

0

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Content Domain	Main Topic	Cognitive Domain
ALGEBRA	Algebraic Expressions	Knowing Facts and Procedures

# Subtract fractions involving x

Subtract:  $\frac{3x}{7} - \frac{x}{7} =$ 

- $\bigcirc \qquad \frac{2}{7}$
- B 3
- © 2x
- $\bigcirc$   $\frac{x}{7}$

Item Number: M022185

**Correct Response:** 

Ε

# **Overall Percent Correct**

Korea, Republic of	86	
Hong Kong, SAR	83	<b>A</b>
Singapore	81	<b>A</b>
Japan	76	<b>A</b>
Latvia	76	<b>A</b>
Chinese Taipei	76	
Hungary	74	
Russian Federation	67	
Lebanon	67	
Romania	65	
Israel	65	
Estonia	65	
Serbia and Montenegro	64	
Slovak Republic	63	
Bulgaria '	63	<b>A</b>
Malaysia	61	<u> </u>
Armenia	60	<u> </u>
Belgium (Flemish)	60	<u> </u>
Cyprus	58	<u> </u>
Moldova, Republic of	58	
Lithuania	57	0
International average	54	U
lordan		0
Bahrain	54	0
	49	•
		<b>V</b>
Philippines	49	
Philippines United States	49 49	
Philippines United States Italy	49 49 48	
Philippines United States Italy Egypt	49 49 48 48	
Philippines United States Italy Egypt Slovenia	49 49 48 48 47	
Philippines United States Italy Egypt	49 49 48 48	
Philippines United States Italy Egypt Slovenia Tunisia Botswana	49 49 48 48 47	
Philippines United States Italy Egypt Slovenia Tunisia	49 49 48 48 47 47	
Philippines United States Italy Egypt Slovenia Tunisia Botswana	49 49 48 48 47 47	* * * * * * * * * * * * * * * * * * *
Philippines United States Italy Egypt Slovenia Tunisia Botswana Iran, Islamic Republic of	49 49 48 48 47 47 46 46	* * * * * * * * * * * * * * * * * * *
Philippines United States Italy Egypt Slovenia Tunisia Botswana Iran, Islamic Republic of Palestinian Nat'l Auth.	49 49 48 48 47 47 46 46 44	* * * * * * * * * * * * * * * * * * *
Philippines United States Italy Egypt Slovenia Tunisia Botswana Iran, Islamic Republic of Palestinian Nat'l Auth. Australia	49 49 48 48 47 47 46 46 44	* * * * * * * * * * * * * * * * * * *
Philippines United States Italy Egypt Slovenia Tunisia Botswana Iran, Islamic Republic of Palestinian Nat'l Auth. Australia Indonesia	49 49 48 48 47 47 46 46 44 44	* * * * * * * * * * * * * * * * * * *
Philippines United States Italy Egypt Slovenia Tunisia Botswana Iran, Islamic Republic of Palestinian Nat'l Auth. Australia Indonesia Morocco	49 48 48 47 47 46 46 44 43 43	* * * * * * * * * * * * * * * * * * *
Philippines United States Italy Egypt Slovenia Tunisia Botswana Iran, Islamic Republic of Palestinian Nat'l Auth. Australia Indonesia Morocco New Zealand	49 48 48 47 47 46 46 44 43 43 42	
Philippines United States Italy Egypt Slovenia Tunisia Botswana Iran, Islamic Republic of Palestinian Nat'l Auth. Australia Indonesia Morocco New Zealand Scotland	49 48 48 47 47 46 46 44 43 43 42 41	* * * * * * * * * * * * * * * * * * *
Philippines United States Italy Egypt Slovenia Tunisia Botswana Iran, Islamic Republic of Palestinian Nat'l Auth. Australia Indonesia Morocco New Zealand Scotland Norway	49 48 48 47 47 46 46 44 43 43 42 41 40	* * * * * * * * * * * * * * * * * * *
Philippines United States Italy Egypt Slovenia Tunisia Botswana Iran, Islamic Republic of Palestinian Nat'l Auth. Australia Indonesia Morocco New Zealand Scotland Norway Sweden	49 48 48 47 47 46 46 44 43 43 42 41 40 39	* * * * * * * * * * * * * * * * * * *
Philippines United States Italy Egypt Slovenia Tunisia Botswana Iran, Islamic Republic of Palestinian Nat'l Auth. Australia Indonesia Morocco New Zealand Scotland Norway Sweden Netherlands	49 48 48 47 47 46 46 44 43 43 42 41 40 39 39	* * * * * * * * * * * * * * * * * * *
Philippines United States Italy Egypt Slovenia Tunisia Botswana Iran, Islamic Republic of Palestinian Nat'l Auth. Australia Indonesia Morocco New Zealand Scotland Norway Sweden Netherlands Saudi Arabia	49 48 48 47 47 46 46 44 43 43 42 41 40 39 39 37	* * * * * * * * * * * * * * * * * * *
Philippines United States Italy Egypt Slovenia Tunisia Botswana Iran, Islamic Republic of Palestinian Nat'l Auth. Australia Indonesia Morocco New Zealand Scotland Norway Sweden Netherlands Saudi Arabia Macedonia, Republic of	49 48 48 47 47 46 46 44 43 43 42 41 40 39 39 37 37	* * * * * * * * * * * * * * * * * * *
Philippines United States Italy Egypt Slovenia Tunisia Botswana Iran, Islamic Republic of Palestinian Nat'l Auth. Australia Indonesia Morocco New Zealand Scotland Norway Sweden Netherlands Saudi Arabia Macedonia, Republic of England	49 49 48 47 47 46 46 44 43 43 42 41 40 39 39 37 37 36	* * * * * * * * * * * * * * * * * * *
Philippines United States Italy Egypt Slovenia Tunisia Botswana Iran, Islamic Republic of Palestinian Nat'l Auth. Australia Indonesia Morocco New Zealand Scotland Norway Sweden Netherlands Saudi Arabia Macedonia, Republic of England Chile	49 49 48 47 47 46 46 44 43 43 42 41 40 39 39 37 37 36 27	* * * * * * * * * * * * * * * * * * *

Country average vs. International average:

0

 $\blacksquare$ 

Content Domain	Main Topic	Cognitive Domain
ALGEBRA	Algebraic Expressions	Knowing Facts and Procedures

# Which equals 2x minus 3y plus 7x plus 5y

Which of these is equal to 2x - 3y + 7x + 5y?

- $\bigcirc$  5x + 8y
- $\bigcirc$  9x + 2y
- $\bigcirc$  9x + 8y

Item Number: M032036

**Correct Response:** 

0

# **Overall Percent Correct**

Korea, Republic of	82	<b>A</b>
Japan	82	<u> </u>
Chinese Taipei	79	_
Singapore	79	<b>A</b>
Slovak Republic	76	<b>A</b>
Hong Kong, SAR	74	<b>A</b>
Hungary	74	<b>A</b>
Estonia	72	<b>A</b>
Belgium (Flemish)	67	<b>A</b>
Latvia	66	<b>A</b>
Israel	65	<b>A</b>
Serbia and Montenegro	62	<b>A</b>
Russian Federation	62	<b>A</b>
Bulgaria	58	<b>A</b>
Romania	58	<b>A</b>
Lebanon	55	0
Slovenia	55	0
Netherlands	54	0
Lithuania	53	0
Italy	53	0
Iran, Islamic Republic of	52	0
Malaysia	51	0
International average	49	
Scotland	48	0
United States	47	0
United States Moldova, Republic of	47 46	0 0
	46 45	0 0 0
Moldova, Republic of	46	0 0 0
Moldova, Republic of Sweden Egypt Australia	46 45	0 0 0 0
Moldova, Republic of Sweden Egypt	46 45 45 45 41	0 0 0 0
Moldova, Republic of Sweden Egypt Australia	46 45 45 45 41 41	0 0 0 0
Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of	46 45 45 45 41 41	0 0 0 0
Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway Armenia Jordan	46 45 45 45 41 41 41 38	0 0 0 0
Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway Armenia Jordan Philippines	46 45 45 45 41 41 41 38 36	0 0 0 0
Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway Armenia Jordan Philippines Cyprus	46 45 45 45 41 41 41 38 36 35	0 0 0 0
Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway Armenia Jordan Philippines Cyprus Palestinian Nat'l Auth.	46 45 45 45 41 41 41 38 36 35 33	0 0 0 0
Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway Armenia Jordan Philippines Cyprus Palestinian Nat'l Auth. England	46 45 45 41 41 41 38 36 35 33	0 0 0 0
Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway Armenia Jordan Philippines Cyprus Palestinian Nat'l Auth. England New Zealand	46 45 45 41 41 41 38 36 35 33 33	0 0 0 0
Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway Armenia Jordan Philippines Cyprus Palestinian Nat'l Auth. England New Zealand Morocco	46 45 45 41 41 41 38 36 35 33 33 33 32	0 0 0 0
Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway Armenia Jordan Philippines Cyprus Palestinian Nat'l Auth. England New Zealand Morocco Bahrain	46 45 45 41 41 41 38 36 35 33 33 33 32 27	0 0 0 0
Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway Armenia Jordan Philippines Cyprus Palestinian Nat'l Auth. England New Zealand Morocco Bahrain Chile	46 45 45 41 41 41 38 36 35 33 33 32 27 25	0 0 0 0
Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway Armenia Jordan Philippines Cyprus Palestinian Nat'l Auth. England New Zealand Morocco Bahrain Chile Botswana	46 45 45 41 41 41 38 36 35 33 33 32 27 25 25	0 0 0 0
Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway Armenia Jordan Philippines Cyprus Palestinian Nat'l Auth. England New Zealand Morocco Bahrain Chile Botswana Tunisia	46 45 45 41 41 41 38 36 35 33 33 32 27 25 25 24	0 0 0 0
Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway Armenia Jordan Philippines Cyprus Palestinian Nat'l Auth. England New Zealand Morocco Bahrain Chile Botswana Tunisia South Africa	46 45 45 41 41 41 38 36 35 33 33 32 27 25 25 24 23	0 0 0 0
Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway Armenia Jordan Philippines Cyprus Palestinian Nat'l Auth. England New Zealand Morocco Bahrain Chile Botswana Tunisia South Africa Saudi Arabia	46 45 45 41 41 41 38 36 35 33 33 32 27 25 25 24 23 23	0 0 0 0
Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway Armenia Jordan Philippines Cyprus Palestinian Nat'l Auth. England New Zealand Morocco Bahrain Chile Botswana Tunisia South Africa	46 45 45 41 41 41 38 36 35 33 33 32 27 25 25 24 23	0 0 0 0

Country average vs. International average:

0

 $\blacksquare$ 

Content Domain	Main Topic	Cognitive Domain
ALGEBRA	Algebraic Expressions	Reasoning

# The value of a + 2 times (b plus c)

If $a + 2b = 5$ and $c = 3$ , what is the value of $a + 2(b + c)$ ?		
A		
Answer:		

Item Number: M032557

## **SCORING**

## **Correct Response**

• 11

## **Incorrect Response**

• 8

• Other incorrect (including crossed out/erased, stray marks, illegible or off task).

# **Overall Percent Correct**

Korea, Republic of Singapore Chinese Taipei Hong Kong, SAR Russian Federation Romania Hungary Israel Japan Estonia Latvia Serbia and Montenegro Armenia Moldova, Republic of Bulgaria Slovak Republic Belgium (Flemish) Lithuania Lebanon	64 58 57 56 53 40 38 38 37 35 34 34 33 31 30 28 28 26 25	
International average	22	
Malaysia Australia United States Cyprus Macedonia, Republic of Scotland Italy Netherlands England New Zealand Slovenia Sweden Egypt Jordan Indonesia Tunisia Palestinian Nat'l Auth. Philippines Morocco Iran, Islamic Republic of Chile Norway South Africa Botswana Bahrain Saudi Arabia	20 20 20 18 18 16 15 14 13 10 10 9 8 5 5 4 3 3 3 2 2 0	

# Country average vs. International average:

# The value of a + 2 times (b plus c) (continued)

Item Number: M032557

# **Student Responses**

## **Correct Response:**

If 
$$a + 2b = 5$$
 and  $c = 3$ , what is the value of  $a + 2(b + c)$ ?

Answer:

# **Incorrect Response:**

If a + 2b = 5 and c = 3, what is the value of a + 2(b + c)?

Answer:

Content Domain	Main Topic	Cognitive Domain
ALGEBRA	Algebraic Expressions	Solving Routine Problems

## Three consecutive even numbers

Sam wanted to find three consecutive even numbers that add up to 84. He wrote the equation k + (k + 2) + (k + 4) = 84. What does the letter k represent?

- (A) The least of the three even numbers
- (B) The middle even number
- (C) The greatest of the three even numbers
- $\bigcirc$  The average of the three even numbers

Item Number: M022002

Correct Response: A

## **Overall Percent Correct**

Hong Kong, SAR	57	
Chinese Taipei	50	
Singapore	48	
Korea, Republic of	46	
Romania	42	
Estonia	37	
Russian Federation	36	
Moldova, Republic of	34	
Japan	34	
Bulgaria	34	
Serbia and Montenegro	33	
Latvia	33	
Hungary	31	
Israel	31	
Armenia	30	
Belgium (Flemish)	30	
Slovak Republic	27	0
Netherlands	27	0
Philippines	25	0
Bahrain	25	0
International average	24	
United States	23	0
Macedonia, Republic of	22	0
Italy	21	0
•		
Australia	20	O
Australia Botswana	20 20	O
Australia Botswana South Africa	20 20 19	O
Australia Botswana South Africa Saudi Arabia	20 20 19 19	O
Australia Botswana South Africa Saudi Arabia Lithuania	20 20 19 19	O
Australia Botswana South Africa Saudi Arabia Lithuania Cyprus	20 20 19 19 19	O
Australia Botswana South Africa Saudi Arabia Lithuania Cyprus Egypt	20 20 19 19 19 19	O
Australia Botswana South Africa Saudi Arabia Lithuania Cyprus Egypt Jordan	20 20 19 19 19 19 18 18	O
Australia Botswana South Africa Saudi Arabia Lithuania Cyprus Egypt Jordan Indonesia	20 20 19 19 19 19 18 18	O
Australia Botswana South Africa Saudi Arabia Lithuania Cyprus Egypt Jordan Indonesia England	20 20 19 19 19 19 18 18 16	O
Australia Botswana South Africa Saudi Arabia Lithuania Cyprus Egypt Jordan Indonesia England Palestinian Nat'l Auth.	20 20 19 19 19 19 18 18 16 16	O
Australia Botswana South Africa Saudi Arabia Lithuania Cyprus Egypt Jordan Indonesia England Palestinian Nat'l Auth. New Zealand	20 20 19 19 19 19 18 18 16 16	O
Australia Botswana South Africa Saudi Arabia Lithuania Cyprus Egypt Jordan Indonesia England Palestinian Nat'l Auth. New Zealand Iran, Islamic Republic of	20 20 19 19 19 18 18 16 16 16	O
Australia Botswana South Africa Saudi Arabia Lithuania Cyprus Egypt Jordan Indonesia England Palestinian Nat'l Auth. New Zealand Iran, Islamic Republic of Sweden	20 20 19 19 19 18 18 16 16 16 15	
Australia Botswana South Africa Saudi Arabia Lithuania Cyprus Egypt Jordan Indonesia England Palestinian Nat'l Auth. New Zealand Iran, Islamic Republic of Sweden Morocco	20 20 19 19 19 18 18 16 16 16 15 15	O
Australia Botswana South Africa Saudi Arabia Lithuania Cyprus Egypt Jordan Indonesia England Palestinian Nat'l Auth. New Zealand Iran, Islamic Republic of Sweden Morocco Slovenia	20 20 19 19 19 18 18 16 16 16 15 15	· · · · · · · · · · · · · · · · · · ·
Australia Botswana South Africa Saudi Arabia Lithuania Cyprus Egypt Jordan Indonesia England Palestinian Nat'l Auth. New Zealand Iran, Islamic Republic of Sweden Morocco Slovenia Lebanon	20 20 19 19 19 18 18 16 16 16 15 15 15 12	· · · · · · · · · · · · · · · · · · ·
Australia Botswana South Africa Saudi Arabia Lithuania Cyprus Egypt Jordan Indonesia England Palestinian Nat'l Auth. New Zealand Iran, Islamic Republic of Sweden Morocco Slovenia Lebanon Chile	20 20 19 19 19 18 18 16 16 16 15 15 15 12 12	· · · · · · · · · · · · · · · · · · ·
Australia Botswana South Africa Saudi Arabia Lithuania Cyprus Egypt Jordan Indonesia England Palestinian Nat'l Auth. New Zealand Iran, Islamic Republic of Sweden Morocco Slovenia Lebanon Chile Scotland	20 20 19 19 19 18 18 16 16 16 15 15 15 12 12 11	· · · · · · · · · · · · · · · · · · ·
Australia Botswana South Africa Saudi Arabia Lithuania Cyprus Egypt Jordan Indonesia England Palestinian Nat'l Auth. New Zealand Iran, Islamic Republic of Sweden Morocco Slovenia Lebanon Chile Scotland Norway	20 20 19 19 19 18 18 16 16 16 15 15 15 12 12 11 11	· · · · · · · · · · · · · · · · · · ·
Australia Botswana South Africa Saudi Arabia Lithuania Cyprus Egypt Jordan Indonesia England Palestinian Nat'l Auth. New Zealand Iran, Islamic Republic of Sweden Morocco Slovenia Lebanon Chile Scotland Norway Malaysia	20 20 19 19 19 18 18 16 16 16 15 15 15 12 12 11 11	O
Australia Botswana South Africa Saudi Arabia Lithuania Cyprus Egypt Jordan Indonesia England Palestinian Nat'l Auth. New Zealand Iran, Islamic Republic of Sweden Morocco Slovenia Lebanon Chile Scotland Norway	20 20 19 19 19 18 18 16 16 16 15 15 15 12 12 11 11	· · · · · · · · · · · · · · · · · · ·
Australia Botswana South Africa Saudi Arabia Lithuania Cyprus Egypt Jordan Indonesia England Palestinian Nat'l Auth. New Zealand Iran, Islamic Republic of Sweden Morocco Slovenia Lebanon Chile Scotland Norway Malaysia	20 20 19 19 19 18 18 16 16 16 15 15 15 12 12 11 11	· · · · · · · · · · · · · · · · · · ·

Country average vs. International average:

Higher △
Not different ○
Lower ▼

Content Domain	Main Topic	Cognitive Domain
ALGEBRA	Algebraic Expressions	Using Concepts

# Total number of books three boys have

Graham has twice as many books as Bob. Chan has six more books than Bob. If Bob has x books, which of the following represents the total number of books the three boys have?

- $\bigcirc$  3x + 6
- (c) 4x + 6
- (D) 5x + 6
- $\bigcirc$  8x + 2

Item Number: M022251

**Correct Response:** 

0

## **Overall Percent Correct**

Singapore	66	
Chinese Taipei	59	
Korea, Republic of	55	
Hong Kong, SAR	53	
Israel	41	
Hungary	41	
Slovak Republic	38	
Russian Federation	36	
Japan	35	<u> </u>
Romania	35	<u> </u>
Netherlands	35	<u> </u>
Estonia	34	
Cyprus	34	<u> </u>
Belgium (Flemish)	33	<u> </u>
Italy	33	0
Latvia	32	0
Lithuania	32	0
New 7ealand	32 31	0
TTCTT Ecalaria		
Serbia and Montenegro	31 31	0
Slovenia		0
International average	29	
Moldova, Republic of	29	0
Australia	28	O
Bulgaria	28	0
Sweden	28	O
Armenia	26	O
United States	26	$\blacksquare$
United States England	26 25	<b>V</b>
		<b>▼</b>
England	25	* * * * * * * * * * * * * * * * * * *
England Malaysia	25 25	* * * * * * * * * * * * * * * * * * *
England Malaysia Scotland	25 25 25	* * * * * * * * * * * * * * * * * * *
England Malaysia Scotland Tunisia	25 25 25 24	* * * * * * * * * * * * * * * * * * *
England Malaysia Scotland Tunisia Norway	25 25 25 24 23	* * * * * * * * * * * * * * * * * * *
England Malaysia Scotland Tunisia Norway Iran, Islamic Republic of	25 25 25 24 23 23	* * * * * * * * * * * * * * * * * * *
England Malaysia Scotland Tunisia Norway Iran, Islamic Republic of Morocco	25 25 25 24 23 23 22	* * * * * * * * * * * * * * * * * * *
England Malaysia Scotland Tunisia Norway Iran, Islamic Republic of Morocco Macedonia, Republic of	25 25 25 24 23 23 22 22	* * * * * * * * * * * * * * * * * * *
England Malaysia Scotland Tunisia Norway Iran, Islamic Republic of Morocco Macedonia, Republic of Egypt	25 25 25 24 23 23 22 22 21	* * * * * * * * * * * * * * * * * * *
England Malaysia Scotland Tunisia Norway Iran, Islamic Republic of Morocco Macedonia, Republic of Egypt Jordan	25 25 24 23 23 22 22 21 20	* * * * * * * * * * * * * * * * * * *
England Malaysia Scotland Tunisia Norway Iran, Islamic Republic of Morocco Macedonia, Republic of Egypt Jordan Lebanon Palestinian Nat'l Auth.	25 25 25 24 23 23 22 22 21 20 20	* * * * * * * * * * * * * * * * * * *
England Malaysia Scotland Tunisia Norway Iran, Islamic Republic of Morocco Macedonia, Republic of Egypt Jordan Lebanon	25 25 25 24 23 23 22 22 21 20 20 20	* * * * * * * * * * * * * * * * * * *
England Malaysia Scotland Tunisia Norway Iran, Islamic Republic of Morocco Macedonia, Republic of Egypt Jordan Lebanon Palestinian Nat'l Auth. Philippines	25 25 25 24 23 23 22 22 21 20 20	* * * * * * * * * * * * * * * * * * *
England Malaysia Scotland Tunisia Norway Iran, Islamic Republic of Morocco Macedonia, Republic of Egypt Jordan Lebanon Palestinian Nat'l Auth. Philippines Bahrain	25 25 25 24 23 23 22 22 21 20 20 20 19 18 18	* * * * * * * * * * * * * * * * * * *
England Malaysia Scotland Tunisia Norway Iran, Islamic Republic of Morocco Macedonia, Republic of Egypt Jordan Lebanon Palestinian Nat'l Auth. Philippines Bahrain Chile Indonesia	25 25 25 24 23 23 22 22 21 20 20 20 19 18 18 18	* * * * * * * * * * * * * * * * * * *
England Malaysia Scotland Tunisia Norway Iran, Islamic Republic of Morocco Macedonia, Republic of Egypt Jordan Lebanon Palestinian Nat'l Auth. Philippines Bahrain Chile Indonesia Saudi Arabia	25 25 25 24 23 23 22 22 21 20 20 20 19 18 18 18 18	* * * * * * * * * * * * * * * * * * *
England Malaysia Scotland Tunisia Norway Iran, Islamic Republic of Morocco Macedonia, Republic of Egypt Jordan Lebanon Palestinian Nat'l Auth. Philippines Bahrain Chile Indonesia Saudi Arabia Botswana	25 25 25 24 23 23 22 21 20 20 20 19 18 18 18 15 13	* * * * * * * * * * * * * * * * * * *
England Malaysia Scotland Tunisia Norway Iran, Islamic Republic of Morocco Macedonia, Republic of Egypt Jordan Lebanon Palestinian Nat'l Auth. Philippines Bahrain Chile Indonesia Saudi Arabia	25 25 25 24 23 23 22 22 21 20 20 20 19 18 18 18 18	* * * * * * * * * * * * * * * * * * *
England Malaysia Scotland Tunisia Norway Iran, Islamic Republic of Morocco Macedonia, Republic of Egypt Jordan Lebanon Palestinian Nat'l Auth. Philippines Bahrain Chile Indonesia Saudi Arabia Botswana	25 25 25 24 23 23 22 21 20 20 20 19 18 18 18 15 13	* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

Country average vs. International average:

O ▼

Content Domain	Main Topic	Cognitive Domain
ALGEBRA	Algebraic Expressions	Using Concepts

# Carla paid x zeds for 3 cartons of juice

Carla paid x zeds for 3 cartons of juice. What is the price in zeds of 1 carton of juice?

- $\bigcirc A \quad \frac{x}{3}$
- $\bigcirc$  3 + x
- (D) 3*x*

Item Number: M032044

**Correct Response:** 

Α

# **Overall Percent Correct**

Singapore	85	<b>A</b>
Hong Kong, SAR	81	
Chinese Taipei	74	
Belgium (Flemish)	67	
Netherlands	62	
Malaysia	59	
Russian Federation	58	
England	55	
Hungary	55	
Korea, Republic of	53	
Estonia	53	
Israel	53	
Slovak Republic	52	
Sweden	52	
Japan	51	
Lithuania	51	
Scotland	49	
Australia	49	O
United States	48	
Armenia	48	O
Lebanon	48	O
Latvia	46	Ο
Italy	45	0
International average	45	
New Zealand	43	0
Serbia and Montenegro	42	Ο

international average	72	
New Zealand	43	0
Serbia and Montenegro	42	0
Romania	42	0
Bulgaria	42	0
Moldova, Republic of	41	0
Philippines	40	$\blacksquare$
Norway	40	▼
Slovenia	40	<b>V</b>
Macedonia, Republic of	39	
Indonesia	39	▼
Tunisia	36	<b>▼ ▼</b>
Cyprus	36	▼
Egypt	35	▼
Jordan	34	▼
Chile	31	▼
Bahrain	30	▼
Palestinian Nat'l Auth.	30	<b>V</b>
Botswana	29	
Morocco	28	<b>* * *</b>
Ghana	28	▼
South Africa	23	▼
Saudi Arabia	22	•
Iran, Islamic Republic of	21	▼

Country average vs. International average:

Higher △
Not different ○
Lower ▼

Content Domain	Main Topic	Cognitive Domain
ALGEBRA	Equations and Formulas	Knowing Facts and Procedures

# Find *n* from proportionality equation

If  $\frac{12}{n} = \frac{36}{21}$ , then n equals

- (A) 3
- (B) 7
- (c) 36
- © 63

Item Number: M012040

**Correct Response:** 

В

## **Overall Percent Correct**

Singapore	93	<b>A</b>
Korea, Republic of	89	
Hong Kong, SAR	88	
Belgium (Flemish)	86	
Netherlands	85	
Chinese Taipei	83	<b>A</b>
Malaysia	83	
United States	80	
Hungary	79	
Japan	79	
Scotland	79	
Australia	76	
England	74	
Slovak Republic	74	
Israel	72	
Slovenia	72	<b>A</b>
Estonia	71	<b>A</b>
Lebanon	71	
Russian Federation	71	
Latvia	70	
New Zealand	68	0
Iran, Islamic Republic of	66	0
Sweden	66	0
Cyprus	65	0
Italy	65	0
International average	64	
Lithuania	64	0
Tunisia	64	0
Serbia and Montenegro	63	0
Moldova, Republic of	61	0
Romania	61	0
Bulgaria	59	▼
Norway	59	<b>V</b>
Egypt	58	<b>V</b>
Indonesia	58	<b>V</b>
Armenia	54	▼
Morocco		
	54	
Iordan		<b>V</b>
Jordan Palestinian Nat'l Auth.	54 53 52	* * * * * * * * * * * * * * * * * * *

Country average vs. International average:

52

44

44

41

30 28

26

Higher △
Not different ○
Lower ▼

Macedonia, Republic of 50

Philippines

Bahrain Chile

Botswana

Ghana

Saudi Arabia

South Africa

Content Domain	Main Topic	Cognitive Domain
ALGEBRA	Equations and Formulas	Knowing Facts and Procedures

# True expression for values of L,K,M

If L = 4 when K = 6 and M = 24, which of the following is true?

- $\bigcirc L = \frac{M}{K}$
- $\bigcirc$  L = KM
- $\bigcirc$  L = K + M
- (E) L = M K

Item Number: M022196

**Correct Response:** 

٨

# **Overall Percent Correct**

Singapore	88	
Korea, Republic of	86	<b>A</b>
Hong Kong, SAR	84	<b>A</b>
Chinese Taipei	82	
Estonia	81	
Russian Federation	79	
Hungary	79	<b>A</b>
Japan	77	<b>A</b>
Belgium (Flemish)	76	<b>A</b>
Slovak Republic	75	
Latvia	75	
Serbia and Montenegro	73	<b>A</b>
Lithuania	73	<b>A</b>
Sweden	70	<b>A</b>
Lebanon	69	<b>A</b>
Romania	67	<b>A</b>
Armenia	66	
Slovenia	66	
Israel	64	
Moldova, Republic of	63	<b>A</b>
Bulgaria	63	0
Tunisia	63	<b>A</b>
United States	62	<b>A</b>
Macedonia, Republic of	60	0
and the second second		
Netherlands	59	0
International average	58	
International average Morocco	<b>58</b> 57	0
International average Morocco Italy	<b>58</b> 57 57	0
International average Morocco Italy England	58 57 57 54	0 0
International average Morocco Italy England Malaysia	58 57 57 54 54	0 0 0
International average Morocco Italy England Malaysia Indonesia	58 57 57 54 54 54	0 0 0 0
International average Morocco Italy England Malaysia Indonesia Cyprus	58 57 57 54 54 54 54 52	0 0 0 0
International average Morocco Italy England Malaysia Indonesia Cyprus Australia	58 57 57 54 54 54 52 49	0 0 0 0
International average Morocco Italy England Malaysia Indonesia Cyprus Australia Scotland	58 57 57 54 54 54 52 49	0 0 0 0
International average Morocco Italy England Malaysia Indonesia Cyprus Australia Scotland New Zealand	58 57 57 54 54 54 52 49 49	0 0 0 0
International average  Morocco Italy England Malaysia Indonesia Cyprus Australia Scotland New Zealand Jordan	58 57 57 54 54 54 52 49 49	0 0 0 0
International average  Morocco Italy England Malaysia Indonesia Cyprus Australia Scotland New Zealand Jordan Norway	58 57 57 54 54 54 52 49 49 49 44	0 0 0 0
International average  Morocco Italy England Malaysia Indonesia Cyprus Australia Scotland New Zealand Jordan Norway Egypt	58 57 57 54 54 54 52 49 49 49 40 38	0 0 0 0
International average Morocco Italy England Malaysia Indonesia Cyprus Australia Scotland New Zealand Jordan Norway Egypt Iran, Islamic Republic of	58 57 57 54 54 54 52 49 49 49 40 38 38	0 0 0 0
International average  Morocco Italy England Malaysia Indonesia Cyprus Australia Scotland New Zealand Jordan Norway Egypt Iran, Islamic Republic of Palestinian Nat'l Auth.	58 57 57 54 54 54 52 49 49 49 40 38 38 35	0 0 0 0
International average  Morocco Italy England Malaysia Indonesia Cyprus Australia Scotland New Zealand Jordan Norway Egypt Iran, Islamic Republic of Palestinian Nat'l Auth. Bahrain	58 57 57 54 54 54 52 49 49 49 40 38 38 35 35	0 0 0 0
International average  Morocco Italy England Malaysia Indonesia Cyprus Australia Scotland New Zealand Jordan Norway Egypt Iran, Islamic Republic of Palestinian Nat'l Auth. Bahrain Botswana	58 57 57 54 54 54 52 49 49 49 40 38 38 35 35	0 0 0 0
International average  Morocco Italy England Malaysia Indonesia Cyprus Australia Scotland New Zealand Jordan Norway Egypt Iran, Islamic Republic of Palestinian Nat'l Auth. Bahrain Botswana Philippines	58 57 57 54 54 54 52 49 49 49 40 38 38 35 28 25	0 0 0 0
International average  Morocco Italy England Malaysia Indonesia Cyprus Australia Scotland New Zealand Jordan Norway Egypt Iran, Islamic Republic of Palestinian Nat'l Auth. Bahrain Botswana Philippines Saudi Arabia	58 57 57 54 54 54 52 49 49 49 40 38 38 35 28 25 22	0 0 0 0
International average  Morocco Italy England Malaysia Indonesia Cyprus Australia Scotland New Zealand Jordan Norway Egypt Iran, Islamic Republic of Palestinian Nat'l Auth. Bahrain Botswana Philippines Saudi Arabia Chile	58 57 57 54 54 54 52 49 49 49 40 38 38 35 28 25 22 21	0 0 0 0
International average  Morocco Italy England Malaysia Indonesia Cyprus Australia Scotland New Zealand Jordan Norway Egypt Iran, Islamic Republic of Palestinian Nat'l Auth. Bahrain Botswana Philippines Saudi Arabia	58 57 57 54 54 54 52 49 49 49 40 38 38 35 28 25 22	0 0 0 0
International average  Morocco Italy England Malaysia Indonesia Cyprus Australia Scotland New Zealand Jordan Norway Egypt Iran, Islamic Republic of Palestinian Nat'l Auth. Bahrain Botswana Philippines Saudi Arabia Chile	58 57 57 54 54 54 52 49 49 49 40 38 38 35 28 25 22 21	0 0 0 0

Country average vs. International average:

0

 $\blacksquare$ 

Content Domain	Main Topic	Cognitive Domain
ALGEBRA	Equations and Formulas	Knowing Facts and Procedures

# Solve equation for x

If $4(x + 5) = 80$ , then $x =$
Answer:

Item Number: M022253

## **SCORING**

## **Correct Response**

• 15

## **Incorrect Response**

- 25 [100 ÷ 4]
- 60 [80 (4 x 5)]
- 71 [80 4 5]
- Any expression or equation, other than x = 15, containing x.
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task).

# **Overall Percent Correct**

Hong Kong, SAR	90	
Singapore	82	
Korea, Republic of	82	
Japan	80	
Chinese Taipei	80	
Estonia	72	
Hungary	70	
Russian Federation	66	
Slovak Republic	65	
Belgium (Flemish)	64	
Latvia	64	
Slovenia	64	
Armenia	61	
Serbia and Montenegro	61	
Romania	60	
Bulgaria	59	
United States	57	
Israel	57	
Cyprus	54	
Moldova, Republic of	53	
Lithuania	51	
Australia	50	
Malaysia	46	0
Netherlands	44	0
International average	44	
England	44	0
New Zealand	44	Ο
Macedonia, Republic of	37	•
Italy	37	•
Scotland	37	•
Lebanon	31	<b>* * *</b>
Sweden	28	•
Tunisia	26	•
Jordan	25	•
Indonesia	25	•
Egypt	23	<b>*</b>
Philippines	22	•
Bahrain	19	•
Partialit	10	_
Iran, Islamic Republic of	18	•
Iran, Islamic Republic of	18 17	*
		<b>* *</b>
Iran, Islamic Republic of Palestinian Nat'l Auth.	17	* * * * * * * * * * * * * * * * * * *
Iran, Islamic Republic of Palestinian Nat'l Auth. Morocco	17 16	* * * * * * * * * * * * * * * * * * *
Iran, Islamic Republic of Palestinian Nat'l Auth. Morocco Norway	17 16 11	* * * * * * * * * * * * * * * * * * *
Iran, Islamic Republic of Palestinian Nat'l Auth. Morocco Norway Chile	17 16 11 9	* * * * * * *

Country average vs. International average:

# Solve equation for *x* (continued)

Item Number: M022253

# **Student Responses**

## **Correct Response:**

If 
$$4(x+5) = 80$$
, then  $x = 4(x+5) = 80$ , then  $x = 4(x+5) = 80$ , then  $x = 4(x+5) = 80$ .

Answer: \_\_\_15

# **Incorrect Response:**

If 
$$4(x + 5) = 80$$
, then  $x =$ 

Answer: 30

$$\frac{4x}{y} = 60$$

Content Domain	Main Topic	Cognitive Domain
ALGEBRA	Equations and Formulas	Knowing Facts and Procedures

# If x plus 3y equals 11 and 2x plus 3y equals 13

If x + 3y = 11 and 2x + 3y = 13, then y =

- A 3
- B) 2
- $\bigcirc$  -3

Item Number: M032728

**Correct Response:** 

Α

# **Overall Percent Correct**

Korea, Republic of	76	<b>A</b>
Singapore	70	<b>A</b>
Chinese Taipei	69	
Japan	61	
Hong Kong, SAR	59	
Scotland	55	
Belgium (Flemish)	53	<b>A</b>
Latvia	51	<b>A</b>
Estonia	50	<b>A</b>
United States	49	<b>A</b>
Serbia and Montenegro	49	<b>A</b>
England	49	0
Romania	48	0
Hungary	47	0
Slovak Republic	46	0
New Zealand	45	0
Moldova, Republic of	45	0
Bulgaria	45	0
Russian Federation	44	0
Australia	44	0
Israel	44	0
Netherlands	43	0
Malaysia	43	0
International average	42	
International average	42	
Lebanon	40	0
Lebanon Botswana	40 38	0
Lebanon Botswana Lithuania	40 38 37	0
Lebanon Botswana Lithuania Jordan	40 38 37 37	0
Lebanon Botswana Lithuania Jordan Tunisia	40 38 37 37 36	<ul><li>○</li><li>○</li><li>▼</li></ul>
Lebanon Botswana Lithuania Jordan Tunisia Slovenia	40 38 37 37 36 36	<ul><li>○</li><li>○</li><li>▼</li><li>○</li></ul>
Lebanon Botswana Lithuania Jordan Tunisia Slovenia Macedonia, Republic of	40 38 37 37 36 36 36	<ul><li>○</li><li>○</li><li>▼</li><li>○</li></ul>
Lebanon Botswana Lithuania Jordan Tunisia Slovenia Macedonia, Republic of Sweden	40 38 37 37 36 36 36 35	<ul><li>○</li><li>○</li><li>▼</li><li>○</li></ul>
Lebanon Botswana Lithuania Jordan Tunisia Slovenia Macedonia, Republic of Sweden Philippines	40 38 37 37 36 36 36 35	<ul><li>○</li><li>○</li><li>▼</li><li>○</li></ul>
Lebanon Botswana Lithuania Jordan Tunisia Slovenia Macedonia, Republic of Sweden Philippines Cyprus	40 38 37 37 36 36 36 35 35	<ul><li>○</li><li>○</li><li>▼</li><li>○</li></ul>
Lebanon Botswana Lithuania Jordan Tunisia Slovenia Macedonia, Republic of Sweden Philippines Cyprus Egypt	40 38 37 37 36 36 36 35 35 34	<ul><li>○</li><li>○</li><li>▼</li><li>○</li></ul>
Lebanon Botswana Lithuania Jordan Tunisia Slovenia Macedonia, Republic of Sweden Philippines Cyprus Egypt Iran, Islamic Republic of	40 38 37 37 36 36 36 35 35 34 34	<ul><li>○</li><li>○</li><li>▼</li><li>○</li></ul>
Lebanon Botswana Lithuania Jordan Tunisia Slovenia Macedonia, Republic of Sweden Philippines Cyprus Egypt Iran, Islamic Republic of Indonesia	40 38 37 36 36 36 35 35 34 34 34	<ul><li>○</li><li>○</li><li>▼</li></ul>
Lebanon Botswana Lithuania Jordan Tunisia Slovenia Macedonia, Republic of Sweden Philippines Cyprus Egypt Iran, Islamic Republic of Indonesia Chile	40 38 37 36 36 36 35 35 34 34 34 33	<ul><li>○</li><li>○</li><li>▼</li><li>○</li></ul>
Lebanon Botswana Lithuania Jordan Tunisia Slovenia Macedonia, Republic of Sweden Philippines Cyprus Egypt Iran, Islamic Republic of Indonesia Chile Palestinian Nat'l Auth.	40 38 37 37 36 36 35 35 34 34 34 33 31	<ul><li>○</li><li>○</li><li>▼</li><li>○</li></ul>
Lebanon Botswana Lithuania Jordan Tunisia Slovenia Macedonia, Republic of Sweden Philippines Cyprus Egypt Iran, Islamic Republic of Indonesia Chile Palestinian Nat'l Auth. South Africa	40 38 37 36 36 36 35 35 34 34 34 33 31 31	<ul><li>○</li><li>○</li><li>▼</li><li>○</li></ul>
Lebanon Botswana Lithuania Jordan Tunisia Slovenia Macedonia, Republic of Sweden Philippines Cyprus Egypt Iran, Islamic Republic of Indonesia Chile Palestinian Nat'l Auth. South Africa Norway	40 38 37 36 36 36 35 35 34 34 34 33 31 31 31	• • • • • • • • • • • • • • • • • • •
Lebanon Botswana Lithuania Jordan Tunisia Slovenia Macedonia, Republic of Sweden Philippines Cyprus Egypt Iran, Islamic Republic of Indonesia Chile Palestinian Nat'l Auth. South Africa Norway Saudi Arabia	40 38 37 36 36 36 35 35 34 34 33 31 31 31 30 29	• • • • • • • • • • • • • • • • • • •
Lebanon Botswana Lithuania Jordan Tunisia Slovenia Macedonia, Republic of Sweden Philippines Cyprus Egypt Iran, Islamic Republic of Indonesia Chile Palestinian Nat'l Auth. South Africa Norway Saudi Arabia Armenia	40 38 37 36 36 36 35 34 34 34 33 31 31 30 29	• • • • • • • • • • • • • • • • • • •
Lebanon Botswana Lithuania Jordan Tunisia Slovenia Macedonia, Republic of Sweden Philippines Cyprus Egypt Iran, Islamic Republic of Indonesia Chile Palestinian Nat'l Auth. South Africa Norway Saudi Arabia Armenia Italy	40 38 37 36 36 36 35 34 34 34 31 31 31 30 29 29 28	• • • • • • • • • • • • • • • • • • •
Lebanon Botswana Lithuania Jordan Tunisia Slovenia Macedonia, Republic of Sweden Philippines Cyprus Egypt Iran, Islamic Republic of Indonesia Chile Palestinian Nat'l Auth. South Africa Norway Saudi Arabia Armenia Italy Bahrain	40 38 37 36 36 36 35 34 34 34 31 31 31 30 29 29 28 27	<ul><li>○</li><li>○</li><li>▼</li><li>○</li></ul>
Lebanon Botswana Lithuania Jordan Tunisia Slovenia Macedonia, Republic of Sweden Philippines Cyprus Egypt Iran, Islamic Republic of Indonesia Chile Palestinian Nat'l Auth. South Africa Norway Saudi Arabia Armenia Italy	40 38 37 36 36 36 35 34 34 34 31 31 31 30 29 29 28	• • • • • • • • • • • • • • • • • • •

Country average vs. International average:

0

 $\blacksquare$ 

Content Domain	Main Topic	Cognitive Domain
ALGEBRA	Equations and Formulas	Solving Routine Problems

# If x minus y equals 5 and x/2 equals 3

If x - y = 5 and  $\frac{x}{2} = 3$ , what is the value of y?

- A) 6
- (B)
- (c) -1

Item Number: M032208

**Correct Response:** 

В

# **Overall Percent Correct**

Singapore	82	<b>A</b>
Korea, Republic of	79	
Hong Kong, SAR	78	<b>A</b>
Chinese Taipei	77	<b>A</b>
Australia	69	<b>A</b>
Belgium (Flemish)	69	<b>A</b>
New Zealand	67	<b>A</b>
Hungary	67	<b>A</b>
England	66	<b>A</b>
United States	63	<b>A</b>
Scotland	61	<b>A</b>
Japan	61	
Malaysia	58	<b>A</b>
Israel	58	
Estonia	58	
Serbia and Montenegro	58	<b>A</b>
Romania	57	
Latvia	56	<b>A</b>
Slovenia	55	0
Cyprus	55	
Norway	55	0
Sweden	53	0
Netherlands	53	0
Lithuania	53	0
		_
Russian Federation	52	0
Russian Federation International average	52 <b>51</b>	0
		0
International average	51	0
International average Lebanon	<b>51</b> 48	0 0
International average Lebanon Slovak Republic	<b>51</b> 48 47	0 0
International average Lebanon Slovak Republic Moldova, Republic of	<b>51</b> 48 47 47	0 0
International average Lebanon Slovak Republic Moldova, Republic of Italy Macedonia, Republic of Bulgaria	51 48 47 47 46	0 0
International average Lebanon Slovak Republic Moldova, Republic of Italy Macedonia, Republic of	48 47 47 46 45	0 0
International average Lebanon Slovak Republic Moldova, Republic of Italy Macedonia, Republic of Bulgaria	48 47 47 46 45 44	0 0
International average Lebanon Slovak Republic Moldova, Republic of Italy Macedonia, Republic of Bulgaria Palestinian Nat'l Auth.	48 47 47 46 45 44 43	0 0
International average Lebanon Slovak Republic Moldova, Republic of Italy Macedonia, Republic of Bulgaria Palestinian Nat'l Auth. Armenia	48 47 47 46 45 44 43 43	0 0
International average Lebanon Slovak Republic Moldova, Republic of Italy Macedonia, Republic of Bulgaria Palestinian Nat'l Auth. Armenia Botswana	48 47 47 46 45 44 43 43 39	0 0
International average Lebanon Slovak Republic Moldova, Republic of Italy Macedonia, Republic of Bulgaria Palestinian Nat'l Auth. Armenia Botswana Indonesia	51 48 47 47 46 45 44 43 43 39 38	0 0
International average Lebanon Slovak Republic Moldova, Republic of Italy Macedonia, Republic of Bulgaria Palestinian Nat'l Auth. Armenia Botswana Indonesia Bahrain	51 48 47 47 46 45 44 43 43 39 38 38	0
International average Lebanon Slovak Republic Moldova, Republic of Italy Macedonia, Republic of Bulgaria Palestinian Nat'l Auth. Armenia Botswana Indonesia Bahrain Jordan	51 48 47 47 46 45 44 43 43 39 38 38 38 37 36	0 0
International average Lebanon Slovak Republic Moldova, Republic of Italy Macedonia, Republic of Bulgaria Palestinian Nat'l Auth. Armenia Botswana Indonesia Bahrain Jordan Chile	51 48 47 47 46 45 44 43 43 39 38 38 38 37	0 0
International average Lebanon Slovak Republic Moldova, Republic of Italy Macedonia, Republic of Bulgaria Palestinian Nat'l Auth. Armenia Botswana Indonesia Bahrain Jordan Chile Egypt	51 48 47 47 46 45 44 43 43 39 38 38 38 37 36	0 0
International average Lebanon Slovak Republic Moldova, Republic of Italy Macedonia, Republic of Bulgaria Palestinian Nat'l Auth. Armenia Botswana Indonesia Bahrain Jordan Chile Egypt Philippines	51 48 47 46 45 44 43 39 38 38 38 37 36 33	0 0
International average Lebanon Slovak Republic Moldova, Republic of Italy Macedonia, Republic of Bulgaria Palestinian Nat'l Auth. Armenia Botswana Indonesia Bahrain Jordan Chile Egypt Philippines Tunisia	51 48 47 46 45 44 43 39 38 38 38 37 36 33 31	0 0
International average Lebanon Slovak Republic Moldova, Republic of Italy Macedonia, Republic of Bulgaria Palestinian Nat'l Auth. Armenia Botswana Indonesia Bahrain Jordan Chile Egypt Philippines Tunisia Morocco	51 48 47 47 46 45 44 43 39 38 38 38 37 36 33 31 31	0 0
International average Lebanon Slovak Republic Moldova, Republic of Italy Macedonia, Republic of Bulgaria Palestinian Nat'l Auth. Armenia Botswana Indonesia Bahrain Jordan Chile Egypt Philippines Tunisia Morocco South Africa	51 48 47 47 46 45 44 43 39 38 38 37 36 33 31 31 30	0 0
International average Lebanon Slovak Republic Moldova, Republic of Italy Macedonia, Republic of Bulgaria Palestinian Nat'l Auth. Armenia Botswana Indonesia Bahrain Jordan Chile Egypt Philippines Tunisia Morocco South Africa Iran, Islamic Republic of	51 48 47 47 46 45 44 43 39 38 38 37 36 33 31 31 30 26	0 0

Country average vs. International average:

0

 $\blacksquare$ 

Content Domain	Main Topic	Cognitive Domain
ALGEBRA	Equations and Formulas	Solving Routine Problems

# If a/b equals 70

If  $\frac{a}{b} = 70$ , then  $\frac{a}{2b} =$ 

 $\bigcirc$ 35

68

72

(D) 140

Item Number: M032210

**Correct Response:** 

# **Overall Percent Correct**

Chinese Taipei	70	
Singapore	69	<u> </u>
Korea, Republic of	69	
Hong Kong, SAR	68	
Estonia	61	
Russian Federation	60	
Hungary	58	
Serbia and Montenegro	57	
Japan	55	
Romania	53	
Latvia	53	
Belgium (Flemish)	52	<b>A</b>
Lithuania	51	
Slovak Republic	47	<b>A</b>
Bulgaria	46	
Israel	44	
Italy	44	0
Macedonia, Republic of	42	0
Moldova, Republic of	41	0
Indonesia	41	0
Armenia	41	0
International average	40	
Netherlands	40	0
Sweden	38	0
United States	38	0
England	38	0
Lebanon	37	Ο
Slovenia	37	0
Australia	37	0
Malaysia	36	0
New Zealand	32	<b>* * * *</b>
Scotland	30	•
Cyprus	30	•
Tunisia		_
Philippines	30 27	•

Country average vs. International average:

Higher Not different Lower

Iran, Islamic Republic of

Palestinian Nat'l Auth.

Egypt

Jordan

Norway

South Africa

Saudi Arabia

Bahrain

Chile

Botswana Morocco

27

26

25

24

23 22

22

21

17

15 15

0  $\blacksquare$ 

Content Domain	Main Topic	Cognitive Domain
ALGEBRA	Equations and Formulas	Solving Routine Problems

# 7 oranges and 4 lemons cost 43 zeds

At a market, 7 oranges and 4 lemons cost 43 zeds, and 11 oranges and 12 lemons cost 79 zeds. Using $x$ to represent the cost of an orange and $y$ to represent the cost of a lemon, write two equations that could be used to find the values of $x$ and $y$ .	
Equation 1:	
Equation 2:	

#### Item Number: M032545

## **SCORING**

## **Correct Response**

• 7x + 4y = 43 (or equivalent) and 11x + 12y = 79 (or equivalent).

## **Incorrect Response**

- One equation correct and one incorrect/missing.
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task).

# Overall Percent Correct

Hong Kong, SAR	72	
Japan	67	
Chinese Taipei	62	
Armenia	61	
Singapore	60	
Korea, Republic of	57	
Estonia	46	
Serbia and Montenegro	43	
Israel	41	
Russian Federation	39	
Romania	38	
Jordan	37	
Hungary	34	
Bulgaria	33	
Moldova, Republic of	27	0
Egypt	27	O
Slovak Republic	25	0
Macedonia, Republic of	24	O
International average	24	
Belgium (Flemish)	22	0
Iran, Islamic Republic of	20	0
United States	20	▼
Latvia	20	
Scotland	20	<b>V</b>
Lithuania	19	<b>V</b>
England	18	<b>V</b>
Bahrain	16	<b>V</b>
Indonesia	16	
Malaysia	15	_
Sweden	15	_
Australia	15	* * * * * * * * * * * * * * * * * * *
Italy	14	<b>V</b>
New Zealand	12	•
Cyprus	11	•
Slovenia	9	•
Morocco	9	* * * * * * * * * * * * * * * * * * *
Netherlands	9	<b>V</b>
Philippines	7	•
Palestinian Nat'l Auth.	6	•
Lebanon	6	•
Botswana	5	<b>V</b>
Saudi Arabia	4	$\blacksquare$
Norway	3	$\blacksquare$
Chile	3	<b>V</b>
Ghana	2	<b>V</b>
South Africa	2	* * * * * * * * * * * * * * * * * * *
Tunisia	1	$\blacksquare$

# Country average vs. International average:

Higher △
Not different ○
Lower ▼

## 7 oranges and 4 lemons cost 43 zeds (continued)

Item Number: M032545

# **Student Responses**

## **Correct Response:**

At a market, 7 oranges and 4 lemons cost 43 zeds, and 11 oranges and 12 lemons cost 79 zeds. Using x to represent the cost of an orange and y to represent the cost of a lemon, write two equations that could be used to find the values of x and y.

Equation 1: 
$$X = \frac{13 - 14}{7}$$

Equation 2: 
$$\sqrt{=\frac{70-11}{12}}$$

## **Incorrect Response:**

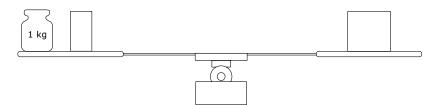
At a market, 7 oranges and 4 lemons cost 43 zeds, and 11 oranges and 12 lemons cost 79 zeds. Using x to represent the cost of an orange and y to represent the cost of a lemon, write two equations that could be used to find the values of x and y.

Equation 1: 
$$7x + 4y = Z$$

Content Domain	Main Topic	Cognitive Domain
ALGEBRA	Equations and Formulas	Using Concepts

# Objects balanced on scale

The objects on the scale make it balance exactly. On the left pan there is a 1 kg weight (mass) and half a brick. On the right pan there is one brick.



What is the weight (mass) of one brick?

- $\bigcirc$  0.5 kg
- B 1 kg
- © 2 kg
- $\bigcirc$  3 kg

Item Number: M012002

**Correct Response:** 

C

## **Overall Percent Correct**

Estonia	86	$\blacktriangle$
Russian Federation	85	$\blacktriangle$
Netherlands	83	<b>A</b>
Japan	82	<b>A</b>
Singapore	82	<b>A</b>
Hong Kong, SAR	81	<b>A</b>
Italy	79	<b>A</b>
Belgium (Flemish)	78	<b>A</b>
Korea, Republic of	78	<b>A</b>
Slovak Republic	78	<b>A</b>
Sweden	78	<b>A</b>
Latvia	77	<b>A</b>
Australia	76	<b>A</b>
Chinese Taipei	76	<b>A</b>
England	76	<b>A</b>
Lithuania	76	<b>A</b>
Hungary	75	<b>A</b>
New Zealand	75	<b>A</b>
Malaysia	74	<b>A</b>
Scotland	74	<b>A</b>
United States	74	<b>A</b>
Bulgaria	73	<b>A</b>
Slovenia	73	<b>A</b>
Moldova, Republic of	68	<b>A</b>
Israel	67	<b>A</b>
Israel Norway	67 66	0
131461	66 66	0 0
Norway	66 66 65	0 0 0
Norway Romania Serbia and Montenegro Cyprus	66 66 65 64	0 0
Norway Romania Serbia and Montenegro Cyprus International average	66 66 65 64 <b>63</b>	0 0 0
Norway Romania Serbia and Montenegro Cyprus International average Iran, Islamic Republic of	66 66 65 64 <b>63</b>	0 0 0 0
Norway Romania Serbia and Montenegro Cyprus International average Iran, Islamic Republic of Macedonia, Republic of	66 66 65 64 <b>63</b> 63	0 0 0
Norway Romania Serbia and Montenegro Cyprus International average Iran, Islamic Republic of Macedonia, Republic of Jordan	66 66 65 64 <b>63</b> 63 63 52	0 0 0 0
Norway Romania Serbia and Montenegro Cyprus International average Iran, Islamic Republic of Macedonia, Republic of Jordan Armenia	66 66 65 64 <b>63</b> 63 63 52	0 0 0 0
Norway Romania Serbia and Montenegro Cyprus International average Iran, Islamic Republic of Macedonia, Republic of Jordan Armenia Tunisia	66 66 65 64 <b>63</b> 63 63 52 51	0 0 0 0
Norway Romania Serbia and Montenegro Cyprus International average Iran, Islamic Republic of Macedonia, Republic of Jordan Armenia Tunisia Chile	66 66 65 64 <b>63</b> 63 63 52 51 51	0 0 0 0
Norway Romania Serbia and Montenegro Cyprus International average Iran, Islamic Republic of Macedonia, Republic of Jordan Armenia Tunisia Chile Morocco	66 66 65 64 <b>63</b> 63 63 52 51 51 50 49	0 0 0 0
Norway Romania Serbia and Montenegro Cyprus International average Iran, Islamic Republic of Macedonia, Republic of Jordan Armenia Tunisia Chile Morocco Palestinian Nat'l Auth.	66 66 65 64 <b>63</b> 63 63 52 51 51 50 49	0 0 0
Norway Romania Serbia and Montenegro Cyprus International average Iran, Islamic Republic of Macedonia, Republic of Jordan Armenia Tunisia Chile Morocco Palestinian Nat'l Auth. Bahrain	66 66 65 64 63 63 63 52 51 51 50 49 45 42	0 0 0 0
Norway Romania Serbia and Montenegro Cyprus International average Iran, Islamic Republic of Macedonia, Republic of Jordan Armenia Tunisia Chile Morocco Palestinian Nat'l Auth. Bahrain Egypt	66 66 65 64 <b>63</b> 63 63 52 51 51 50 49 45 42	0 0 0 0
Norway Romania Serbia and Montenegro Cyprus International average Iran, Islamic Republic of Macedonia, Republic of Jordan Armenia Tunisia Chile Morocco Palestinian Nat'l Auth. Bahrain Egypt Indonesia	66 66 65 64 <b>63</b> 63 63 52 51 51 50 49 45 42 42 41	0 0 0 0
Norway Romania Serbia and Montenegro Cyprus International average Iran, Islamic Republic of Macedonia, Republic of Jordan Armenia Tunisia Chile Morocco Palestinian Nat'l Auth. Bahrain Egypt Indonesia Lebanon	66 66 65 64 <b>63</b> 63 63 52 51 51 50 49 45 42 42 41 41	0 0 0 0
Norway Romania Serbia and Montenegro Cyprus International average Iran, Islamic Republic of Macedonia, Republic of Jordan Armenia Tunisia Chile Morocco Palestinian Nat'l Auth. Bahrain Egypt Indonesia Lebanon Botswana	66 66 65 64 63 63 63 52 51 51 50 49 45 42 42 41 41 36	0 0 0 0
Norway Romania Serbia and Montenegro Cyprus International average Iran, Islamic Republic of Macedonia, Republic of Jordan Armenia Tunisia Chile Morocco Palestinian Nat'l Auth. Bahrain Egypt Indonesia Lebanon Botswana Philippines	66 66 65 64 63 63 63 52 51 51 50 49 45 42 42 41 41 36 34	0 0 0 0
Norway Romania Serbia and Montenegro Cyprus International average Iran, Islamic Republic of Macedonia, Republic of Jordan Armenia Tunisia Chile Morocco Palestinian Nat'l Auth. Bahrain Egypt Indonesia Lebanon Botswana Philippines Saudi Arabia	66 66 65 64 63 63 63 52 51 51 50 49 45 42 41 41 36 34 31	0 0 0 0
Norway Romania Serbia and Montenegro Cyprus International average Iran, Islamic Republic of Macedonia, Republic of Jordan Armenia Tunisia Chile Morocco Palestinian Nat'l Auth. Bahrain Egypt Indonesia Lebanon Botswana Philippines Saudi Arabia South Africa	66 66 65 64 63 63 63 52 51 51 50 49 45 42 41 41 36 34 31 28	0 0 0 0
Norway Romania Serbia and Montenegro Cyprus International average Iran, Islamic Republic of Macedonia, Republic of Jordan Armenia Tunisia Chile Morocco Palestinian Nat'l Auth. Bahrain Egypt Indonesia Lebanon Botswana Philippines Saudi Arabia	66 66 65 64 63 63 63 52 51 51 50 49 45 42 41 41 36 34 31	0 0 0 0

Country average vs. International average:

O ▼

Content Domain	Main Topic	Cognitive Domain
ALGEBRA	Equations and Formulas	Using Concepts

# If y equals 3x plus 2

If y = 3x + 2, which of these expresses x in terms of y?

Item Number: M032046

# **Correct Response:**

## Α

# **Overall Percent Correct**

Singapore Hong Kong, SAR Korea, Republic of Chinese Taipei Japan Armenia Russian Federation Romania Serbia and Montenegro Moldova, Republic of Bulgaria Malaysia Belgium (Flemish) Indonesia Macedonia, Republic of Estonia United States	61 60 52 48 46 45 44 43 34 31 31 30 30 27 26	
International average	25	
Lebanon	24	0
Israel	24	0
Jordan	23	0
Philippines	22	•
Egypt	21	•
Lithuania	21	•
Hungary	21	•
Latvia	21	•
Cyprus	20	$\blacksquare$
Italy	20	$\blacksquare$
England	20	<b>▼ ▼</b>
Slovak Republic	19	$\blacksquare$
Australia	18	▼
Netherlands	17	•
Tunisia	17	<b>V</b>
Iran, Islamic Republic of	16	▼
Palestinian Nat'l Auth.	15	•
Bahrain	15	<b>V</b>
Slovenia	15	▼
New Zealand	14	<b>V</b>
Scotland	12	* * * * * * * * * * * * * * * * * * *
Morocco	12	•
Saudi Arabia	12	•
Sweden	11	•
Botswana	10	•
South Africa	10	<b>* * *</b>
Chile	9	<b>V</b>
Norway	6	<b>—</b>
ivoivvay	J	*

Country average vs. International average:

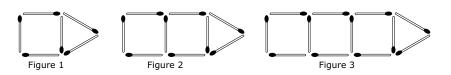
0

 $\blacksquare$ 

Content Domain	Main Topic	Cognitive Domain
ALGEBRA	Patterns	Reasoning

# Number of matchsticks continuing pattern

Matchsticks are arranged as shown in the figures.



If the pattern is continued, how many matchsticks would be used to make Figure 10?

- A 30
- (B) 33
- © 36
- (D) 39
- E) 42

Item Number: M012017

**Correct Response:** 

В

## **Overall Percent Correct**

Korea, Republic of	78	<b>A</b>
Singapore	78 73	
Chinese Taipei	73 71	
Japan	67	<u> </u>
Hong Kong, SAR	66	
Belgium (Flemish)	64	
New Zealand	63	<b>A</b>
Australia	62	<b>A</b>
Scotland	61	<u> </u>
Hungary	61	<b>A</b>
Slovak Republic	60	<b>A</b>
Netherlands	59	<b>A</b>
Russian Federation	59	<b>A</b>
Sweden	59	<b>A</b>
Estonia	58	<b>A</b>
Israel	58	
Malaysia	57	<b>A</b>
United States	56	
Slovenia	56	
Lithuania	56	<b>A</b>
Moldova, Republic of	55	
Italy	54	
Bulgaria	53	0
England	52	0
Romania	51	0
Serbia and Montenegro	51	0
Macedonia, Republic of	50	0
Latvia	49	0
Cyprus	49	0
International average	48	
Armenia	47	0
Norway	46	0
Chile	43	•
Philippines	41	<b>V</b>
Bahrain	37	•
Iran, Islamic Republic of	34	•
Jordan	33	•
Lebanon	32	•
Egypt	30	* * * * * * * * * * * * * * * * * * *
Tunisia	29	<b>*</b>
		<b>*</b>
Indonesia	29	<u>*</u>
Palestinian Nat'l Auth.	29	<u>*</u>
Botswana	27	<b>▼</b>
Morocco	26	<b>V</b>
South Africa	24	•
Saudi Arabia	16	•
Ghana	16	_

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
ALGEBRA	Patterns	Reasoning

# Numbers in sequence increasing by 4

The numbers in the sequence 7, 11, 15, 19, 23, increase by four. The numbers in the sequence 1, 10, 19, 28, 37, increase by nine. The number 19 is in both sequences. If the two sequences are continued, what is the next number that is in BOTH the first and the second sequences?
Answer:
Aliswei.

#### Item Number: M022008

## **SCORING**

#### Correct

• 55

## **Incorrect Response**

- 27 AND 46 [23 + 4 and 37 + 9]
- Either 27 OR 46
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task).

# **Overall Percent Correct**

Armenia	63	<b>A</b>
Korea, Republic of	51	<b>A</b>
Singapore	50	<b>A</b>
Hungary	49	
Japan	46	
United States	45	
Italy	45	<b>A</b>
Belgium (Flemish)	43	<b>A</b>
Slovenia	41	<b>A</b>
Australia	39	<b>A</b>
Hong Kong, SAR	39	<b>A</b>
Slovak Republic	39	<b>A</b>
Chinese Taipei	39	<b>A</b>
Bulgaria	38	<b>A</b>
Estonia	38	<b>A</b>
Netherlands	38	<b>A</b>
Scotland	37	<b>A</b>
Sweden	35	<b>A</b>
Malaysia	35	<b>A</b>
England	34	0
Tunisia	34	0
New Zealand	33	0
Lithuania	33	0
Russian Federation	32	0
Romania	32	0
Romania Israel	32 31	0
Israel Cyprus	31 31	0
Israel Cyprus Latvia	31 31 31	0
Israel Cyprus Latvia International average	31 31 31 31	0 0
Israel Cyprus Latvia International average Moldova, Republic of	31 31 31 31 31	0 0 0
Israel Cyprus Latvia International average Moldova, Republic of Iran, Islamic Republic of	31 31 31 31 31 30 25	0 0 0
Israel Cyprus Latvia International average Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of	31 31 31 31 30 25 24	0 0 0
Israel Cyprus Latvia International average Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Chile	31 31 31 31 30 25 24 24	0 0 0
Israel Cyprus Latvia International average Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Chile Indonesia	31 31 31 31 30 25 24 24 23	0 0 0
Israel Cyprus Latvia International average Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Chile Indonesia Serbia and Montenegro	31 31 31 31 30 25 24 24 23 23	0 0 0
Israel Cyprus Latvia International average Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Chile Indonesia Serbia and Montenegro Bahrain	31 31 31 31 30 25 24 24 23 23 22	0 0 0
Israel Cyprus Latvia International average Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Chile Indonesia Serbia and Montenegro Bahrain Morocco	31 31 31 30 25 24 24 23 23 22 20	0 0 0
Israel Cyprus Latvia International average Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Chile Indonesia Serbia and Montenegro Bahrain Morocco Norway	31 31 31 30 25 24 24 23 23 22 20 20	0 0 0
Israel Cyprus Latvia International average Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Chile Indonesia Serbia and Montenegro Bahrain Morocco Norway Palestinian Nat'l Auth.	31 31 31 30 25 24 24 23 23 22 20 20	0 0 0
Israel Cyprus Latvia International average Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Chile Indonesia Serbia and Montenegro Bahrain Morocco Norway Palestinian Nat'l Auth. Botswana	31 31 31 30 25 24 24 23 23 22 20 20 19 18	0 0 0
Israel Cyprus Latvia International average Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Chile Indonesia Serbia and Montenegro Bahrain Morocco Norway Palestinian Nat'l Auth. Botswana Lebanon	31 31 31 30 25 24 24 23 23 22 20 20 19 18 17	0 0 0 V V V V V
Israel Cyprus Latvia International average Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Chile Indonesia Serbia and Montenegro Bahrain Morocco Norway Palestinian Nat'l Auth. Botswana Lebanon Jordan	31 31 31 30 25 24 24 23 22 20 20 19 18 17 16	0 0 0 V V V V V
Israel Cyprus Latvia International average Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Chile Indonesia Serbia and Montenegro Bahrain Morocco Norway Palestinian Nat'l Auth. Botswana Lebanon Jordan Egypt	31 31 31 30 25 24 24 23 23 22 20 20 19 18 17 16 14	0 0 0 V V V V V
Israel Cyprus Latvia International average Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Chile Indonesia Serbia and Montenegro Bahrain Morocco Norway Palestinian Nat'l Auth. Botswana Lebanon Jordan Egypt Philippines	31 31 31 30 25 24 24 23 23 22 20 20 19 18 17 16 14	0 0 0 V V V V V
Israel Cyprus Latvia International average Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Chile Indonesia Serbia and Montenegro Bahrain Morocco Norway Palestinian Nat'l Auth. Botswana Lebanon Jordan Egypt Philippines Saudi Arabia	31 31 31 30 25 24 24 23 23 22 20 20 19 18 17 16 14 14 8	0 0 0 V V V V V
Israel Cyprus Latvia International average Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Chile Indonesia Serbia and Montenegro Bahrain Morocco Norway Palestinian Nat'l Auth. Botswana Lebanon Jordan Egypt Philippines Saudi Arabia South Africa	31 31 31 30 25 24 24 23 23 22 20 20 19 18 17 16 14 14 8 6	0 0 0
Israel Cyprus Latvia International average Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Chile Indonesia Serbia and Montenegro Bahrain Morocco Norway Palestinian Nat'l Auth. Botswana Lebanon Jordan Egypt Philippines Saudi Arabia	31 31 31 30 25 24 24 23 23 22 20 20 19 18 17 16 14 14 8	0 0 0 V V V V V

# Country average vs. International average:

## Numbers in sequence increasing by 4 (continued)

Item Number: M022008

# **Student Responses**

## **Correct Response:**

The numbers in the sequence 7, 11, 15, 18, 23, ... increase by four. The numbers in the sequence 1, 10, 19, 28, 37, ... increase by nine. The number 19 is in both sequences. If the two sequences are continued, what is the next number that is in BOTH the first and the second sequences?

Answer: 55

7,11,15,19,23,27,31,35,39,43,47,51 (55,59,63)
67,71

1,10,19,28,37,46,65

## **Incorrect Response:**

The numbers in the sequence 7, 11, 15, 19, 23, ... increase by four. The numbers in the sequence 1, 10, 19, 28, 37, ... increase by nine. The number 19 is in both sequences. If the two sequences are continued, what is the next number that is in BOTH the first and the second sequences?

Answer: LI6 39

Content Domain	Main Topic	Cognitive Domain
A. ALGEBRA	Patterns	Solving Routine Problems
B. ALGEBRA	Patterns	Solving Routine Problems
C. ALGEBRA	Patterns	Reasoning

## Sequence of figures with triangles: fill table

The three figures below are divided into small congruent triangles.





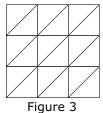


Figure 1

A. Complete the table below. First, fill in how many small triangles make up Figure 3. Then, find the number of small triangles that would be needed for the 4th figure if the sequence of figures is extended.

Figure	Number of Small Triangles
1	2
2	8
3	
4	

B. The sequence of figures is extended to the 7th figure. How many small triangles would be needed for Figure 7?

Δηςταρν		

C. The sequence of figures is extended to the 50th figure. Explain a way to find the number of small triangles in the 50th figure that does not involve drawing it and counting the number of triangles.

Item Number: M022261A

#### **SCORING**

#### **Correct Response**

• 18 AND 32

#### **Incorrect Response**

- 18 and any number other than 32.
- · 18 and no numerical response for the 4th figure.
- · Other incorrect (including crossed out/erased, stray marks, illegible, or off task).

## **Overall Percent Correct**

Korea, Republic of	78	
Singapore	74	
Japan	74	
Hong Kong, SAR	72	
Chinese Taipei	69	
Netherlands	59	
Australia	57	
England	57	
New Zealand	55	
Armenia	53	
Scotland	53	
Belgium (Flemish)	51	
Hungary	50	
United States	50	
Estonia	50	
Sweden	49	
Slovenia	42	
Malaysia	42	
Israel	42	
Russian Federation	41	
Slovak Republic	40	0
Latvia	38	0
Lithuania	38	0
International average	36	

International average	36	
Italy	35	0
Norway	34	0
Romania	31	0
Moldova, Republic of	31	$\blacksquare$
Serbia and Montenegro	31	$\blacksquare$
Cyprus	30	$\blacksquare$
Bulgaria	30	$\blacksquare$
Macedonia, Republic of	25	$\blacksquare$
Chile	23	$\blacksquare$
Jordan	21	$\blacksquare$
Indonesia	20	$\blacksquare$
Palestinian Nat'l Auth.	17	$\blacksquare$
Philippines	17	* * * * * * * * * * * * * * * * * * *
Morocco	16	$\blacksquare$
Bahrain	16	$\blacksquare$
Iran, Islamic Republic of	15	$\blacksquare$
Egypt	15	$\blacksquare$
Lebanon	12	$\blacksquare$
Botswana	11	$\blacksquare$
South Africa	6	$\blacksquare$
Tunisia	5	$\blacksquare$
Saudi Arabia	4	$\blacksquare$
Ghana	3	$\blacksquare$

Country average vs. International average:

Higher	
Not different	0
Lower	_

# Sequence of figures with triangles: fill table (continued)

Item Number: M022261A

# **Student Responses**

## **Correct Response:**

The three figures below are divided into small congruent triangles.

1/2

Figure 1



Figure 2

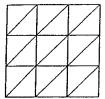


Figure 3

a) Complete the table below. First, fill in how many small triangles make up Figure 3. Then, find the number of small triangles that would be needed for the 4th figure if the sequence of figures is extended.

	Number of
Figure	small triangles
1	2
2	8
3	18
4	32

## **Incorrect Response:**

The three figures below are divided into small congruent triangles.



Figure 1



Figure 2

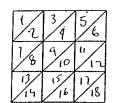


Figure 3

a) Complete the table below. First, fill in how many small triangles make up Figure 3. Then, find the number of small triangles that would be needed for the 4th figure if the sequence of figures is extended.

	Number of		
Figure	small triangles		
1	2		
2	8		
3	18		
4	25		

Content Domain	Main Topic	Cognitive Domain
A. ALGEBRA	Patterns	Solving Routine Problems
B. ALGEBRA	Patterns	Solving Routine Problems
C. ALGEBRA	Patterns	Reasoning

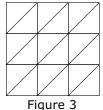
# Sequence of figures with triangles: 7th figure

The three figures below are divided into small congruent triangles.









A. Complete the table below. First, fill in how many small triangles make

up Figure 3. Then, find the number of small triangles that would be needed for the 4th figure if the sequence of figures is extended.

Figure	Number of Small Triangles
1	2
2	8
3	
4	

B. The sequence of figures is extended to the 7th figure. How many small triangles would be needed for Figure 7?

Answer:	
Answer:	

C. The sequence of figures is extended to the 50th figure. Explain a way to find the number of small triangles in the 50th figure that does not involve drawing it and counting the number of triangles.

Item Number: M022261B

#### **SCORING**

#### **Correct Response**

• 98

#### **Incorrect Response**

- 49 [Multiplies 7 x 7]
- 58 [Series is 2, 8, 18, 28, 38...7th term is 58]
- · Other incorrect (including crossed out/erased, stray marks, illegible, or off task).

## **Overall Percent Correct**

Korea, Republic of	60	
Singapore	56	
Chinese Taipei	56	
Hong Kong, SAR	56	
Japan	55	
Armenia	42	
Netherlands	40	
Australia	33	
Scotland	31	<b>A</b>
Hungary	30	
United States	30	
New Zealand	29	
Belgium (Flemish)	28	_
Sweden	26	<u> </u>
England	25	0
Malaysia	24	0
Estonia	24	0
Italy	24	0
Russian Federation	23	0
Slovenia	22	0
Slovak Republic	22	0
International average	22	
Moldova, Republic of	20	0
Israel	20	O
Lithuania	19	0
Romania	19	Ο
2.0.1001110		O O
Romania	19 19 19	0 0
Romania Latvia	19 19 19 17	0 0
Romania Latvia Serbia and Montenegro	19 19 19	0 0
Romania Latvia Serbia and Montenegro Cyprus	19 19 19 17	0 0
Romania Latvia Serbia and Montenegro Cyprus Bulgaria	19 19 19 17 16	0 0
Romania Latvia Serbia and Montenegro Cyprus Bulgaria Indonesia	19 19 19 17 16	0 0
Romania Latvia Serbia and Montenegro Cyprus Bulgaria Indonesia Norway	19 19 19 17 16 15	0 0
Romania Latvia Serbia and Montenegro Cyprus Bulgaria Indonesia Norway Jordan	19 19 19 17 16 15 14	0 0
Romania Latvia Serbia and Montenegro Cyprus Bulgaria Indonesia Norway Jordan Philippines	19 19 19 17 16 15 14 12	0 0
Romania Latvia Serbia and Montenegro Cyprus Bulgaria Indonesia Norway Jordan Philippines Palestinian Nat'l Auth.	19 19 19 17 16 15 14 12 11	0 0
Romania Latvia Serbia and Montenegro Cyprus Bulgaria Indonesia Norway Jordan Philippines Palestinian Nat'l Auth. Macedonia, Republic of	19 19 19 17 16 15 14 12 11 11	0 0
Romania Latvia Serbia and Montenegro Cyprus Bulgaria Indonesia Norway Jordan Philippines Palestinian Nat'l Auth. Macedonia, Republic of Chile	19 19 19 17 16 15 14 12 11 11 10 9	O O
Romania Latvia Serbia and Montenegro Cyprus Bulgaria Indonesia Norway Jordan Philippines Palestinian Nat'l Auth. Macedonia, Republic of Chile Egypt	19 19 19 17 16 15 14 12 11 11 10 9	0 0
Romania Latvia Serbia and Montenegro Cyprus Bulgaria Indonesia Norway Jordan Philippines Palestinian Nat'l Auth. Macedonia, Republic of Chile Egypt Bahrain	19 19 19 17 16 15 14 12 11 11 10 9	0 0 0 * * * * * * * * *
Romania Latvia Serbia and Montenegro Cyprus Bulgaria Indonesia Norway Jordan Philippines Palestinian Nat'l Auth. Macedonia, Republic of Chile Egypt Bahrain Iran, Islamic Republic of	19 19 19 17 16 15 14 12 11 11 10 9 9 8 7	0 0 0 1 1 1 1 1
Romania Latvia Serbia and Montenegro Cyprus Bulgaria Indonesia Norway Jordan Philippines Palestinian Nat'l Auth. Macedonia, Republic of Chile Egypt Bahrain Iran, Islamic Republic of Morocco	19 19 19 17 16 15 14 12 11 10 9 8 7	0 0 0 * * * * * * * * *
Romania Latvia Serbia and Montenegro Cyprus Bulgaria Indonesia Norway Jordan Philippines Palestinian Nat'l Auth. Macedonia, Republic of Chile Egypt Bahrain Iran, Islamic Republic of Morocco Lebanon Botswana	19 19 19 17 16 15 14 12 11 10 9 8 7 7	0 0 0 * * * * * * * * *
Romania Latvia Serbia and Montenegro Cyprus Bulgaria Indonesia Norway Jordan Philippines Palestinian Nat'l Auth. Macedonia, Republic of Chile Egypt Bahrain Iran, Islamic Republic of Morocco Lebanon	19 19 19 17 16 15 14 12 11 10 9 9 8 7 7 6 5	0 0 0 * * * * * * * * *
Romania Latvia Serbia and Montenegro Cyprus Bulgaria Indonesia Norway Jordan Philippines Palestinian Nat'l Auth. Macedonia, Republic of Chile Egypt Bahrain Iran, Islamic Republic of Morocco Lebanon Botswana South Africa Tunisia	19 19 19 17 16 15 14 12 11 10 9 8 7 7 6 5 4 2	0 0 0 * * * * * * * * *
Romania Latvia Serbia and Montenegro Cyprus Bulgaria Indonesia Norway Jordan Philippines Palestinian Nat'l Auth. Macedonia, Republic of Chile Egypt Bahrain Iran, Islamic Republic of Morocco Lebanon Botswana South Africa Tunisia Ghana	19 19 19 17 16 15 14 12 11 10 9 8 7 7 6 5 4 2	0 0 0
Romania Latvia Serbia and Montenegro Cyprus Bulgaria Indonesia Norway Jordan Philippines Palestinian Nat'l Auth. Macedonia, Republic of Chile Egypt Bahrain Iran, Islamic Republic of Morocco Lebanon Botswana South Africa Tunisia	19 19 19 17 16 15 14 12 11 10 9 8 7 7 6 5 4 2	0 0 0 1 1 1 1 1

Country average vs. International average:

Sequence of figures with triangles: 7th figure (continued)

Item Number: M022261B

# **Student Responses**

## **Correct Response:**

The three figures below are divided into small congruent triangles.

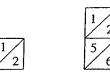


Figure 1

1 2 3 5 7 8

Figure 2

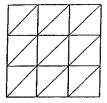


Figure 3

b) The sequence of figures is extended to the 7th figure. How many small triangles would be needed for Figure 7?

Answer: 98

## **Incorrect Response:**

The three figures below are divided into small congruent triangles.

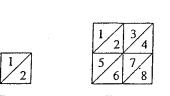


Figure 1

Figure 2

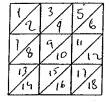


Figure 3

b) The sequence of figures is extended to the 7th figure. How many small triangles would be needed for Figure 7?

58
Answer: \_\_\_\_\_

Content Domain	Main Topic	Cognitive Domain
A. ALGEBRA	Patterns	Solving Routine Problems
B. ALGEBRA	Patterns	Solving Routine Problems
C. ALGEBRA	Patterns	Reasoning

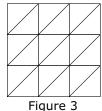
# Sequence of figures with triangles: 50th figure

The three figures below are divided into small congruent triangles.





1 3 4 5 7 6 8



A. Complete the table below. First, fill in how many small triangles make up Figure 3. Then, find the number of small triangles that would be needed for the 4th figure if the sequence of figures is extended.

Figure	Number of Small Triangles
1	2
2	8
3	
4	

B. The sequence of figures is extended to the 7th figure. How many small triangles would be needed for Figure 7?

Δηςπον		

C. The sequence of figures is extended to the 50th figure. Explain a way to find the number of small triangles in the 50th figure that does not involve drawing it and counting the number of triangles.

Item Number: M022261C

#### **SCORING**

#### **Correct Response**

- · Correct general (i.e., literal) expression, e.g., 2n2, or equivalent expressed in words.
- 2 x 502 OR 2 x 50 x 50 OR 100 x 50 OR (50 + 50) x 50 OR equivalent expressed in words (disregard errors in computation).

#### **Partial Response**

- Derives answer (5000) without showing work.
- · Other partially correct.

#### Incorrect Response

- 50 x 2 OR 100
- 50 x 50 OR 2,500
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task).

# **Overall Percent Correct**

Chinese Taipei	49	<b>A</b>
Korea, Republic of	48	
Hong Kong, SAR	45	
Singapore	44	
Japan	44	
Netherlands	36	
Australia	26	
Hungary	24	<b>A</b>
Scotland	22	
Belgium (Flemish)	21	
England	20	<b>A</b>
United States	19	<u> </u>
Sweden	17	<u> </u>
New Zealand	16	0
Estonia	15	0
Slovak Republic	14	0
International average	14	
Italy	14	0
Latvia	13	0
Slovenia	13	0
Serbia and Montenegro	11	▼
Lithuania	11	<b>*</b>
Romania	11	0
Malaysia	10	_
Israel	10	Ž
	10	Ž
Cyprus	9	Ž
Norway Russian Federation	9	_
	_	
Armenia	8	_
Indonesia	7	
Chile	6	
Jordan	5	_
Egypt	5	_
Palestinian Nat'l Auth.	5	
Macedonia, Republic of	4	_
Philippines	4	_
Bulgaria	4	_
Bahrain	4	* * * * * * * * * * * * * * * * * * *
Iran, Islamic Republic of	3	_
Morocco	2	_
Botswana	2	▼
South Africa	1	_
Tunisia	1	<b>V</b>
Lebanon	1	•
Ghana	1	* * * * * * * * * * * * * * * * * * *
Saudi Arabia	0	<b>V</b>
Moldova, Republic of	0	•

# Country average vs. International average:

Higher	
Not different	O
Lower	_

## Sequence of figures with triangles/50th figure (continued)

Item Number: M022261C

# **Student Responses**

## **Correct Response:**

The three figures below are divided into small congruent triangles.

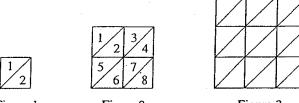


Figure 1

Figure

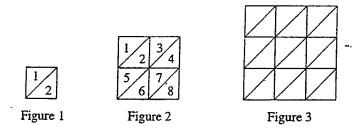
Figure 3

c) The sequence of figures is extended to the 50th figure. Explain a way to find the number of small triangles in the 50th figure that does not involve drawing it and counting the number of triangles.

5000 Multiply the figure by itself and then multiply the answer you get by two.

## **Partial Response:**

The three figures below are divided into small congruent triangles.



c) The sequence of figures is extended to the 50th figure. Explain a way to find the number of small triangles in the 50th figure that does not involve drawing it and counting the number of triangles.

500

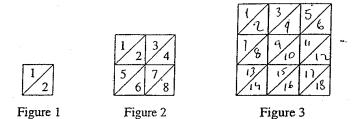
# Sequence of figures with triangles/50th figure (continued)

Item Number: M022261C

# **Student Responses** (continued)

## **Incorrect Response:**

The three figures below are divided into small congruent triangles.

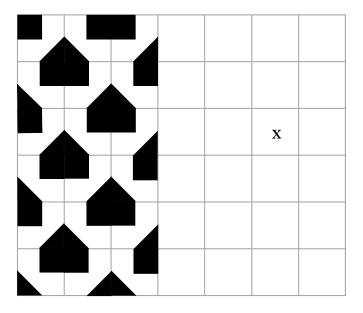


c) The sequence of figures is extended to the 50th figure. Explain a way to find the number of small triangles in the 50th figure that does not involve drawing it and counting the number of triangles.

Content Domain	Main Topic	Cognitive Domain
ALGEBRA	Patterns	Using Concepts

# Geometry tiling: identify cell with letter

If the pattern on the grid below was continued, what letter would identify the orientation of the tile in the cell labeled **X**?



Answer:			
Answer:			

Item Number: M032744

## **SCORING**

#### **Correct Response**

• D (including drawing of tile D).

## **Incorrect Response**

- A, B, or C (including drawings).
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task).

## **Overall Percent Correct**

Japan	73	
Korea, Republic of	66	
Singapore	62	
Sweden	57	
Hong Kong, SAR	57	
Netherlands	55	
Chinese Taipei	55	
Estonia	55	
Hungary	54	
Scotland	54	
Australia	53	
New Zealand	51	
Belgium (Flemish)	50	
United States	48	
England	47	
Slovak Republic	46	
Latvia	45	
Malaysia	44	
Slovenia	43	
Russian Federation	39	
Norway	36	O
Italy	34	O
Israel	34	0
International average	32	

international average		
Bulgaria	30	0
Romania	29	0
Lithuania	27	0
Cyprus	24	$\blacksquare$
Chile	23	$\blacksquare$
Bahrain	22	$\blacksquare$
Serbia and Montenegro	20	$\blacksquare$
Jordan	16	$\blacksquare$
Moldova, Republic of	15	* * * * * * * * * * * * * * * * * * *
Philippines	14	$\blacksquare$
Iran, Islamic Republic of	13	$\blacksquare$
Macedonia, Republic of	13	$\blacksquare$
Indonesia	11	$\blacksquare$
Lebanon	10	$\blacksquare$
South Africa	8	* * * * * * * * * * * * * * * * * * *
Saudi Arabia	8	$\blacksquare$
Morocco	7	$\blacksquare$
Egypt	7	$\blacksquare$
Botswana	7	$\blacksquare$
Armenia	6	$\blacksquare$
Palestinian Nat'l Auth.	3	$\blacksquare$
Tunisia	2	$\blacksquare$

Country average vs. International average:

Higher	
Not different	
Lower	<b>\</b>

Geometry tiling: identify cell with letter (continued)

Item Number: M032744

# **Student Responses**

## **Correct Response:**

If the pattern on the grid below was continued, what letter yould identify the orientation of the tile in the cell labeled X?

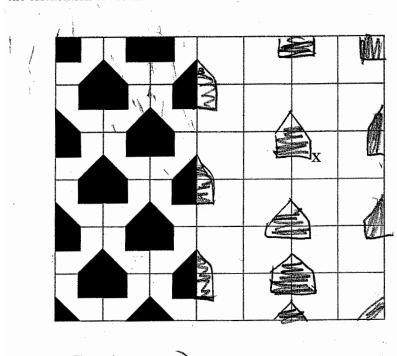
Geometry tiling: identify cell with letter (continued)

Item Number: M032744

# **Student Responses** (continued)

## **Incorrect Response:**

If the pattern on the grid below was continued, what letter would identify the orientation of the tile in the cell labeled X?



Content Domain	Main Topic	Cognitive Domain
ALGEBRA	Relationships	Reasoning

# Sets of ordered pairs of numbers

(3, 6), (6, 15), (8, 21)

Which of these describes how to get the second number from the first number in every ordered pair above?

- $\bigcirc$  Add 3
- (B) Subtract 3
- © Multiply by 2
- (D) Multiply by 2 and then add 3
- (E) Multiply by 3 and then subtract 3

Item Number: M012029

**Correct Response:** 

Ε

# **Overall Percent Correct**

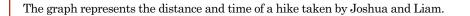
Korea, Republic of	85	<b>A</b>
Japan	76	<b>A</b>
Hungary	75	<b>A</b>
Estonia	74	<b>A</b>
Chinese Taipei	71	<b>A</b>
Singapore	71	
Hong Kong, SAR	71	
Latvia	71	<b>A</b>
Australia	70	
Russian Federation	69	
Scotland	69	
United States	68	
Netherlands	68	
New Zealand	67	
England	64	<b>A</b>
Lithuania	64	<b>A</b>
Belgium (Flemish)	62	<u> </u>
Serbia and Montenegro	58	<u> </u>
Israel	57	<u> </u>
Slovak Republic	56	
Bulgaria	54	0
Slovenia	53	0
Italy	51	0
,	51 51	0
Malaysia		U
International average	EΛ	
International average	<b>50</b>	_
Jordan	46	<b>V</b>
Jordan Sweden	46 45	▼
Jordan Sweden Macedonia, Republic of	46 45 42	▼
Jordan Sweden Macedonia, Republic of Romania	46 45 42 42	▼
Jordan Sweden Macedonia, Republic of Romania Norway	46 45 42 42 40	▼
Jordan Sweden Macedonia, Republic of Romania Norway Moldova, Republic of	46 45 42 42 40 39	▼
Jordan Sweden Macedonia, Republic of Romania Norway Moldova, Republic of Bahrain	46 45 42 42 40 39 38	▼
Jordan Sweden Macedonia, Republic of Romania Norway Moldova, Republic of Bahrain Botswana	46 45 42 42 40 39 38 36	▼
Jordan Sweden Macedonia, Republic of Romania Norway Moldova, Republic of Bahrain Botswana Iran, Islamic Republic of	46 45 42 42 40 39 38 36 35	▼
Jordan Sweden Macedonia, Republic of Romania Norway Moldova, Republic of Bahrain Botswana Iran, Islamic Republic of Armenia	46 45 42 42 40 39 38 36 35 34	▼
Jordan Sweden Macedonia, Republic of Romania Norway Moldova, Republic of Bahrain Botswana Iran, Islamic Republic of Armenia Egypt	46 45 42 42 40 39 38 36 35 34 33	▼
Jordan Sweden Macedonia, Republic of Romania Norway Moldova, Republic of Bahrain Botswana Iran, Islamic Republic of Armenia Egypt Indonesia	46 45 42 40 39 38 36 35 34 33	▼
Jordan Sweden Macedonia, Republic of Romania Norway Moldova, Republic of Bahrain Botswana Iran, Islamic Republic of Armenia Egypt Indonesia Palestinian Nat'l Auth.	46 45 42 40 39 38 36 35 34 33 33	* * * * * * * * * * * * * * * * * * *
Jordan Sweden Macedonia, Republic of Romania Norway Moldova, Republic of Bahrain Botswana Iran, Islamic Republic of Armenia Egypt Indonesia	46 45 42 40 39 38 36 35 34 33	▼
Jordan Sweden Macedonia, Republic of Romania Norway Moldova, Republic of Bahrain Botswana Iran, Islamic Republic of Armenia Egypt Indonesia Palestinian Nat'l Auth.	46 45 42 40 39 38 36 35 34 33 33 31 26	* * * * * * * * * * * * * * * * * * *
Jordan Sweden Macedonia, Republic of Romania Norway Moldova, Republic of Bahrain Botswana Iran, Islamic Republic of Armenia Egypt Indonesia Palestinian Nat'l Auth. Philippines Saudi Arabia Cyprus	46 45 42 40 39 38 36 35 34 33 33 33	* * * * * * * * * * * * * * * * * * *
Jordan Sweden Macedonia, Republic of Romania Norway Moldova, Republic of Bahrain Botswana Iran, Islamic Republic of Armenia Egypt Indonesia Palestinian Nat'l Auth. Philippines Saudi Arabia	46 45 42 40 39 38 36 35 34 33 33 31 26	* * * * * * * * * * * * * * * * * * *
Jordan Sweden Macedonia, Republic of Romania Norway Moldova, Republic of Bahrain Botswana Iran, Islamic Republic of Armenia Egypt Indonesia Palestinian Nat'l Auth. Philippines Saudi Arabia Cyprus	46 45 42 40 39 38 36 35 34 33 33 31 26 25	* * * * * * * * * * * * * * * * * * *
Jordan Sweden Macedonia, Republic of Romania Norway Moldova, Republic of Bahrain Botswana Iran, Islamic Republic of Armenia Egypt Indonesia Palestinian Nat'l Auth. Philippines Saudi Arabia Cyprus Chile	46 45 42 40 39 38 36 35 34 33 33 31 26 25 24	* * * * * * * * * * * * * * * * * * *
Jordan Sweden Macedonia, Republic of Romania Norway Moldova, Republic of Bahrain Botswana Iran, Islamic Republic of Armenia Egypt Indonesia Palestinian Nat'l Auth. Philippines Saudi Arabia Cyprus Chile Ghana	46 45 42 40 39 38 36 35 34 33 33 31 26 25 24 23	* * * * * * * * * * * * * * * * * * *
Jordan Sweden Macedonia, Republic of Romania Norway Moldova, Republic of Bahrain Botswana Iran, Islamic Republic of Armenia Egypt Indonesia Palestinian Nat'l Auth. Philippines Saudi Arabia Cyprus Chile Ghana Lebanon	46 45 42 40 39 38 36 35 34 33 33 31 26 25 24 23 23	* * * * * * * * * * * * * * * * * * *
Jordan Sweden Macedonia, Republic of Romania Norway Moldova, Republic of Bahrain Botswana Iran, Islamic Republic of Armenia Egypt Indonesia Palestinian Nat'l Auth. Philippines Saudi Arabia Cyprus Chile Ghana Lebanon	46 45 42 40 39 38 36 35 34 33 33 31 26 25 24 23 23	* * * * * * * * * * * * * * * * * * *

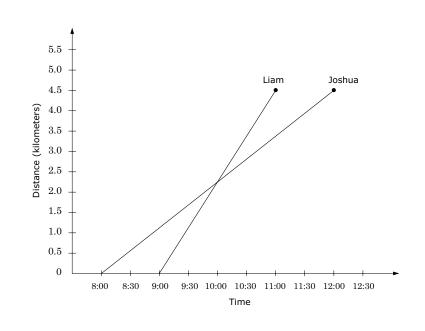
Country average vs. International average:

O ▼

Content Domain	Main Topic	Cognitive Domain
ALGEBRA	Relationships	Solving Routine Problems

# Intersection point of distance/time graphs





If they both started from the same place and walked in the same direction, at what time did they meet?

- (A) 8:00
- (B) 8:30
- © 9:00
- (D) 10:00
- (E) 11:00

Item Number: M012025

**Correct Response:** 

D

## **Overall Percent Correct**

Japan	96	
Hong Kong, SAR	90	<b>A</b>
Korea, Republic of	89	<b>A</b>
Estonia	88	<b>A</b>
Singapore	87	
Hungary	84	
Lithuania	84	<b>A</b>
Sweden	84	<b>A</b>
Russian Federation	81	<b>A</b>
Netherlands	81	
Chinese Taipei	81	<b>A</b>
England	81	<b>A</b>
United States	80	<b>A</b>
Slovenia	79	<b>A</b>
Latvia	78	<b>A</b>
Italy	75	<b>A</b>
Australia	75	<b>A</b>
Belgium (Flemish)	73	<b>A</b>
Scotland	73	<b>A</b>
New Zealand	72	<b>A</b>
Israel	72	<b>A</b>
Slovak Republic	70	<b>A</b>
Serbia and Montenegro	68	<b>A</b>
Bulgaria	67	<b>A</b>
Monagay	64	0
Norway		U
International average	62	
International average Cyprus	<b>62</b> 58	0
International average Cyprus Romania	<b>62</b> 58 58	0
International average Cyprus Romania Macedonia, Republic of	<b>62</b> 58 58 53	0 0 •
International average Cyprus Romania Macedonia, Republic of Malaysia	58 58 58 53	0 0 •
International average Cyprus Romania Macedonia, Republic of Malaysia Jordan	58 58 58 53 53 52	0 0 •
International average Cyprus Romania Macedonia, Republic of Malaysia Jordan Armenia	58 58 53 53 52 52	0 0 •
International average Cyprus Romania Macedonia, Republic of Malaysia Jordan Armenia Chile	58 58 53 53 52 52 51	0 0 •
International average Cyprus Romania Macedonia, Republic of Malaysia Jordan Armenia Chile Bahrain	58 58 53 53 52 52 52 51	0 0 •
International average Cyprus Romania Macedonia, Republic of Malaysia Jordan Armenia Chile Bahrain Egypt	58 58 53 53 52 52 51 50 47	0 0 •
International average Cyprus Romania Macedonia, Republic of Malaysia Jordan Armenia Chile Bahrain Egypt Moldova, Republic of	58 58 53 53 52 52 51 50 47	0 0 •
International average Cyprus Romania Macedonia, Republic of Malaysia Jordan Armenia Chile Bahrain Egypt Moldova, Republic of Indonesia	58 58 53 53 52 52 51 50 47 47 46	0 0 •
International average Cyprus Romania Macedonia, Republic of Malaysia Jordan Armenia Chile Bahrain Egypt Moldova, Republic of Indonesia Lebanon	58 58 53 53 52 52 51 50 47 47 46 42	0 0 •
International average Cyprus Romania Macedonia, Republic of Malaysia Jordan Armenia Chile Bahrain Egypt Moldova, Republic of Indonesia Lebanon Botswana	58 58 53 53 52 52 51 50 47 47 46 42 41	0
International average Cyprus Romania Macedonia, Republic of Malaysia Jordan Armenia Chile Bahrain Egypt Moldova, Republic of Indonesia Lebanon Botswana Palestinian Nat'l Auth.	58 58 53 53 52 52 51 50 47 47 46 42 41 39	0 0 •
International average Cyprus Romania Macedonia, Republic of Malaysia Jordan Armenia Chile Bahrain Egypt Moldova, Republic of Indonesia Lebanon Botswana Palestinian Nat'l Auth. Saudi Arabia	58 58 53 53 52 52 51 50 47 47 46 42 41 39 37	0 0 •
International average Cyprus Romania Macedonia, Republic of Malaysia Jordan Armenia Chile Bahrain Egypt Moldova, Republic of Indonesia Lebanon Botswana Palestinian Nat'l Auth. Saudi Arabia Philippines	58 58 53 53 52 52 51 50 47 47 46 42 41 39 37 31	0 0 •
International average Cyprus Romania Macedonia, Republic of Malaysia Jordan Armenia Chile Bahrain Egypt Moldova, Republic of Indonesia Lebanon Botswana Palestinian Nat'l Auth. Saudi Arabia Philippines Iran, Islamic Republic of	58 58 53 52 52 51 50 47 46 42 41 39 37 31 26	0 0 •
International average Cyprus Romania Macedonia, Republic of Malaysia Jordan Armenia Chile Bahrain Egypt Moldova, Republic of Indonesia Lebanon Botswana Palestinian Nat'l Auth. Saudi Arabia Philippines Iran, Islamic Republic of Ghana	52 58 53 53 52 52 51 50 47 46 42 41 39 37 31 26 21	0 0 •
International average Cyprus Romania Macedonia, Republic of Malaysia Jordan Armenia Chile Bahrain Egypt Moldova, Republic of Indonesia Lebanon Botswana Palestinian Nat'l Auth. Saudi Arabia Philippines Iran, Islamic Republic of Ghana South Africa	52 58 53 53 52 52 51 50 47 47 46 42 41 39 37 31 26 21	0 0 •
International average Cyprus Romania Macedonia, Republic of Malaysia Jordan Armenia Chile Bahrain Egypt Moldova, Republic of Indonesia Lebanon Botswana Palestinian Nat'l Auth. Saudi Arabia Philippines Iran, Islamic Republic of Ghana	52 58 53 53 52 52 51 50 47 46 42 41 39 37 31 26 21	0 0 •
International average Cyprus Romania Macedonia, Republic of Malaysia Jordan Armenia Chile Bahrain Egypt Moldova, Republic of Indonesia Lebanon Botswana Palestinian Nat'l Auth. Saudi Arabia Philippines Iran, Islamic Republic of Ghana South Africa	52 58 53 53 52 52 51 50 47 47 46 42 41 39 37 31 26 21	0 0 •

Country average vs. International average:

0

•

Content Domain	Main Topic	Cognitive Domain
DATA	Data Interpretation	Reasoning

### Test score frequency table

The table shows scores for a class on a 10-point test.

Test Score	Tally	Frequency
4	/	1
5	///	3
6	///// /	6
7	//	2
8	////	4
9	///	3
10	/	1

How many in the class had a score greater than 7?

- A 2
- (B) 8
- (c) 10
- (D) 12
- (F) 20

Item Number: M012037

**Correct Response:** 

В

### **Overall Percent Correct**

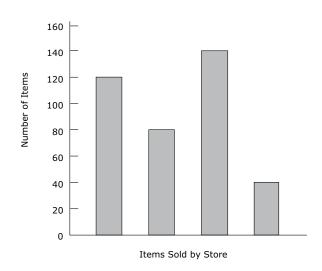
Korea, Republic of	85	
Netherlands	77	
Slovenia	68	
Belgium (Flemish)	67	
Sweden	65	<b>A</b>
United States	65	<u> </u>
Scotland	64	<u> </u>
Singapore	63	<u> </u>
Lithuania	61	
Israel	59	<b>A</b>
		<b>A</b>
New Zealand	59	
England	58	<b>A</b>
Estonia	58	<b>A</b>
Australia	56	<b>A</b>
Hungary	56	<b>A</b>
Serbia and Montenegro	56	<b>A</b>
Norway	55	
Indonesia	53	
Latvia	53	
Russian Federation	52	0
Bahrain	51	0
Chinese Taipei	51	0
Macedonia, Republic of	51	0
Slovak Republic	49	0
•	48	0
Hong Kong, SAR	48 48	0
Hong Kong, SAR International average	48	
Hong Kong, SAR International average Malaysia	<b>48</b> 47	0
Hong Kong, SAR International average Malaysia Romania	<b>48</b> 47 47	0
Hong Kong, SAR International average Malaysia Romania Jordan	48 47 47 46	0 0 0
Hong Kong, SAR International average Malaysia Romania Jordan Italy	48 47 47 46 45	0 0 0
Hong Kong, SAR International average Malaysia Romania Jordan Italy Japan	48 47 47 46 45 44	0 0 0
Hong Kong, SAR International average Malaysia Romania Jordan Italy Japan Cyprus	48 47 47 46 45 44 42	0 0 0
Hong Kong, SAR International average Malaysia Romania Jordan Italy Japan Cyprus Egypt	48 47 47 46 45 44 42 42	0 0 0
Hong Kong, SAR International average Malaysia Romania Jordan Italy Japan Cyprus Egypt Iran, Islamic Republic of	48 47 47 46 45 44 42 42 42	0 0 0
Hong Kong, SAR International average Malaysia Romania Jordan Italy Japan Cyprus Egypt Iran, Islamic Republic of Armenia	48 47 47 46 45 44 42 42 42 39	0 0 0
Hong Kong, SAR International average Malaysia Romania Jordan Italy Japan Cyprus Egypt Iran, Islamic Republic of Armenia Philippines	48 47 47 46 45 44 42 42 42 39 39	0 0 0
Hong Kong, SAR International average Malaysia Romania Jordan Italy Japan Cyprus Egypt Iran, Islamic Republic of Armenia	48 47 47 46 45 44 42 42 42 39	0 0 0
Hong Kong, SAR International average Malaysia Romania Jordan Italy Japan Cyprus Egypt Iran, Islamic Republic of Armenia Philippines Palestinian Nat'l Auth. Tunisia	48 47 47 46 45 44 42 42 42 39 39 36 35	0 0 0 0 •
Hong Kong, SAR International average Malaysia Romania Jordan Italy Japan Cyprus Egypt Iran, Islamic Republic of Armenia Philippines Palestinian Nat'l Auth.	48 47 47 46 45 44 42 42 42 39 39 36	0 0 0
Hong Kong, SAR International average Malaysia Romania Jordan Italy Japan Cyprus Egypt Iran, Islamic Republic of Armenia Philippines Palestinian Nat'l Auth. Tunisia	48 47 47 46 45 44 42 42 42 39 39 36 35	0 0 0 0 •
Hong Kong, SAR International average Malaysia Romania Jordan Italy Japan Cyprus Egypt Iran, Islamic Republic of Armenia Philippines Palestinian Nat'l Auth. Tunisia Bulgaria	48 47 47 46 45 44 42 42 42 39 39 36 35 34	0 0 0 0 •
Hong Kong, SAR International average Malaysia Romania Jordan Italy Japan Cyprus Egypt Iran, Islamic Republic of Armenia Philippines Palestinian Nat'l Auth. Tunisia Bulgaria Botswana	48 47 47 46 45 44 42 42 42 39 39 36 35 34 33	0 0 0 0 0 0 0 0 0
Hong Kong, SAR International average Malaysia Romania Jordan Italy Japan Cyprus Egypt Iran, Islamic Republic of Armenia Philippines Palestinian Nat'l Auth. Tunisia Bulgaria Botswana Chile	48 47 47 46 45 44 42 42 42 39 36 35 34 33 33	0 0 0 0 0 0 0 0 0
Hong Kong, SAR International average Malaysia Romania Jordan Italy Japan Cyprus Egypt Iran, Islamic Republic of Armenia Philippines Palestinian Nat'l Auth. Tunisia Bulgaria Botswana Chile Lebanon	48 47 47 46 45 44 42 42 42 39 36 35 34 33 33 31	0 0 0 0 0 0 0 0 0
Hong Kong, SAR International average Malaysia Romania Jordan Italy Japan Cyprus Egypt Iran, Islamic Republic of Armenia Philippines Palestinian Nat'l Auth. Tunisia Bulgaria Botswana Chile Lebanon Moldova, Republic of	48 47 47 46 45 44 42 42 42 39 36 35 34 33 31 31	0 0 0 0 0 0 0 0 0
International average Malaysia Romania Jordan Italy Japan Cyprus Egypt Iran, Islamic Republic of Armenia Philippines Palestinian Nat'l Auth. Tunisia Bulgaria Botswana Chile Lebanon Moldova, Republic of Ghana	48 47 47 46 45 44 42 42 42 39 36 35 34 33 31 31 27	0 0 0 0 0 0 0 0 0
International average Malaysia Romania Jordan Italy Japan Cyprus Egypt Iran, Islamic Republic of Armenia Philippines Palestinian Nat'l Auth. Tunisia Bulgaria Botswana Chile Lebanon Moldova, Republic of Ghana Saudi Arabia	48 47 47 46 45 44 42 42 42 39 36 35 34 33 31 31 27 26	0 0 0 0 •

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
DATA	Data interpretation	Reasoning

### How many pencils sold from bar graph

The graph shows the number of pens, pencils, rulers, and erasers sold by a store in one week.



The names of the items are missing from the graph. Pens were the item most often sold, and fewer erasers than any other item were sold. More pencils than rulers were sold. How many pencils were sold?

(A) 40

(B) 80

© 120

(D) 140

Item Number: M022189

**Correct Response:** 

C

### **Overall Percent Correct**

Belgium (Flemish)	90	
Chinese Taipei	89	
Japan	88	
Hong Kong, SAR	88	
Korea, Republic of	87	
Malaysia	87	
Estonia	87	
Slovenia	86	
United States	86	
Sweden	86	
Netherlands	85	
Hungary	85	
Scotland	84	
Singapore	83	
Latvia	82	
Slovak Republic	80	
Russian Federation	80	
Italy	80	<b>A</b>
Norway	78	<b>A</b>
England	78	
New Zealand	78	
Lithuania	77	
Cyprus	76	
Australia	76	
Israel	76 70	<b>▲</b> O
Israel International average	70 <b>67</b>	0
Israel International average Bulgaria	70 <b>67</b> 67	0
Israel International average Bulgaria Bahrain	70 <b>67</b> 67 66	0 0 0
Israel International average Bulgaria Bahrain Serbia and Montenegro	70 <b>67</b> 67	0 0 0 •
Israel International average Bulgaria Bahrain Serbia and Montenegro Moldova, Republic of	70 <b>67</b> 67 66 63 62	0 0 0 •
Israel International average Bulgaria Bahrain Serbia and Montenegro Moldova, Republic of Iran, Islamic Republic of	70 <b>67</b> 66 63 62 61	<ul><li>○</li><li>○</li><li>○</li><li>▼</li><li>▼</li></ul>
Israel International average Bulgaria Bahrain Serbia and Montenegro Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of	70 <b>67</b> 66 63 62 61 59	<ul><li>○</li><li>○</li><li>○</li><li>▼</li><li>▼</li></ul>
Israel International average Bulgaria Bahrain Serbia and Montenegro Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Romania	70 67 66 63 62 61 59	<ul><li>○</li><li>○</li><li>○</li><li>▼</li><li>▼</li></ul>
Israel International average Bulgaria Bahrain Serbia and Montenegro Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Romania Jordan	70 67 66 63 62 61 59 59	0 0 • • •
Israel International average Bulgaria Bahrain Serbia and Montenegro Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Romania Jordan Morocco	70 67 66 63 62 61 59 59 59	0 0 0 •
Israel International average Bulgaria Bahrain Serbia and Montenegro Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Romania Jordan Morocco Armenia	70 67 66 63 62 61 59 59 59 53 51	0 0 0 •
Israel International average Bulgaria Bahrain Serbia and Montenegro Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Romania Jordan Morocco	70 67 67 66 63 62 61 59 59 59 53 51 50	0 0 0 •
Israel International average Bulgaria Bahrain Serbia and Montenegro Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Romania Jordan Morocco Armenia Chile Egypt	70 67 66 63 62 61 59 59 59 53 51	0 0 0 •
Israel International average Bulgaria Bahrain Serbia and Montenegro Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Romania Jordan Morocco Armenia Chile Egypt Indonesia	70 67 67 66 63 62 61 59 59 59 53 51 50 49	0 0 0 V V V V V V
Israel International average Bulgaria Bahrain Serbia and Montenegro Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Romania Jordan Morocco Armenia Chile Egypt Indonesia Palestinian Nat'l Auth.	70 67 67 66 63 62 61 59 59 59 53 51 50 49 49	0 0 0 V V V V V V
Israel International average Bulgaria Bahrain Serbia and Montenegro Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Romania Jordan Morocco Armenia Chile Egypt Indonesia	70 67 66 63 62 61 59 59 59 53 51 50 49 49 48 45	0 0 0 V V V V V V
International average Bulgaria Bahrain Serbia and Montenegro Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Romania Jordan Morocco Armenia Chile Egypt Indonesia Palestinian Nat'l Auth. Saudi Arabia Lebanon	70 67 66 63 62 61 59 59 59 53 51 50 49 49 48 45 42	0 0 0 V V V V V V
Israel International average Bulgaria Bahrain Serbia and Montenegro Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Romania Jordan Morocco Armenia Chile Egypt Indonesia Palestinian Nat'l Auth. Saudi Arabia	70 67 66 63 62 61 59 59 59 53 51 50 49 48 45 42 40	0 0 0 V V V V V V
International average Bulgaria Bahrain Serbia and Montenegro Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Romania Jordan Morocco Armenia Chile Egypt Indonesia Palestinian Nat'l Auth. Saudi Arabia Lebanon Tunisia Botswana	70 67 66 63 62 61 59 59 59 53 51 50 49 48 45 42 40 37	0 0 0 •
International average Bulgaria Bahrain Serbia and Montenegro Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of Romania Jordan Morocco Armenia Chile Egypt Indonesia Palestinian Nat'l Auth. Saudi Arabia Lebanon Tunisia	70 67 66 63 62 61 59 59 59 53 51 50 49 48 45 42 40	0 0 0 V V V V V V

Country average vs. International average:

24

**○** 

Higher Not different Lower

Ghana

Content Domain	Main Topic	Cognitive Domain
DATA	Data interpretation	Reasoning

### Phone plans: least expensive plan for Betty

Betty talks for less than 2 hours per month. Which plan would be less expensive for her?
Less expensive plan
Explain your answer in terms of both the monthly fee and free minutes.

#### Item Number: M032762

#### **SCORING**

#### **Correct Response**

 Plan B with explanation that includes free minutes used and explicit reference to lower monthly fee for Plan B.

#### **Partial Response**

• Plan B with explicit reference to lower monthly fee and no reference to free minutes.

#### **Incorrect Response**

- Plan B with inadequate (only free minutes) or no explanation.
- Plan A with or without explanation.
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task).

### **Overall Percent Correct**

Japan	49	<b>A</b>
England	45	<u> </u>
Australia	44	_
Estonia	44	_ _
Korea, Republic of	40	<u> </u>
Singapore	40	_ _
Hungary	39	<u> </u>
Belgium (Flemish)	38	_
Lithuania	37	_
United States	37	_
Scotland	36	_
Israel	33	<b>A</b>
New Zealand	30	<b>A</b>
Netherlands	28	<b>A</b>
Hong Kong, SAR	28	
Slovenia	27	
Sweden	27	
Malaysia	27	<b>A</b>
Chinese Taipei	27	
Slovak Republic	26	
Italy	23	0
Latvia	22	0
International average	21	
Jordan	20	0
50.00		
Bahrain	18	0
Bahrain Norway		0
Bahrain Norway Romania	18 18 16	0
Bahrain Norway Romania Russian Federation	18 18 16 15	0
Bahrain Norway Romania Russian Federation Egypt	18 18 16 15	0
Bahrain Norway Romania Russian Federation Egypt Cyprus	18 18 16 15 14	0
Bahrain Norway Romania Russian Federation Egypt Cyprus Indonesia	18 18 16 15 14 13	0
Bahrain Norway Romania Russian Federation Egypt Cyprus Indonesia Serbia and Montenegro	18 18 16 15 14 13 12	0
Bahrain Norway Romania Russian Federation Egypt Cyprus Indonesia Serbia and Montenegro Chile	18 18 16 15 14 13 12 12	0
Bahrain Norway Romania Russian Federation Egypt Cyprus Indonesia Serbia and Montenegro Chile Bulgaria	18 18 16 15 14 13 12 12 12	0
Bahrain Norway Romania Russian Federation Egypt Cyprus Indonesia Serbia and Montenegro Chile Bulgaria Lebanon	18 18 16 15 14 13 12 12 12 12 11	0
Bahrain Norway Romania Russian Federation Egypt Cyprus Indonesia Serbia and Montenegro Chile Bulgaria Lebanon Philippines	18 18 16 15 14 13 12 12 12 11 11	0
Bahrain Norway Romania Russian Federation Egypt Cyprus Indonesia Serbia and Montenegro Chile Bulgaria Lebanon Philippines Macedonia, Republic of	18 18 16 15 14 13 12 12 12 12 11 11	0
Bahrain Norway Romania Russian Federation Egypt Cyprus Indonesia Serbia and Montenegro Chile Bulgaria Lebanon Philippines Macedonia, Republic of Saudi Arabia	18 18 16 15 14 13 12 12 12 12 11 11 10 8	0
Bahrain Norway Romania Russian Federation Egypt Cyprus Indonesia Serbia and Montenegro Chile Bulgaria Lebanon Philippines Macedonia, Republic of Saudi Arabia Morocco	18 18 16 15 14 13 12 12 12 12 11 11 10 8 7	
Bahrain Norway Romania Russian Federation Egypt Cyprus Indonesia Serbia and Montenegro Chile Bulgaria Lebanon Philippines Macedonia, Republic of Saudi Arabia Morocco South Africa	18 18 16 15 14 13 12 12 12 11 11 10 8 7 6	0
Bahrain Norway Romania Russian Federation Egypt Cyprus Indonesia Serbia and Montenegro Chile Bulgaria Lebanon Philippines Macedonia, Republic of Saudi Arabia Morocco South Africa Palestinian Nat'l Auth.	18 18 16 15 14 13 12 12 12 11 11 10 8 7 6	0
Bahrain Norway Romania Russian Federation Egypt Cyprus Indonesia Serbia and Montenegro Chile Bulgaria Lebanon Philippines Macedonia, Republic of Saudi Arabia Morocco South Africa Palestinian Nat'l Auth. Iran, Islamic Republic of	18 18 16 15 14 13 12 12 12 12 11 11 10 8 7 6 5	0
Bahrain Norway Romania Russian Federation Egypt Cyprus Indonesia Serbia and Montenegro Chile Bulgaria Lebanon Philippines Macedonia, Republic of Saudi Arabia Morocco South Africa Palestinian Nat'l Auth. Iran, Islamic Republic of Tunisia	18 18 16 15 14 13 12 12 12 12 11 11 10 8 7 6 5 4	0
Bahrain Norway Romania Russian Federation Egypt Cyprus Indonesia Serbia and Montenegro Chile Bulgaria Lebanon Philippines Macedonia, Republic of Saudi Arabia Morocco South Africa Palestinian Nat'l Auth. Iran, Islamic Republic of Tunisia Ghana	18 18 16 15 14 13 12 12 12 11 11 10 8 7 6 5 4 4 3	0
Bahrain Norway Romania Russian Federation Egypt Cyprus Indonesia Serbia and Montenegro Chile Bulgaria Lebanon Philippines Macedonia, Republic of Saudi Arabia Morocco South Africa Palestinian Nat'l Auth. Iran, Islamic Republic of Tunisia Ghana Botswana	18 18 16 15 14 13 12 12 12 11 11 10 8 7 6 5 4 4 3 2	0
Bahrain Norway Romania Russian Federation Egypt Cyprus Indonesia Serbia and Montenegro Chile Bulgaria Lebanon Philippines Macedonia, Republic of Saudi Arabia Morocco South Africa Palestinian Nat'l Auth. Iran, Islamic Republic of Tunisia Ghana Botswana Armenia	18 18 16 15 14 13 12 12 12 11 11 10 8 7 6 5 4 4 3 2 2	0
Bahrain Norway Romania Russian Federation Egypt Cyprus Indonesia Serbia and Montenegro Chile Bulgaria Lebanon Philippines Macedonia, Republic of Saudi Arabia Morocco South Africa Palestinian Nat'l Auth. Iran, Islamic Republic of Tunisia Ghana Botswana	18 18 16 15 14 13 12 12 12 11 11 10 8 7 6 5 4 4 3 2	0

# Country average vs. International average:

Higher	
Not different	0
Lower	_

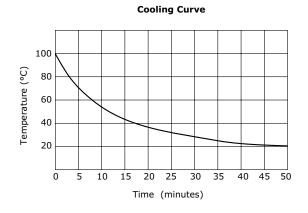
Phone plans: least expensive plan for Betty (continued) Item Number: M032762 **Student Responses Correct Response:** Betty talks for less than 2 hours per month. Which plan would be less expensive for her? Less expensive plan \_\_\_ Explain your answer in terms of both the monthly fee and free minutes. She talks for under anahours and it pays the least glds Questions for Phose Plans continue. **Partial Response:** Betty talks for less than 2 hours per month. Which plan would be less expensive for her? Less expensive plan <u>R</u> Explain your answer in terms of both the monthly fee and free minutes. **Incorrect Response:** Betty talks for less than 2 hours per month. Which plan would be less

expensive for her?	•			
Less expensive plan _	<u>B</u>			
Explain your answer i				
Since Betty	could fo	r zhrs u	hich 15	120 min
She will be	1. 400	C - 1-1-1	Pr A	acau 10

Content Domain	Main Topic	Cognitive Domain
DATA	Data interpretation	Solving Routine Problems

### Graph of cooling water

A beaker of water which has reached boiling point is allowed to cool. The temperature of the water is recorded at five minute intervals, and a temperature-time graph is drawn.



About how many minutes did it take for the water to cool the first 20 degrees?

- 3 (A)
- 8
- © 37
- (D) 50

Item Number: M022135

**Correct Response:** 

### **Overall Percent Correct**

Belgium (Flemish)	70	<b>A</b>
Sweden	62	<b>A</b>
Australia	59	<b>A</b>
Estonia	57	<b>A</b>
Hungary	56	<b>A</b>
Scotland	55	<b>A</b>
England	55	<b>A</b>
Norway	54	<b>A</b>
Singapore	54	<b>A</b>
Netherlands	53	<b>A</b>
United States	52	<b>A</b>
New Zealand	49	<b>A</b>
Lithuania	49	<b>A</b>
Latvia	47	
Chinese Taipei	45	<b>A</b>
Lebanon	40	<b>A</b>
Italy	40	<b>A</b>
Slovenia	39	<b>A</b>
Japan	39	<b>A</b>
Russian Federation	38	<b>A</b>
Israel	36	0
Indonesia	35	0
Armenia	35	0
Slovak Republic	34	0
Malaysia	33	0
International average	33	
International average Serbia and Montenegro	<b>33</b>	0
International average Serbia and Montenegro Bulgaria	33 33 32	0
International average Serbia and Montenegro Bulgaria Romania	33 33 32 30	0 0
International average Serbia and Montenegro Bulgaria Romania Moldova, Republic of	33 33 32 30 28	0 0
International average Serbia and Montenegro Bulgaria Romania Moldova, Republic of Hong Kong, SAR	33 33 32 30 28 26	0 0
International average Serbia and Montenegro Bulgaria Romania Moldova, Republic of Hong Kong, SAR Chile	33 33 32 30 28 26 25	0 0
International average Serbia and Montenegro Bulgaria Romania Moldova, Republic of Hong Kong, SAR Chile Cyprus	33 33 32 30 28 26 25 21	0 0
International average Serbia and Montenegro Bulgaria Romania Moldova, Republic of Hong Kong, SAR Chile Cyprus Jordan	33 33 32 30 28 26 25 21	0 0
International average Serbia and Montenegro Bulgaria Romania Moldova, Republic of Hong Kong, SAR Chile Cyprus Jordan Iran, Islamic Republic of	33 33 32 30 28 26 25 21 18	0 0
International average Serbia and Montenegro Bulgaria Romania Moldova, Republic of Hong Kong, SAR Chile Cyprus Jordan Iran, Islamic Republic of Macedonia, Republic of	33 33 32 30 28 26 25 21 18 18	0 0
International average Serbia and Montenegro Bulgaria Romania Moldova, Republic of Hong Kong, SAR Chile Cyprus Jordan Iran, Islamic Republic of Macedonia, Republic of South Africa	33 33 32 30 28 26 25 21 18 18 17	0 0
International average Serbia and Montenegro Bulgaria Romania Moldova, Republic of Hong Kong, SAR Chile Cyprus Jordan Iran, Islamic Republic of Macedonia, Republic of South Africa Palestinian Nat'l Auth.	33 33 32 30 28 26 25 21 18 18 17 14	0 0 0 V V V
International average Serbia and Montenegro Bulgaria Romania Moldova, Republic of Hong Kong, SAR Chile Cyprus Jordan Iran, Islamic Republic of Macedonia, Republic of South Africa Palestinian Nat'l Auth. Ghana	33 33 32 30 28 26 25 21 18 18 17 14 14	0 0
International average Serbia and Montenegro Bulgaria Romania Moldova, Republic of Hong Kong, SAR Chile Cyprus Jordan Iran, Islamic Republic of Macedonia, Republic of South Africa Palestinian Nat'l Auth. Ghana Botswana	33 33 32 30 28 26 25 21 18 18 17 14 14 13	0 0 0 V V V
International average Serbia and Montenegro Bulgaria Romania Moldova, Republic of Hong Kong, SAR Chile Cyprus Jordan Iran, Islamic Republic of Macedonia, Republic of South Africa Palestinian Nat'l Auth. Ghana Botswana Korea, Republic of	33 33 32 30 28 26 25 21 18 18 17 14 14 13 12	0 0 0 V V V
International average Serbia and Montenegro Bulgaria Romania Moldova, Republic of Hong Kong, SAR Chile Cyprus Jordan Iran, Islamic Republic of Macedonia, Republic of South Africa Palestinian Nat'l Auth. Ghana Botswana Korea, Republic of Bahrain	33 33 32 30 28 26 25 21 18 18 17 14 14 13 12 11	0 0 0 V V V V V V V V V V V V V V V V V
International average Serbia and Montenegro Bulgaria Romania Moldova, Republic of Hong Kong, SAR Chile Cyprus Jordan Iran, Islamic Republic of Macedonia, Republic of South Africa Palestinian Nat'l Auth. Ghana Botswana Korea, Republic of Bahrain Morocco	33 33 32 30 28 26 25 21 18 17 14 14 13 12 11 11	0 0 0 V V V V V V V V V V V V V V V V V
International average Serbia and Montenegro Bulgaria Romania Moldova, Republic of Hong Kong, SAR Chile Cyprus Jordan Iran, Islamic Republic of Macedonia, Republic of South Africa Palestinian Nat'l Auth. Ghana Botswana Korea, Republic of Bahrain Morocco Philippines	33 33 32 30 28 26 25 21 18 17 14 14 13 12 11 11 10 10	0 0 0 V V V V V V V V V V V V V V V V V
International average Serbia and Montenegro Bulgaria Romania Moldova, Republic of Hong Kong, SAR Chile Cyprus Jordan Iran, Islamic Republic of Macedonia, Republic of South Africa Palestinian Nat'l Auth. Ghana Botswana Korea, Republic of Bahrain Morocco Philippines Saudi Arabia	33 33 32 30 28 26 25 21 18 17 14 14 13 12 11 10 10 9	0 0 0 V V V V V V V V V V V V V V V V V
International average Serbia and Montenegro Bulgaria Romania Moldova, Republic of Hong Kong, SAR Chile Cyprus Jordan Iran, Islamic Republic of Macedonia, Republic of South Africa Palestinian Nat'l Auth. Ghana Botswana Korea, Republic of Bahrain Morocco Philippines Saudi Arabia Egypt	33 33 32 30 28 26 25 21 18 17 14 13 12 11 10 10 9 8	0 0 0 V V V V V V V V V V V V V V V V V
International average Serbia and Montenegro Bulgaria Romania Moldova, Republic of Hong Kong, SAR Chile Cyprus Jordan Iran, Islamic Republic of Macedonia, Republic of South Africa Palestinian Nat'l Auth. Ghana Botswana Korea, Republic of Bahrain Morocco Philippines Saudi Arabia	33 33 32 30 28 26 25 21 18 17 14 14 13 12 11 10 10 9	0 0 0 V V V

Country average vs. International average:

Higher Not different 0  $\blacksquare$ Lower

Content Domain	Main Topic	Cognitive Domain
DATA	Data interpretation	Solving Routine Problems

# Phone plans: cost of plans for Frank

Frank talks for 5 hours per month at cost him per month? Show your work	t the night rate. What would each plan ĸ.
Cost Per Month for Plan A:	zeds
Cost Per Month for Plan B:	zeds

Item Number: M032763

#### **SCORING**

#### **Correct Response**

• Plan A= 140 zeds and Plan B = 375 zeds, with work shown.

#### **Partial Response**

- 140 zeds and 375 zeds with no work shown.
- Plan A or plan B correct with work shown but not both.

#### **Incorrect Response**

• Incorrect (including crossed out/erased, stray marks, illegible, or off task).

### **Overall Percent Correct**

Singapore Japan Chinese Taipei Hong Kong, SAR Korea, Republic of Netherlands Sweden Lithuania Belgium (Flemish) Estonia Hungary England United States New Zealand Scotland Slovak Republic Australia Israel Malaysia International average	27 19 18 15 15 14 12 11 10 10 8 7 7 7 6 6	
Latvia	6	0
Slovenia	5	0
Russian Federation	5	0
Romania	5 5	0
Norway Bulgaria	5 4	0
Serbia and Montenegro	3	
Italy	3	<b>*</b>
Moldova, Republic of	2	* * * * * * * * * * * * * * * * * * *
Jordan	1	▼
Cyprus	1	▼
Macedonia, Republic of	1	▼
Indonesia	1	•
South Africa	1	_
Armenia Palestinian Nat'l Auth.	1 1	
Philippines	1	¥
Chile	0	<b>*</b>
Iran, Islamic Republic of	0	<b>*</b>
Egypt	0	▼
Lebanon	0	▼
Bahrain	0	▼
Ghana	0	▼
Tunisia	0	▼
Morocco	0	<b>V</b>
Botswana Saudi Arabia	0	▼
Jauui Alabid	<u> </u>	▼

# Country average vs. International average:

Higher ∧ Not different ∪ Lower ▼

Phone plans: cost of plans for Frank (continued)

Item Number: M032763

# **Student Responses**

#### **Correct Response:**

Frank talks for 5 hours per month at the night rate. What would each plan cost him per month? Show your work.

Cost Per Month for Plan A: \_\_\_\_\_ zeds

Cost Per Month for Plan B: 375 zeds

Plan A - Ized - 180 mins free Plan B - 2zed - 120 mins Free

Plan A-3 hours free

120 zeds140 zed

Plan B-2 hour free
360 zeas

### **Inorrect Response:**

Frank talks for 5 hours per month at the night rate. What would each plan cost him per month? Show your work.

Cost Per Month for Plan A: 40 zeds

Cost Per Month for Plan B: 255 zeds

Content Domain	Main Topic	Cognitive Domain
DATA	Data interpretation	Solving Routine Problems

### Phone plans: minutes talk by Darlene

Darlene signed up for the $Plan\ B$ , and the cost of one month of service was 75 zeds. How many minutes did she talk that month? Show your work.
Minutes talked

#### Item Number: M032764

#### **SCORING**

#### **Correct Response**

• 150 with work shown.

#### **Partial Response**

- 150 with no work shown.
- · Correct method but with calculation error.
- 12 30 with calculations leading to 30.

#### **Incorrect Response**

• Incorrect (including crossed out/erased, stray marks, illegible, or off task).

### **Overall Percent Correct**

Singapore Korea, Republic of Hong Kong, SAR Chinese Taipei Japan Netherlands Belgium (Flemish) Sweden Estonia England Hungary Lithuania Australia United States Slovak Republic New Zealand International average	28 22 21 20 19 17 13 12 11 11 9 9 8 8 8 7	
Latvia	6	0
Scotland	6	0
Slovenia	5	0
Israel	5 5	0
Romania	5	0
Norway Russian Federation	4	
Malaysia	4	· · · · · · · · · · · · · · · · · · ·
Ghana	3	•
Bulgaria	3	•
Italy	3	<b>*</b>
Moldova, Republic of	2	▼
Jordan	2	<b>V</b>
Cyprus	2	•
Serbia and Montenegro	2	$\blacksquare$
Macedonia, Republic of	1	▼
Indonesia	1	$\blacksquare$
South Africa	1	•
Bahrain	1	•
Lebanon	0	•
Tunisia	0	•
Iran, Islamic Republic of	0	<b>V</b>
Chile	0	_
Philippines	0	_
Armenia Palestinian Nat'l Auth.	0	<b>V</b>
Morocco	0	<b>V</b>
Botswana	0	<b>V</b>
Egypt	0	▼
Saudi Arabia	0	•

# Country average vs. International average:

Higher	
Not different	(
Lower	<b>T</b>

Phone plans: minutes talk by Darlene (continued)

Item Number: M032764

# **Student Responses**

#### **Correct Response:**

Darlene signed up for the *Plan B*, and the cost of one month of service was 75 zeds. How many minutes did she talk that month? Show your work.

Minutes talked 
$$150$$
  
 $75 \ 2)60 \ + 30$   
 $-15 \ -150$ 

#### **Partial Response:**

Darlene signed up for the *Plan B*, and the cost of one month of service was 75 zeds. How many minutes did she talk that month? Show your work.

Minutes talked 
$$13\overline{25}$$
 munites.

 $15-15=65$ 
 $32.5$ 
 $2\sqrt{65}$ 
 $32.5$ 
 $+120$ 
 $132.5$ 

#### **Incorrect Response:**

Darlene signed up for the *Plan B*, and the cost of one month of service was 75 zeds. How many minutes did she talk that month? Show your work.

Content Domain	Main Topic	Cognitive Domain
DATA	Data Interpretation	Using Concepts

### Comparison of two average scores

Joe had three test scores of 78, 76, and 74, while Mary had scores of 72, 82, and 74. How did Joe's average (mean) score compare with Mary's average (mean) score?

- A Joe's was 1 point higher.
- (B) Joe's was 1 point lower.
- © Both averages were the same.
- (D) Joe's was 2 points higher.
- (E) Joe's was 2 points lower.

Item Number: M012006

**Correct Response:** 

0

### **Overall Percent Correct**

Korea, Republic of Singapore Hong Kong, SAR Malaysia Japan Slovak Republic Lithuania Netherlands Latvia Tunisia Slovenia United States Bulgaria Israel Scotland Estonia Hungary Moldova, Republic of Romania Serbia and Montenegro Russian Federation Australia Belgium (Flemish)	90 88 87 84 81 76 76 75 74 74 73 73 72 72 72 72 72 70 69 69	
Italy International average	68	U
Macedonia, Republic of	68	0
Macedonia, Republic of Sweden	66	0
Macedonia, Republic of Sweden Armenia	66 65	0 0
Macedonia, Republic of Sweden Armenia Cyprus	66	0 0 0
Macedonia, Republic of Sweden Armenia	66 65 65	0 0
Macedonia, Republic of Sweden Armenia Cyprus Iran, Islamic Republic of	66 65 65 64	0 0 0 0
Macedonia, Republic of Sweden Armenia Cyprus Iran, Islamic Republic of Morocco	66 65 65 64 64	0 0 0 0
Macedonia, Republic of Sweden Armenia Cyprus Iran, Islamic Republic of Morocco Chile	66 65 65 64 64 62	0 0 0 0
Macedonia, Republic of Sweden Armenia Cyprus Iran, Islamic Republic of Morocco Chile Norway Philippines Egypt	66 65 65 64 64 62 61 61	0 0 0 0
Macedonia, Republic of Sweden Armenia Cyprus Iran, Islamic Republic of Morocco Chile Norway Philippines Egypt England	66 65 65 64 64 62 61 61 60	0 0 0 0
Macedonia, Republic of Sweden Armenia Cyprus Iran, Islamic Republic of Morocco Chile Norway Philippines Egypt England New Zealand	66 65 65 64 64 62 61 61 60 60	0 0 0 0
Macedonia, Republic of Sweden Armenia Cyprus Iran, Islamic Republic of Morocco Chile Norway Philippines Egypt England New Zealand Bahrain	66 65 65 64 64 62 61 61 60 60 58	0 0 0 0
Macedonia, Republic of Sweden Armenia Cyprus Iran, Islamic Republic of Morocco Chile Norway Philippines Egypt England New Zealand Bahrain Indonesia	66 65 65 64 64 62 61 61 60 60 58	0 0 0 0
Macedonia, Republic of Sweden Armenia Cyprus Iran, Islamic Republic of Morocco Chile Norway Philippines Egypt England New Zealand Bahrain	66 65 65 64 64 62 61 61 60 60 58	0 0 0 0
Macedonia, Republic of Sweden Armenia Cyprus Iran, Islamic Republic of Morocco Chile Norway Philippines Egypt England New Zealand Bahrain Indonesia Botswana	66 65 64 64 62 61 61 60 60 58 56	0 0 0 0
Macedonia, Republic of Sweden Armenia Cyprus Iran, Islamic Republic of Morocco Chile Norway Philippines Egypt England New Zealand Bahrain Indonesia Botswana Jordan	66 65 65 64 64 62 61 60 60 60 58 56 53	0 0 0 0
Macedonia, Republic of Sweden Armenia Cyprus Iran, Islamic Republic of Morocco Chile Norway Philippines Egypt England New Zealand Bahrain Indonesia Botswana Jordan Palestinian Nat'l Auth.	66 65 65 64 64 62 61 60 60 60 58 56 53 52	0 0 0 0
Macedonia, Republic of Sweden Armenia Cyprus Iran, Islamic Republic of Morocco Chile Norway Philippines Egypt England New Zealand Bahrain Indonesia Botswana Jordan Palestinian Nat'l Auth. Ghana	66 65 64 64 62 61 60 60 58 56 53 52 51 43	0 0 0 0

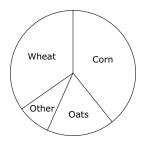
Country average vs. International average:

O ▼

Content Domain	Main Topic	Cognitive Domain
DATA	Data Interpretation	Using Concepts

### Pie graph of crop distribution

The graph shows the distribution of crops grown in a certain country.



According to the information in the graph, which of these statements is true?

- (A) More oats are grown than wheat.
- (B) Corn is more than one-half of the country's crop.
- (C) Oats are more than one-third of the country's crop.
- (D) The total crop of oats and wheat is greater than the corn crop.

Item Number: M012014

**Correct Response:** 

D

### **Overall Percent Correct**

Korea, Republic of	93	<b>A</b>
Japan	93 92	
Netherlands	88	<u> </u>
Australia	86	<u> </u>
Belgium (Flemish)	86	_
Sweden	85	<u> </u>
Hong Kong, SAR	85	<u> </u>
Chinese Taipei	84	<u> </u>
Latvia	84	<u> </u>
Singapore	83	<u> </u>
Slovak Republic	82	<u> </u>
England	82	<u> </u>
Estonia	82	_
Slovenia	82	<u> </u>
Lithuania	82	
Hungary	81	<u> </u>
New Zealand	81	
United States	81	
Scotland	81	
Israel	79	
Norway	78	<b>A</b>
Russian Federation	78	
Cyprus	76	
Cyprus	70	_
Italy	74	0
Italy Romania		
Italy	74 72 <b>71</b>	0
Italy Romania	74 72	0
Italy Romania International average	74 72 <b>71</b>	0 0
Italy Romania International average Tunisia	74 72 <b>71</b> 71	0 0 0 0 0
Italy Romania International average Tunisia Bulgaria	74 72 <b>71</b> 71 70	0 0 0 0 0
Italy Romania International average Tunisia Bulgaria Egypt Moldova, Republic of Morocco	74 72 <b>71</b> 71 70 69 67	0 0 0 0 0 0
Italy Romania International average Tunisia Bulgaria Egypt Moldova, Republic of	74 72 <b>71</b> 71 70 69 67 67	0 0 0 0 0
Italy Romania International average Tunisia Bulgaria Egypt Moldova, Republic of Morocco Jordan Macedonia, Republic of	74 72 <b>71</b> 71 70 69 67 67 66 65	0 0 0 0 0 0
Italy Romania International average Tunisia Bulgaria Egypt Moldova, Republic of Morocco Jordan Macedonia, Republic of Serbia and Montenegro	74 72 71 71 70 69 67 67 66 65 65	0 0 0 0 0
Italy Romania International average Tunisia Bulgaria Egypt Moldova, Republic of Morocco Jordan Macedonia, Republic of Serbia and Montenegro Iran, Islamic Republic of	74 72 71 71 70 69 67 67 66 65 65 64	0 0 0 0 0
Italy Romania International average Tunisia Bulgaria Egypt Moldova, Republic of Morocco Jordan Macedonia, Republic of Serbia and Montenegro Iran, Islamic Republic of Malaysia	74 72 71 71 70 69 67 66 65 65 64 63	0 0 0 0 0
Italy Romania International average Tunisia Bulgaria Egypt Moldova, Republic of Morocco Jordan Macedonia, Republic of Serbia and Montenegro Iran, Islamic Republic of Malaysia Bahrain	74 72 71 71 70 69 67 66 65 65 64 63 63	0 0 0 0 0
Italy Romania International average Tunisia Bulgaria Egypt Moldova, Republic of Morocco Jordan Macedonia, Republic of Serbia and Montenegro Iran, Islamic Republic of Malaysia Bahrain Palestinian Nat'l Auth.	74 72 71 71 70 69 67 66 65 65 64 63 63 61	0 0 0 0 0
Italy Romania International average Tunisia Bulgaria Egypt Moldova, Republic of Morocco Jordan Macedonia, Republic of Serbia and Montenegro Iran, Islamic Republic of Malaysia Bahrain Palestinian Nat'l Auth. Armenia	74 72 71 71 70 69 67 66 65 65 64 63 63 61 60	0 0 0 0 0
Italy Romania International average Tunisia Bulgaria Egypt Moldova, Republic of Morocco Jordan Macedonia, Republic of Serbia and Montenegro Iran, Islamic Republic of Malaysia Bahrain Palestinian Nat'l Auth. Armenia Chile	74 72 71 71 70 69 67 66 65 65 64 63 63 61 60 57	0 0 0 0 0
Italy Romania International average Tunisia Bulgaria Egypt Moldova, Republic of Morocco Jordan Macedonia, Republic of Serbia and Montenegro Iran, Islamic Republic of Malaysia Bahrain Palestinian Nat'l Auth. Armenia Chile Saudi Arabia	74 72 71 71 70 69 67 66 65 65 64 63 63 61 60 57 52	0 0 0 0 0
Italy Romania International average Tunisia Bulgaria Egypt Moldova, Republic of Morocco Jordan Macedonia, Republic of Serbia and Montenegro Iran, Islamic Republic of Malaysia Bahrain Palestinian Nat'l Auth. Armenia Chile Saudi Arabia Botswana	74 72 71 71 70 69 67 66 65 65 64 63 63 61 60 57 52 51	0 0 0 0 0
Italy Romania International average Tunisia Bulgaria Egypt Moldova, Republic of Morocco Jordan Macedonia, Republic of Serbia and Montenegro Iran, Islamic Republic of Malaysia Bahrain Palestinian Nat'l Auth. Armenia Chile Saudi Arabia Botswana Philippines	74 72 71 71 70 69 67 66 65 65 64 63 63 61 60 57 52 51 50	0 0 0 0 0 0
Italy Romania International average Tunisia Bulgaria Egypt Moldova, Republic of Morocco Jordan Macedonia, Republic of Serbia and Montenegro Iran, Islamic Republic of Malaysia Bahrain Palestinian Nat'l Auth. Armenia Chile Saudi Arabia Botswana	74 72 71 71 70 69 67 66 65 65 64 63 63 61 60 57 52 51	0 0 0 0 0

Country average vs. International average:

41

**○** 

Higher Not different Lower

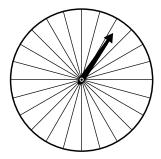
Ghana

South Africa

Content Domain	Main Topic	Cognitive Domain
DATA	Uncertainty and Probability	Reasoning

### Most likely sector on spinner

The figure below shows a spinner with 24 sectors. When someone spins the arrow, it is equally likely to stop on any sector.



 $\frac{1}{8}$  of the sectors are blue,  $\frac{1}{24}$  are purple,  $\frac{1}{2}$  are orange, and  $\frac{1}{3}$  are red. If a person spins the arrow, on which color sector is the spinner LEAST likely to stop?

- (A) blue
- (B) purple
- © orange
- (D) red

Item Number: M022252

**Correct Response:** 

В

### **Overall Percent Correct**

Hong Kong, SAR	87	<b>A</b>
Chinese Taipei	85	<b>A</b>
Netherlands	85	$\blacktriangle$
Japan	82	$\blacktriangle$
Sweden	81	$\blacktriangle$
Belgium (Flemish)	81	$\blacktriangle$
England	79	$\blacktriangle$
Singapore	79	$\blacktriangle$
Korea, Republic of	79	$\blacktriangle$
United States	78	<b>A</b>
Australia	78	<b>A</b>
Hungary	76	$\blacktriangle$
Scotland	76	$\blacktriangle$
Israel	74	$\blacktriangle$
Slovenia	74	$\blacktriangle$
Norway	73	<b>A</b>
Estonia	73	<b>A</b>
Latvia	71	
New Zealand	71	<b>A</b>
Slovak Republic	69	<b>A</b>
Cyprus	69	<b>A</b>
Lithuania	67	<b>A</b>
Serbia and Montenegro	66	<b>A</b>
Malaysia	65	<b>A</b>
Bulgaria	60	0
Russian Federation	60	0 0
Russian Federation International average	60 <b>60</b>	0
Russian Federation International average Italy	60 <b>60</b> 58	0
Russian Federation International average Italy Romania	60 <b>60</b> 58 57	0 0 0
Russian Federation International average Italy Romania Macedonia, Republic of	60 60 58 57 54	0 0 0
Russian Federation International average Italy Romania Macedonia, Republic of Armenia	60 60 58 57 54 47	0 0 0
Russian Federation International average Italy Romania Macedonia, Republic of Armenia Moldova, Republic of	60 58 57 54 47 46	0 0 0
Russian Federation International average Italy Romania Macedonia, Republic of Armenia Moldova, Republic of Jordan	60 60 58 57 54 47 46 46	0 0 0
Russian Federation International average Italy Romania Macedonia, Republic of Armenia Moldova, Republic of Jordan Philippines	60 60 58 57 54 47 46 46 43	0 0 0
Russian Federation International average Italy Romania Macedonia, Republic of Armenia Moldova, Republic of Jordan Philippines Iran, Islamic Republic of	60 58 57 54 47 46 46 43 43	0 0 0
Russian Federation International average Italy Romania Macedonia, Republic of Armenia Moldova, Republic of Jordan Philippines Iran, Islamic Republic of Egypt	60 58 57 54 47 46 46 43 43	0 0 0
Russian Federation International average Italy Romania Macedonia, Republic of Armenia Moldova, Republic of Jordan Philippines Iran, Islamic Republic of Egypt Lebanon	60 58 57 54 47 46 43 43 43	0 0 0
Russian Federation International average Italy Romania Macedonia, Republic of Armenia Moldova, Republic of Jordan Philippines Iran, Islamic Republic of Egypt Lebanon Palestinian Nat'l Auth.	60 58 57 54 47 46 46 43 43 43 42 41	0
Russian Federation International average Italy Romania Macedonia, Republic of Armenia Moldova, Republic of Jordan Philippines Iran, Islamic Republic of Egypt Lebanon Palestinian Nat'l Auth. Bahrain	60 58 57 54 47 46 43 43 43 42 41 40	0 0 0
Russian Federation International average Italy Romania Macedonia, Republic of Armenia Moldova, Republic of Jordan Philippines Iran, Islamic Republic of Egypt Lebanon Palestinian Nat'l Auth. Bahrain Morocco	60 58 57 54 47 46 43 43 43 42 41 40 39	0 0 0
Russian Federation International average Italy Romania Macedonia, Republic of Armenia Moldova, Republic of Jordan Philippines Iran, Islamic Republic of Egypt Lebanon Palestinian Nat'l Auth. Bahrain Morocco Chile	58 57 54 47 46 46 43 43 43 42 41 40 39 38	0 0 0
Russian Federation International average Italy Romania Macedonia, Republic of Armenia Moldova, Republic of Jordan Philippines Iran, Islamic Republic of Egypt Lebanon Palestinian Nat'l Auth. Bahrain Morocco Chile Indonesia	60 58 57 54 47 46 46 43 43 42 41 40 39 38 37	0 0 0
Russian Federation International average Italy Romania Macedonia, Republic of Armenia Moldova, Republic of Jordan Philippines Iran, Islamic Republic of Egypt Lebanon Palestinian Nat'l Auth. Bahrain Morocco Chile Indonesia Botswana	58 57 54 47 46 46 43 43 42 41 40 39 38 37 34	0 0 0
Russian Federation International average Italy Romania Macedonia, Republic of Armenia Moldova, Republic of Jordan Philippines Iran, Islamic Republic of Egypt Lebanon Palestinian Nat'l Auth. Bahrain Morocco Chile Indonesia Botswana Saudi Arabia	58 57 54 47 46 46 43 43 42 41 40 39 38 37 34	0 0 0
Russian Federation International average Italy Romania Macedonia, Republic of Armenia Moldova, Republic of Jordan Philippines Iran, Islamic Republic of Egypt Lebanon Palestinian Nat'l Auth. Bahrain Morocco Chile Indonesia Botswana Saudi Arabia Ghana	58 57 54 47 46 46 43 43 42 41 40 39 38 37 34 34	0 0 0
Russian Federation International average Italy Romania Macedonia, Republic of Armenia Moldova, Republic of Jordan Philippines Iran, Islamic Republic of Egypt Lebanon Palestinian Nat'l Auth. Bahrain Morocco Chile Indonesia Botswana Saudi Arabia Ghana South Africa	58 57 54 47 46 46 43 43 42 41 40 39 38 37 34 34 34	0 0 0
Russian Federation International average Italy Romania Macedonia, Republic of Armenia Moldova, Republic of Jordan Philippines Iran, Islamic Republic of Egypt Lebanon Palestinian Nat'l Auth. Bahrain Morocco Chile Indonesia Botswana Saudi Arabia Ghana	58 57 54 47 46 46 43 43 42 41 40 39 38 37 34 34	0 0 0

Country average vs. International average:

**○** 

Content Domain	Main Topic	Cognitive Domain
DATA	Uncertainty and Probability	Reasoning

#### In a school there were 1200 students

In a school there were 1,200 students (boys and girls). A sample of 100 students was selected at random, and 45 boys were found in the sample. Which of these is most likely to be the number of boys in the school?

- (A) 450
- B) 500
- © 540
- (D) 600

Item Number: M032271

**Correct Response:** 

0

### **Overall Percent Correct**

Hong Kong, SAR	81	
Singapore	80	_
Netherlands	78	_
Chinese Taipei	77	<u> </u>
Korea, Republic of	75	_
Belgium (Flemish)	71	
Japan	66	•
Estonia	61	<u> </u>
Sweden	61	<u> </u>
United States	60	
Hungary	56	
• •	56	
Australia New Zealand	55	•
Lithuania	55	
		<b>A</b>
Italy	55 53	<b>A</b>
Scotland	53	<b>A</b>
Russian Federation	52	<b>A</b>
Latvia	50	0
Malaysia	49	0
England	49	0
Israel	47	0
International average	47	
Norway	46	0
Slovak Republic	45	0
Serbia and Montenegro	44	0
Serbia and Montenegro Moldova, Republic of	44 44	0 0
Serbia and Montenegro	44 44 44	0 0 0
Serbia and Montenegro Moldova, Republic of	44 44	0 0 0
Serbia and Montenegro Moldova, Republic of Slovenia	44 44 44	0 0 0
Serbia and Montenegro Moldova, Republic of Slovenia Bulgaria	44 44 44 43	0 0 0 •
Serbia and Montenegro Moldova, Republic of Slovenia Bulgaria Cyprus	44 44 44 43 43	<ul><li>○</li><li>○</li><li>○</li><li>▼</li><li>▼</li></ul>
Serbia and Montenegro Moldova, Republic of Slovenia Bulgaria Cyprus Lebanon	44 44 43 43 41	<ul><li>○</li><li>○</li><li>○</li><li>▼</li><li>▼</li></ul>
Serbia and Montenegro Moldova, Republic of Slovenia Bulgaria Cyprus Lebanon Armenia	44 44 43 43 41 39	<ul><li>○</li><li>○</li><li>○</li><li>▼</li><li>▼</li></ul>
Serbia and Montenegro Moldova, Republic of Slovenia Bulgaria Cyprus Lebanon Armenia Tunisia	44 44 43 43 41 39 39	<ul><li>○</li><li>○</li><li>○</li><li>▼</li><li>▼</li></ul>
Serbia and Montenegro Moldova, Republic of Slovenia Bulgaria Cyprus Lebanon Armenia Tunisia Jordan	44 44 43 43 41 39 39	<ul><li>○</li><li>○</li><li>○</li><li>▼</li><li>▼</li></ul>
Serbia and Montenegro Moldova, Republic of Slovenia Bulgaria Cyprus Lebanon Armenia Tunisia Jordan Romania	44 44 43 43 41 39 39 39	<ul><li>○</li><li>○</li><li>○</li><li>▼</li><li>▼</li></ul>
Serbia and Montenegro Moldova, Republic of Slovenia Bulgaria Cyprus Lebanon Armenia Tunisia Jordan Romania Egypt	44 44 43 43 41 39 39 39 38 38	<ul><li>○</li><li>○</li><li>○</li><li>▼</li><li>▼</li></ul>
Serbia and Montenegro Moldova, Republic of Slovenia Bulgaria Cyprus Lebanon Armenia Tunisia Jordan Romania Egypt Macedonia, Republic of	44 44 43 43 41 39 39 39 38 38 36	<ul><li>○</li><li>○</li><li>○</li><li>▼</li><li>▼</li></ul>
Serbia and Montenegro Moldova, Republic of Slovenia Bulgaria Cyprus Lebanon Armenia Tunisia Jordan Romania Egypt Macedonia, Republic of Iran, Islamic Republic of	44 44 43 43 41 39 39 39 38 38 36 35	<ul><li>○</li><li>○</li><li>○</li><li>▼</li><li>▼</li></ul>
Serbia and Montenegro Moldova, Republic of Slovenia Bulgaria Cyprus Lebanon Armenia Tunisia Jordan Romania Egypt Macedonia, Republic of Iran, Islamic Republic of Indonesia	44 44 43 43 41 39 39 39 38 38 36 35 34	<ul><li>○</li><li>○</li><li>○</li><li>▼</li><li>▼</li></ul>
Serbia and Montenegro Moldova, Republic of Slovenia Bulgaria Cyprus Lebanon Armenia Tunisia Jordan Romania Egypt Macedonia, Republic of Iran, Islamic Republic of Indonesia Chile Palestinian Nat'l Auth.	44 44 43 43 41 39 39 39 38 38 36 35 34	<ul><li>○</li><li>○</li><li>○</li><li>▼</li><li>▼</li></ul>
Serbia and Montenegro Moldova, Republic of Slovenia Bulgaria Cyprus Lebanon Armenia Tunisia Jordan Romania Egypt Macedonia, Republic of Iran, Islamic Republic of Indonesia Chile	44 44 43 43 41 39 39 39 38 38 36 35 34 32	<ul><li>○</li><li>○</li><li>○</li><li>▼</li><li>▼</li></ul>
Serbia and Montenegro Moldova, Republic of Slovenia Bulgaria Cyprus Lebanon Armenia Tunisia Jordan Romania Egypt Macedonia, Republic of Iran, Islamic Republic of Indonesia Chile Palestinian Nat'l Auth. Philippines	44 44 43 43 41 39 39 39 38 36 35 34 32 32 31	O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O
Serbia and Montenegro Moldova, Republic of Slovenia Bulgaria Cyprus Lebanon Armenia Tunisia Jordan Romania Egypt Macedonia, Republic of Iran, Islamic Republic of Indonesia Chile Palestinian Nat'l Auth. Philippines Morocco	44 44 43 41 39 39 39 38 38 36 35 34 32 32 31 28	O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O
Serbia and Montenegro Moldova, Republic of Slovenia Bulgaria Cyprus Lebanon Armenia Tunisia Jordan Romania Egypt Macedonia, Republic of Iran, Islamic Republic of Indonesia Chile Palestinian Nat'l Auth. Philippines Morocco Botswana	44 44 43 43 41 39 39 39 38 36 35 34 32 32 31 28 28 26	<ul><li>○</li><li>○</li><li>○</li><li>▼</li><li>▼</li></ul>
Serbia and Montenegro Moldova, Republic of Slovenia Bulgaria Cyprus Lebanon Armenia Tunisia Jordan Romania Egypt Macedonia, Republic of Iran, Islamic Republic of Indonesia Chile Palestinian Nat'l Auth. Philippines Morocco Botswana Saudi Arabia	44 44 43 41 39 39 39 38 36 35 34 32 32 31 28 28	O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O

Country average vs. International average:

23

Higher △
Not different ○
Lower ▼

Ghana

Content Domain	Main Topic	Cognitive Domain
DATA	Uncertainty and Probability	Solving Routine Problems

### Number of students from probability

In an eighth-grade class of 30 students, the probability that a student chosen at random will be less than 13 years old is  $\frac{1}{5}$ . How many students in the class are less than 13 years old?

- (A) Two
- (B) Three
- © Four
- D Five
- (E) Six

Item Number: M022146

**Correct Response:** 

Ε

### **Overall Percent Correct**

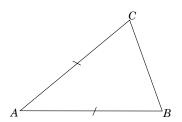
Korea, Republic of	89	<b>A</b>
Singapore	87	
Chinese Taipei	86	<b>A</b>
Japan	86	<b>A</b>
Hong Kong, SAR	84	<b>A</b>
Netherlands	82	
Belgium (Flemish)	79	
Sweden	71	
Malaysia	69	
Scotland	66	
England	63	<b>A</b>
Armenia	62	
Australia	60	
Latvia	59	<b>A</b>
United States	58	<b>A</b>
Estonia	57	<b>A</b>
Italy	56	<b>A</b>
Hungary	55	<b>A</b>
Israel	54	<b>A</b>
New Zealand	54	0
Cyprus	53	0
Slovenia	53	0
Lithuania	52	0
	51	0
Russian Federation		
	50	
Russian Federation Norway Bulgaria		0
Norway	50	0
Norway Bulgaria	50 50	0 0
Norway Bulgaria International average	50 50 <b>50</b>	0 0
Norway Bulgaria International average Slovak Republic	50 50 <b>50</b> 50	0 0
Norway Bulgaria International average Slovak Republic Serbia and Montenegro	50 50 <b>50</b> 50 46	0 0
Norway Bulgaria International average Slovak Republic Serbia and Montenegro Indonesia Romania Iran, Islamic Republic of	50 50 <b>50</b> 50 46 42	0 0
Norway Bulgaria International average Slovak Republic Serbia and Montenegro Indonesia Romania	50 50 50 50 46 42 39	0 0
Norway Bulgaria International average Slovak Republic Serbia and Montenegro Indonesia Romania Iran, Islamic Republic of	50 50 50 50 46 42 39 37	0 0
Norway Bulgaria International average Slovak Republic Serbia and Montenegro Indonesia Romania Iran, Islamic Republic of Jordan	50 50 50 50 46 42 39 37 33	0 0
Norway Bulgaria International average Slovak Republic Serbia and Montenegro Indonesia Romania Iran, Islamic Republic of Jordan Egypt	50 50 50 50 46 42 39 37 33 33	0 0
Norway Bulgaria International average Slovak Republic Serbia and Montenegro Indonesia Romania Iran, Islamic Republic of Jordan Egypt Botswana	50 50 50 50 46 42 39 37 33 33 33	0 0
Norway Bulgaria International average Slovak Republic Serbia and Montenegro Indonesia Romania Iran, Islamic Republic of Jordan Egypt Botswana Macedonia, Republic of	50 50 50 46 42 39 37 33 33 32 32	0 0
Norway Bulgaria International average Slovak Republic Serbia and Montenegro Indonesia Romania Iran, Islamic Republic of Jordan Egypt Botswana Macedonia, Republic of Philippines	50 50 50 46 42 39 37 33 33 32 32 32	0 0
Norway Bulgaria International average Slovak Republic Serbia and Montenegro Indonesia Romania Iran, Islamic Republic of Jordan Egypt Botswana Macedonia, Republic of Philippines Moldova, Republic of	50 50 50 46 42 39 37 33 33 32 32 32 31	0 0
Norway Bulgaria International average Slovak Republic Serbia and Montenegro Indonesia Romania Iran, Islamic Republic of Jordan Egypt Botswana Macedonia, Republic of Philippines Moldova, Republic of Palestinian Nat'l Auth.	50 50 50 46 42 39 37 33 33 32 32 32 31 28	0 0
Norway Bulgaria International average Slovak Republic Serbia and Montenegro Indonesia Romania Iran, Islamic Republic of Jordan Egypt Botswana Macedonia, Republic of Philippines Moldova, Republic of Palestinian Nat'l Auth. Lebanon	50 50 50 50 46 42 39 37 33 32 32 32 32 31 28 28	0 0
Norway Bulgaria International average Slovak Republic Serbia and Montenegro Indonesia Romania Iran, Islamic Republic of Jordan Egypt Botswana Macedonia, Republic of Philippines Moldova, Republic of Palestinian Nat'l Auth. Lebanon Ghana	50 50 50 46 42 39 37 33 32 32 32 31 28 28 28	0 0
Norway Bulgaria International average Slovak Republic Serbia and Montenegro Indonesia Romania Iran, Islamic Republic of Jordan Egypt Botswana Macedonia, Republic of Philippines Moldova, Republic of Palestinian Nat'l Auth. Lebanon Ghana South Africa	50 50 50 46 42 39 37 33 32 32 32 31 28 28 28 26	0 0
Norway Bulgaria International average Slovak Republic Serbia and Montenegro Indonesia Romania Iran, Islamic Republic of Jordan Egypt Botswana Macedonia, Republic of Philippines Moldova, Republic of Palestinian Nat'l Auth. Lebanon Ghana South Africa Bahrain	50 50 50 46 42 39 37 33 32 32 32 31 28 28 28 26 24	0 0
Norway Bulgaria International average Slovak Republic Serbia and Montenegro Indonesia Romania Iran, Islamic Republic of Jordan Egypt Botswana Macedonia, Republic of Philippines Moldova, Republic of Palestinian Nat'l Auth. Lebanon Ghana South Africa Bahrain Chile	50 50 50 46 42 39 37 33 32 32 32 31 28 28 28 26 24 23	0 0
Norway Bulgaria International average Slovak Republic Serbia and Montenegro Indonesia Romania Iran, Islamic Republic of Jordan Egypt Botswana Macedonia, Republic of Philippines Moldova, Republic of Palestinian Nat'l Auth. Lebanon Ghana South Africa Bahrain Chile Tunisia	50 50 50 46 42 39 37 33 32 32 32 32 32 32 32 28 28 26 24 23 22	0 0

Country average vs. International average:

Higher △
Not different ○
Lower ▼

Content Domain	Main Topic	Cognitive Domain
GEOMETRY	Congruence and Similarity	Knowing Facts and Procedures

### Draw a line to divide triangle ABC



The triangle ABC has AB = AC.

Draw a line to divide triangle ABC into two congruent triangles.

Item Number: M032403

#### **SCORING**

#### **Correct Response**

· Line drawn from A to (approximate) midpoint of BC.

#### **Incorrect Response**

- · Line drawn from C or B.
- Other incorrect (including crossed out/erased, stray marks, illegible or off task).

### **Overall Percent Correct**

Singapore	88	
Japan	86	<b>A</b>
Korea, Republic of	84	
Hong Kong, SAR	79	
Armenia	77	<b>A</b>
Russian Federation	73	<b>A</b>
Belgium (Flemish)	72	$\blacktriangle$
Chinese Taipei	71	
Latvia	71	$\blacktriangle$
Lithuania	70	<b>A</b>
Estonia	69	<b>A</b>
Israel	66	<b>A</b>
Bahrain	65	<b>A</b>
Romania	62	<b>A</b>
Bulgaria	61	<b>A</b>
Slovak Republic	60	<b>A</b>
Netherlands	59	<b>A</b>
Moldova, Republic of	56	0
Lebanon	55	0
Australia	55	0
United States	54	0
Slovenia	53	0
Tunisia	53	0
Hungary	53	0
Malaysia	52	0
Malaysia International average	52	
Malaysia International average Cyprus	<b>52</b> 51	0
Malaysia International average Cyprus England	<b>52</b> 51 48	0
Malaysia International average Cyprus England New Zealand	<b>52</b> 51 48 48	0 0 0
Malaysia International average Cyprus England New Zealand Jordan	52 51 48 48 47	0 0 0
Malaysia International average Cyprus England New Zealand Jordan Scotland	52 51 48 48 47 47	O O O ▼
Malaysia International average Cyprus England New Zealand Jordan Scotland Italy	52 51 48 48 47 47 45	O O O ▼
Malaysia International average Cyprus England New Zealand Jordan Scotland Italy Iran, Islamic Republic of	52 51 48 48 47 47 45 43	O O O ▼
Malaysia International average Cyprus England New Zealand Jordan Scotland Italy Iran, Islamic Republic of Norway	52 51 48 48 47 47 45 43 42	O O O ▼
Malaysia International average Cyprus England New Zealand Jordan Scotland Italy Iran, Islamic Republic of Norway Morocco	52 51 48 48 47 47 45 43 42 41	O O O ▼
Malaysia International average Cyprus England New Zealand Jordan Scotland Italy Iran, Islamic Republic of Norway Morocco Serbia and Montenegro	52 51 48 48 47 47 45 43 42 41 40	O O O ▼
Malaysia International average Cyprus England New Zealand Jordan Scotland Italy Iran, Islamic Republic of Norway Morocco Serbia and Montenegro Egypt	52 51 48 48 47 47 45 43 42 41 40 40	O O O ▼
Malaysia International average Cyprus England New Zealand Jordan Scotland Italy Iran, Islamic Republic of Norway Morocco Serbia and Montenegro Egypt Saudi Arabia	52 51 48 48 47 47 45 43 42 41 40 40 39	0 0 0
Malaysia International average Cyprus England New Zealand Jordan Scotland Italy Iran, Islamic Republic of Norway Morocco Serbia and Montenegro Egypt Saudi Arabia Palestinian Nat'l Auth.	52 51 48 48 47 47 45 43 42 41 40 40 39 36	O O O ▼
Malaysia International average Cyprus England New Zealand Jordan Scotland Italy Iran, Islamic Republic of Norway Morocco Serbia and Montenegro Egypt Saudi Arabia Palestinian Nat'l Auth. Macedonia, Republic of	52 51 48 47 47 45 43 42 41 40 40 39 36 35	O O O ▼
Malaysia International average Cyprus England New Zealand Jordan Scotland Italy Iran, Islamic Republic of Norway Morocco Serbia and Montenegro Egypt Saudi Arabia Palestinian Nat'l Auth. Macedonia, Republic of Indonesia	52 51 48 47 47 45 43 42 41 40 40 39 36 35 26	O O O ▼
Malaysia International average Cyprus England New Zealand Jordan Scotland Italy Iran, Islamic Republic of Norway Morocco Serbia and Montenegro Egypt Saudi Arabia Palestinian Nat'l Auth. Macedonia, Republic of Indonesia Sweden	52 51 48 47 47 45 43 42 41 40 40 39 36 35 26 20	O O O ▼
Malaysia International average Cyprus England New Zealand Jordan Scotland Italy Iran, Islamic Republic of Norway Morocco Serbia and Montenegro Egypt Saudi Arabia Palestinian Nat'l Auth. Macedonia, Republic of Indonesia Sweden Chile	52 51 48 48 47 45 43 42 41 40 40 39 36 35 26 20 19	O O O ▼
Malaysia International average Cyprus England New Zealand Jordan Scotland Italy Iran, Islamic Republic of Norway Morocco Serbia and Montenegro Egypt Saudi Arabia Palestinian Nat'l Auth. Macedonia, Republic of Indonesia Sweden Chile Botswana	52 51 48 48 47 45 43 42 41 40 40 39 36 35 26 20 19	O O O ▼
Malaysia International average Cyprus England New Zealand Jordan Scotland Italy Iran, Islamic Republic of Norway Morocco Serbia and Montenegro Egypt Saudi Arabia Palestinian Nat'l Auth. Macedonia, Republic of Indonesia Sweden Chile Botswana Philippines	52 51 48 48 47 45 43 42 41 40 40 39 36 35 26 20 19 14 11	O O O ▼
Malaysia International average Cyprus England New Zealand Jordan Scotland Italy Iran, Islamic Republic of Norway Morocco Serbia and Montenegro Egypt Saudi Arabia Palestinian Nat'l Auth. Macedonia, Republic of Indonesia Sweden Chile Botswana	52 51 48 48 47 45 43 42 41 40 40 39 36 35 26 20 19	O O O ▼
Malaysia International average Cyprus England New Zealand Jordan Scotland Italy Iran, Islamic Republic of Norway Morocco Serbia and Montenegro Egypt Saudi Arabia Palestinian Nat'l Auth. Macedonia, Republic of Indonesia Sweden Chile Botswana Philippines	52 51 48 48 47 45 43 42 41 40 40 39 36 35 26 20 19 14 11	O O O ▼

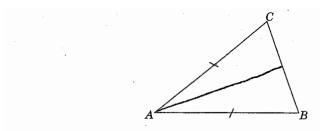
Country average vs. International average:

# Draw a line to divide triangle ABC (continued)

Item Number: M032403

# **Student Responses**

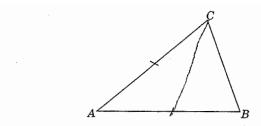
#### **Correct:**



The triangle ABC has AB = AC.

Draw a line to divide triangle ABC into two congruent triangles.

#### **Incorrect:**



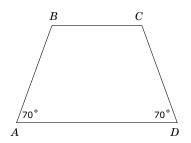
The triangle ABC has AB = AC.

Draw a line to divide triangle ABC into two congruent triangles.

Content Domain	Main Topic	Cognitive Domain
GEOMETRY	Congruence and Similarity	Reasoning

### Property of congruent trapezoids

ABCD is a trapezoid.



Another trapezoid, GHIJ (not shown), is congruent (the same size and shape) to ABCD. Angles G and J each measure 70°. Which of these could be true?

- $\widehat{A}$  GH = AB
- $\bigcirc$  Angle H is a right angle.
- (c) All sides of *GHIJ* are the same length.
- (D) The perimeter of *GHIJ* is 3 times the perimeter of *ABCD*.
- (E) The area of *GHIJ* is less than the area of *ABCD*.

Item Number: M012015

Correct Response:

Λ

### **Overall Percent Correct**

Korea, Republic of	86	
Estonia	84	<u> </u>
Japan	83	_ _
Hong Kong, SAR	81	<b>A</b>
Singapore	81	<b>A</b>
Chinese Taipei	79	<b>A</b>
Latvia	77	<b>A</b>
Russian Federation	77	<b>A</b>
Lithuania	74	<b>A</b>
Belgium (Flemish)	73	<b>A</b>
Slovak Republic	73	<b>A</b>
Netherlands	69	$\blacktriangle$
United States	69	<b>A</b>
Hungary	69	$\blacktriangle$
Slovenia	68	<b>A</b>
Romania	68	<b>A</b>
Italy	67	<b>A</b>
Bulgaria	67	<b>A</b>
Australia	66	<b>A</b>
Israel	66	$\blacktriangle$
Scotland	64	0
Malaysia	64	0
Moldova, Republic of	63	0
Sweden	62	0
Morocco	62	0
Morocco Tunisia	62 62	0 0
Tunisia New Zealand Cyprus	62 61 61	0
Tunisia New Zealand Cyprus International average	62 61 61	0 0 0
Tunisia New Zealand Cyprus International average Macedonia, Republic of	62 61 61 <b>60</b>	0 0 0
Tunisia New Zealand Cyprus International average Macedonia, Republic of Armenia	62 61 61 <b>60</b> 60 59	0 0 0
Tunisia New Zealand Cyprus International average Macedonia, Republic of Armenia Norway	62 61 61 <b>60</b> 60 59 58	0 0 0 0 0 0
Tunisia New Zealand Cyprus International average Macedonia, Republic of Armenia Norway England	62 61 61 <b>60</b> 60 59 58 57	0 0 0
Tunisia New Zealand Cyprus International average Macedonia, Republic of Armenia Norway England Indonesia	62 61 61 <b>60</b> 60 59 58 57 56	0 0 0 0 0 0 0 0
Tunisia New Zealand Cyprus International average Macedonia, Republic of Armenia Norway England Indonesia Serbia and Montenegro	62 61 61 <b>60</b> 60 59 58 57 56	0 0 0 0 0
Tunisia New Zealand Cyprus International average Macedonia, Republic of Armenia Norway England Indonesia Serbia and Montenegro Lebanon	62 61 61 <b>60</b> 59 58 57 56 56	0 0 0 0 0 0 0 0
Tunisia New Zealand Cyprus International average Macedonia, Republic of Armenia Norway England Indonesia Serbia and Montenegro Lebanon Bahrain	62 61 61 60 60 59 58 57 56 56 55	0 0 0 0 0
Tunisia New Zealand Cyprus International average Macedonia, Republic of Armenia Norway England Indonesia Serbia and Montenegro Lebanon Bahrain Jordan	62 61 61 60 60 59 58 57 56 56 55 54 48	0 0 0 0 0
Tunisia New Zealand Cyprus International average Macedonia, Republic of Armenia Norway England Indonesia Serbia and Montenegro Lebanon Bahrain Jordan Iran, Islamic Republic of	62 61 61 60 59 58 57 56 56 55 54 48 45	0 0 0 0 0
Tunisia New Zealand Cyprus International average Macedonia, Republic of Armenia Norway England Indonesia Serbia and Montenegro Lebanon Bahrain Jordan Iran, Islamic Republic of Saudi Arabia	62 61 61 60 60 59 58 57 56 56 55 54 48 45 39	0 0 0 0 0
Tunisia New Zealand Cyprus International average Macedonia, Republic of Armenia Norway England Indonesia Serbia and Montenegro Lebanon Bahrain Jordan Iran, Islamic Republic of Saudi Arabia Chile	62 61 61 60 60 59 58 57 56 56 55 54 48 45 39	0 0 0 0 0
Tunisia New Zealand Cyprus International average Macedonia, Republic of Armenia Norway England Indonesia Serbia and Montenegro Lebanon Bahrain Jordan Iran, Islamic Republic of Saudi Arabia Chile Palestinian Nat'l Auth.	62 61 61 60 60 59 58 57 56 56 55 54 48 45 39 39	0 0 0 0 0
Tunisia New Zealand Cyprus International average Macedonia, Republic of Armenia Norway England Indonesia Serbia and Montenegro Lebanon Bahrain Jordan Iran, Islamic Republic of Saudi Arabia Chile Palestinian Nat'l Auth. Egypt	62 61 61 60 60 59 58 57 56 56 55 54 48 45 39 39 37 35	0 0 0 0 0
Tunisia New Zealand Cyprus International average Macedonia, Republic of Armenia Norway England Indonesia Serbia and Montenegro Lebanon Bahrain Jordan Iran, Islamic Republic of Saudi Arabia Chile Palestinian Nat'l Auth. Egypt Botswana	62 61 61 60 60 59 58 57 56 56 55 54 48 45 39 39 37 35 34	0 0 0 0 0
Tunisia New Zealand Cyprus International average Macedonia, Republic of Armenia Norway England Indonesia Serbia and Montenegro Lebanon Bahrain Jordan Iran, Islamic Republic of Saudi Arabia Chile Palestinian Nat'l Auth. Egypt Botswana Philippines	62 61 61 60 60 59 58 57 56 56 55 54 48 45 39 39 37 35 34 30	0 0 0 0 0
Tunisia New Zealand Cyprus International average Macedonia, Republic of Armenia Norway England Indonesia Serbia and Montenegro Lebanon Bahrain Jordan Iran, Islamic Republic of Saudi Arabia Chile Palestinian Nat'l Auth. Egypt Botswana Philippines Ghana	62 61 61 60 59 58 57 56 56 55 54 48 45 39 37 35 34 30 25	0 0 0 0 0
Tunisia New Zealand Cyprus International average Macedonia, Republic of Armenia Norway England Indonesia Serbia and Montenegro Lebanon Bahrain Jordan Iran, Islamic Republic of Saudi Arabia Chile Palestinian Nat'l Auth. Egypt Botswana Philippines	62 61 61 60 60 59 58 57 56 56 55 54 48 45 39 39 37 35 34 30	0 0 0 0 0

Country average vs. International average:

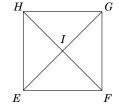
Higher △
Not different ○
Lower ▼

Content Domain	Main Topic	Cognitive Domain
GEOMETRY	Congruence and Similarity	Using Concepts

### False statement of congruent triangles

In square *EFGH*, which of these is FALSE?

- (A)  $\Delta EIF$  and  $\Delta EIH$  are congruent.
- (B)  $\Delta GHI$  and  $\Delta GHF$  are congruent.
- ©  $\Delta EFH$  and  $\Delta EGH$  are congruent.
- (D)  $\Delta EIF$  and  $\Delta GIH$  are congruent.



Item Number: M012005

**Correct Response:** 

В

### **Overall Percent Correct**

Korea, Republic of	86	<b>A</b>
Japan	85	
Chinese Taipei	82	
Estonia	82	
Hong Kong, SAR	79	
Latvia	78	
Bulgaria	74	
Russian Federation	74	
Lithuania	73	
Netherlands	72	
Singapore	72	<b>A</b>
Cyprus	69	
Belgium (Flemish)	68	•
Slovak Republic	68	_
Romania	64	
Armenia	62	
Israel	62	<b>A A A</b>
Sweden	62	
Slovenia	61	
Italy	58	0
Morocco	58	0
Bahrain	57	0
International average	56	
Moldova, Republic of	56	O
Indonesia	55	O
United States	55	0
Jordan	54	0
Iran, Islamic Republic of	53	0
Malaysia	50	$\blacksquare$
Tunisia	49	$\blacksquare$
Egypt	46	$\blacksquare$
Egypt	40	*
Norway	46	<b>* * * *</b>

Country average vs. International average:

45

45

44

44

43

42

41 39

35

35

28

26 25

**○** 

•

•

Higher Not different Lower

Lebanon

Scotland

Australia

New Zealand

Philippines

South Africa

Botswana

England Saudi Arabia

Chile

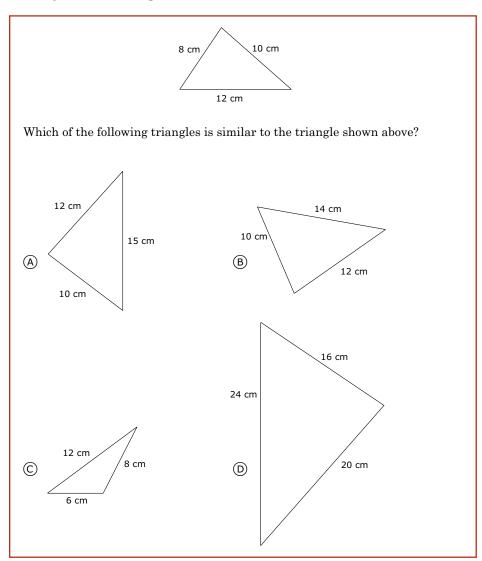
Macedonia, Republic of

Serbia and Montenegro

Palestinian Nat'l Auth.

Content Domain	Main Topic	Cognitive Domain
GEOMETRY	Congruence and Similarity	Using Concepts

### Identify similar triangles



Item Number: M032261

Correct Response:

D

# Overall Percent Correct

Korea, Republic of	83	
Hong Kong, SAR	76	
Singapore	75	
Japan	70	
Chinese Taipei	68	
Russian Federation	61	
Netherlands	60	
Belgium (Flemish)	59	<b>A</b>
Iran, Islamic Republic of	54	
Hungary	51	<b>A</b>
Malaysia	51	<b>A</b>
Lithuania	50	
Latvia	49	
Estonia	46	
United States	46	<u> </u>
Lebanon	46	0
Italy	44	0
England	43	0
International average	42	
Jordan	41	0
Philippines	41	0
Sweden	41	0
Australia	40	0
Komania	39	O
Romania Serbia and Montenegro	39 38	0
Serbia and Montenegro	38	0
Serbia and Montenegro Palestinian Nat'l Auth.		0
Serbia and Montenegro Palestinian Nat'l Auth. Moldova, Republic of	38 38 38	<ul><li>○</li><li>▼</li><li>○</li></ul>
Serbia and Montenegro Palestinian Nat'l Auth. Moldova, Republic of New Zealand	38 38 38 37	<ul><li>○</li><li>▼</li><li>○</li></ul>
Serbia and Montenegro Palestinian Nat'l Auth. Moldova, Republic of New Zealand Slovak Republic	38 38 38 37 37	<ul><li>○</li><li>▼</li><li>○</li></ul>
Serbia and Montenegro Palestinian Nat'l Auth. Moldova, Republic of New Zealand Slovak Republic Armenia	38 38 38 37 37 36	<ul><li>○</li><li>▼</li><li>○</li></ul>
Serbia and Montenegro Palestinian Nat'l Auth. Moldova, Republic of New Zealand Slovak Republic Armenia Israel	38 38 38 37 37 36 36	<ul><li>○</li><li>▼</li><li>○</li></ul>
Serbia and Montenegro Palestinian Nat'l Auth. Moldova, Republic of New Zealand Slovak Republic Armenia Israel Macedonia, Republic of	38 38 38 37 37 36	<ul><li>○</li><li>▼</li><li>○</li></ul>
Serbia and Montenegro Palestinian Nat'l Auth. Moldova, Republic of New Zealand Slovak Republic Armenia Israel Macedonia, Republic of Cyprus	38 38 38 37 37 36 36 36 34	<ul><li>○</li><li>▼</li><li>○</li></ul>
Serbia and Montenegro Palestinian Nat'l Auth. Moldova, Republic of New Zealand Slovak Republic Armenia Israel Macedonia, Republic of Cyprus Norway	38 38 38 37 37 36 36 36 34 34	<ul><li>○</li><li>▼</li><li>○</li></ul>
Serbia and Montenegro Palestinian Nat'l Auth. Moldova, Republic of New Zealand Slovak Republic Armenia Israel Macedonia, Republic of Cyprus Norway Egypt	38 38 38 37 37 36 36 36 34 34	<ul><li>○</li><li>▼</li><li>○</li></ul>
Serbia and Montenegro Palestinian Nat'l Auth. Moldova, Republic of New Zealand Slovak Republic Armenia Israel Macedonia, Republic of Cyprus Norway Egypt Indonesia	38 38 38 37 37 36 36 36 34 34	<ul><li>○</li><li>▼</li><li>○</li></ul>
Serbia and Montenegro Palestinian Nat'l Auth. Moldova, Republic of New Zealand Slovak Republic Armenia Israel Macedonia, Republic of Cyprus Norway Egypt	38 38 38 37 37 36 36 36 34 34 34	<ul><li>○</li><li>▼</li><li>○</li></ul>
Serbia and Montenegro Palestinian Nat'l Auth. Moldova, Republic of New Zealand Slovak Republic Armenia Israel Macedonia, Republic of Cyprus Norway Egypt Indonesia Bulgaria	38 38 38 37 37 36 36 36 34 34 34 33 31 30	0
Serbia and Montenegro Palestinian Nat'l Auth. Moldova, Republic of New Zealand Slovak Republic Armenia Israel Macedonia, Republic of Cyprus Norway Egypt Indonesia Bulgaria Slovenia Scotland	38 38 37 37 36 36 36 34 34 34 33 31 30 29	<ul><li>○</li><li>▼</li><li>○</li></ul>
Serbia and Montenegro Palestinian Nat'l Auth. Moldova, Republic of New Zealand Slovak Republic Armenia Israel Macedonia, Republic of Cyprus Norway Egypt Indonesia Bulgaria Slovenia Scotland Bahrain	38 38 38 37 37 36 36 36 34 34 33 31 30 29 27	<ul><li>○</li><li>▼</li><li>○</li></ul>
Serbia and Montenegro Palestinian Nat'l Auth. Moldova, Republic of New Zealand Slovak Republic Armenia Israel Macedonia, Republic of Cyprus Norway Egypt Indonesia Bulgaria Slovenia Scotland Bahrain Chile	38 38 38 37 37 36 36 36 34 34 33 31 30 29 27 25	· · · · · · · · · · · · · · · · · · ·
Serbia and Montenegro Palestinian Nat'l Auth. Moldova, Republic of New Zealand Slovak Republic Armenia Israel Macedonia, Republic of Cyprus Norway Egypt Indonesia Bulgaria Slovenia Scotland Bahrain Chile Ghana	38 38 38 37 37 36 36 36 34 34 33 31 30 29 27 25 23	· · · · · · · · · · · · · · · · · · ·
Serbia and Montenegro Palestinian Nat'l Auth. Moldova, Republic of New Zealand Slovak Republic Armenia Israel Macedonia, Republic of Cyprus Norway Egypt Indonesia Bulgaria Slovenia Scotland Bahrain Chile Ghana Botswana	38 38 38 37 37 36 36 36 34 34 33 31 30 29 27 25 23 23	· · · · · · · · · · · · · · · · · · ·
Serbia and Montenegro Palestinian Nat'l Auth. Moldova, Republic of New Zealand Slovak Republic Armenia Israel Macedonia, Republic of Cyprus Norway Egypt Indonesia Bulgaria Slovenia Scotland Bahrain Chile Ghana Botswana South Africa	38 38 38 37 37 36 36 36 34 34 33 31 30 29 27 25 23 23 21	• • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • •
Serbia and Montenegro Palestinian Nat'l Auth. Moldova, Republic of New Zealand Slovak Republic Armenia Israel Macedonia, Republic of Cyprus Norway Egypt Indonesia Bulgaria Slovenia Scotland Bahrain Chile Ghana Botswana South Africa Morocco	38 38 38 37 37 36 36 36 34 34 34 33 31 30 29 27 25 23 23 21 21	<ul><li>○</li><li>▼</li><li>○</li></ul>
Serbia and Montenegro Palestinian Nat'l Auth. Moldova, Republic of New Zealand Slovak Republic Armenia Israel Macedonia, Republic of Cyprus Norway Egypt Indonesia Bulgaria Slovenia Scotland Bahrain Chile Ghana Botswana South Africa	38 38 38 37 37 36 36 36 34 34 33 31 30 29 27 25 23 23 21	• • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • •

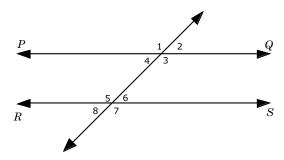
Country average vs. International average:

Higher △
Not different ○
Lower ▼

Content Domain	Main Topic	Cognitive Domain
GEOMETRY	Lines and Angles	Knowing Facts and Procedures

### Sum of angles equal to 180 degrees

In this figure, PQ and RS are parallel.



Of the following, which pair of angles has the sum of 180°?

- $\bigcirc$   $\triangle$  5 and  $\triangle$  7
- (B)  $\angle 3$  and  $\angle 6$
- $\bigcirc$   $\angle 1$  and  $\angle 5$
- $\bigcirc$   $\angle 1$  and  $\angle 7$
- (E)  $\angle 2$  and  $\angle 8$

Item Number: M022142

**Correct Response:** 

В

### **Overall Percent Correct**

Japan	83	<b>A</b>
Korea, Republic of	81	<u> </u>
Hong Kong, SAR	79	<u> </u>
Singapore	72	<u> </u>
Chinese Taipei	67	<u> </u>
Estonia	63	<u> </u>
Belgium (Flemish)	62	_
Latvia	56	<u> </u>
Russian Federation	54	<u> </u>
Australia	49	<u> </u>
Lithuania	49	<u> </u>
England	48	0
Israel	47	0
Bulgaria	47	0
Moldova, Republic of	47	0
Hungary	47	0
Slovak Republic	46	0
Bahrain	46 46	0
Netherlands	45	0
		0
New Zealand	45	-
Serbia and Montenegro	43 <b>43</b>	0
International average Armenia	43	0
Allicila	45	0
Cyprus	12	$\circ$
Cyprus	42 41	0
Scotland	41	Ο
Scotland Slovenia	41 41	0 0
Scotland Slovenia Romania	41 41 41	0 0 0
Scotland Slovenia Romania Malaysia	41 41 41 41	0 0 0
Scotland Slovenia Romania Malaysia Lebanon	41 41 41 41 38	0 0 0
Scotland Slovenia Romania Malaysia Lebanon Egypt	41 41 41 41 38 37	0 0 0 •
Scotland Slovenia Romania Malaysia Lebanon Egypt United States	41 41 41 41 38 37 37	0 0 0 •
Scotland Slovenia Romania Malaysia Lebanon Egypt United States Italy	41 41 41 41 38 37 37 36	0 0 0 •
Scotland Slovenia Romania Malaysia Lebanon Egypt United States Italy Macedonia, Republic of	41 41 41 41 38 37 37 36 35	0 0 0 •
Scotland Slovenia Romania Malaysia Lebanon Egypt United States Italy Macedonia, Republic of Palestinian Nat'l Auth.	41 41 41 41 38 37 37 36 35 34	0 0 0 • • •
Scotland Slovenia Romania Malaysia Lebanon Egypt United States Italy Macedonia, Republic of Palestinian Nat'l Auth. Norway	41 41 41 41 38 37 37 36 35 34	0 0 0 • • •
Scotland Slovenia Romania Malaysia Lebanon Egypt United States Italy Macedonia, Republic of Palestinian Nat'l Auth. Norway Sweden	41 41 41 41 38 37 37 36 35 34 34 34	0 0 0 • • •
Scotland Slovenia Romania Malaysia Lebanon Egypt United States Italy Macedonia, Republic of Palestinian Nat'l Auth. Norway Sweden Indonesia	41 41 41 41 38 37 37 36 35 34 34 32 31	0 0 0 • • •
Scotland Slovenia Romania Malaysia Lebanon Egypt United States Italy Macedonia, Republic of Palestinian Nat'l Auth. Norway Sweden Indonesia Jordan	41 41 41 41 38 37 37 36 35 34 34 32 31 29	0 0 0 • • •
Scotland Slovenia Romania Malaysia Lebanon Egypt United States Italy Macedonia, Republic of Palestinian Nat'l Auth. Norway Sweden Indonesia Jordan Tunisia	41 41 41 41 38 37 36 35 34 34 32 31 29 28	0 0 0 0 V V V V V V V V V V V V V V V V
Scotland Slovenia Romania Malaysia Lebanon Egypt United States Italy Macedonia, Republic of Palestinian Nat'l Auth. Norway Sweden Indonesia Jordan Tunisia Morocco	41 41 41 41 38 37 36 35 34 34 32 31 29 28 28	0 0 0 0 0 0 0 0 0 0 0 0
Scotland Slovenia Romania Malaysia Lebanon Egypt United States Italy Macedonia, Republic of Palestinian Nat'l Auth. Norway Sweden Indonesia Jordan Tunisia Morocco Philippines	41 41 41 38 37 36 35 34 34 32 31 29 28 28 26	0 0 0 0 0 0 0 0 0 0 0 0
Scotland Slovenia Romania Malaysia Lebanon Egypt United States Italy Macedonia, Republic of Palestinian Nat'l Auth. Norway Sweden Indonesia Jordan Tunisia Morocco Philippines Iran, Islamic Republic of	41 41 41 38 37 36 35 34 32 31 29 28 28 26 25	0 0 0 0 V V V V V V V V V V V V V V V V
Scotland Slovenia Romania Malaysia Lebanon Egypt United States Italy Macedonia, Republic of Palestinian Nat'l Auth. Norway Sweden Indonesia Jordan Tunisia Morocco Philippines Iran, Islamic Republic of Chile	41 41 41 38 37 36 35 34 32 31 29 28 28 26 25 25	
Scotland Slovenia Romania Malaysia Lebanon Egypt United States Italy Macedonia, Republic of Palestinian Nat'l Auth. Norway Sweden Indonesia Jordan Tunisia Morocco Philippines Iran, Islamic Republic of Chile South Africa	41 41 41 41 38 37 36 35 34 32 31 29 28 26 25 25 23	0 0 0 0 0 0 0 0 0 0 0 0
Scotland Slovenia Romania Malaysia Lebanon Egypt United States Italy Macedonia, Republic of Palestinian Nat'l Auth. Norway Sweden Indonesia Jordan Tunisia Morocco Philippines Iran, Islamic Republic of Chile	41 41 41 38 37 36 35 34 32 31 29 28 28 26 25 25	

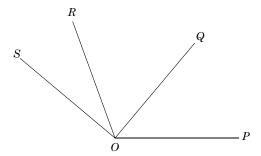
Country average vs. International average:

Botswana

Content Domain	Main Topic	Cognitive Domain
GEOMETRY	Lines and Angles	Reasoning

### Measure of angle in adjacent angles

In the figure, the measure of  $\angle POR$  is 110°, the measure of  $\angle QOS$  is 90°, and the measure of  $\angle POS$  is 140°.



What is the measure of  $\angle QOR$ ?

Answer:	
---------	--

Item Number: M022202

#### **SCORING**

#### **Correct Response**

• 60

#### **Incorrect Response**

- 30 OR 50 [140° 110° or 140° 90°]
- 55 [110 ÷ 2]
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task).

### **Overall Percent Correct**

Korea, Republic of	63	
Japan	60	
Singapore	58	
Hong Kong, SAR	57	
Chinese Taipei	49	
Hungary	44	
Norway	41	
Russian Federation	40	
Armenia	39	
Latvia	37	
Belgium (Flemish)	36	
Slovak Republic	36	
Estonia	36	
Serbia and Montenegro	35	
Romania	34	
Bulgaria	34	
Israel	32	
Moldova, Republic of	32	0
Malaysia	32	
Netherlands	28	0
New Zealand	28	0
International average	28	
Lithuania	27	0
Macedonia, Republic of	26	0
Australia	26	0

Lithuania	27	0
Macedonia, Republic of	26	0
Australia	26	0
Lebanon	26	0
Italy	25	0
Slovenia	25	0
England	23	<b>V</b>
United States	22	$\blacksquare$
Cyprus	21	▼ ▼ ▼
Sweden	20	$\blacksquare$
Tunisia	18	$\blacksquare$
Scotland	17	<b>V</b>
Palestinian Nat'l Auth.	16	$\blacksquare$
Indonesia	16	<b>V</b>
Bahrain	16	
Egypt	15	<b>▼</b>
Jordan	13	$\blacksquare$
Morocco	11	<b>V</b>
Philippines	11	
Iran, Islamic Republic of	11	<b>*</b>
Chile	10	$\blacksquare$
Botswana	9	<b>V</b>
Saudi Arabia	6	$\blacksquare$
South Africa	4	$\blacksquare$

Country average vs. International average:

O ▼

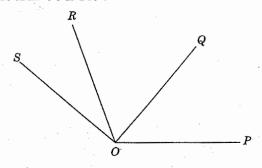
# Measure of angle in adjacent angles (continued)

Item Number: M022202

# **Student Responses**

### **Correct Response:**

In the figure, the measure of  $\angle POR$  is 110°, the measure of  $\angle QOS$  is 90°, and the measure of  $\angle POS$  is 140°.

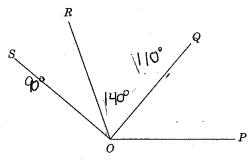


What is the measure of  $\angle QOR$ ?

Answer:

### **Incorrect Response:**

In the figure, the measure of  $\angle POR$  is 110°, the measure of  $\angle QOS$  is 90°, and the measure of  $\angle POS$  is 140°.



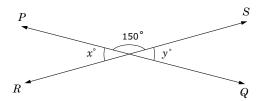
What is the measure of  $\angle QOR$ ?

Answer: 50°

Content Domain	Main Topic	Cognitive Domain
GEOMETRY	Lines and Angles	Solving Routine Problems

### Sum of angles from intersecting lines

In the figure, PQ and RS are intersecting straight lines.



What is the value of x + y?

- A 15
- (B) 30
- © 60
- (D) 180
- **E** 300

Item Number: M012039

**Correct Response:** 

0

### **Overall Percent Correct**

Korea, Republic of	84	
	84	
Singapore		
Hong Kong, SAR	83	
Chinese Taipei	82	
Japan	78	
Malaysia	69	
Estonia	67	
Latvia	66	
Russian Federation	64	
Belgium (Flemish)	59	
Serbia and Montenegro	59	
Israel	58	
Romania	58	
Slovenia	58	
Bulgaria	57	
Netherlands	57	
Lebanon	55	
Lithuania	54	0
Australia	52	0
Moldova, Republic of	52	0
Slovak Republic	52	0
England	50	Ο
International average	EΛ	

England	50	U
International average	50	
Italy	50	0
Hungary	48	0
Iran, Islamic Republic of	48	0
United States	47	0
Cyprus	46	$\blacksquare$
New Zealand	46	0
Macedonia, Republic of	45	$\blacksquare$
Armenia	44	$\blacksquare$
Egypt	43	<b>▼</b>
Sweden	43	$\blacksquare$
Scotland	41	<b>V</b>
Tunisia	41	$\blacksquare$
Jordan	40	$\blacksquare$
Palestinian Nat'l Auth.	40	* * * * * * * * * * * * * * * * * * *
Indonesia	38	$\blacksquare$
Norway	34	$\blacksquare$
Bahrain	33	$\blacksquare$
Morocco	33	$\blacksquare$
Chile	32	$\blacksquare$
Philippines	27	<b>V</b>
Botswana	26	$\blacksquare$
Saudi Arabia	26	<b>* * *</b>
Ghana	21	$\blacksquare$
South Africa	16	•

Country average vs. International average:

O ▼

Content Domain	Main Topic	Cognitive Domain
GEOMETRY	Locations and Spatial Relationships	Knowing Facts and Procedures

### Point on a line defined by two points

A straight line passes through the points (2,3) and (4,7). Which of these points is also on the line?

- (0,2)
- (B) (1,2)
- © (2,4)
- $\bigcirc$  (3,5)
- (4,5)

Item Number: M022016

**Correct Response:** 

D

### **Overall Percent Correct**

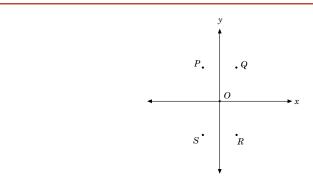
Netherlands England Scotland Korea, Republic of Singapore Chinese Taipei Sweden Australia United States Japan Norway Hong Kong, SAR Hungary Lithuania New Zealand Belgium (Flemish) Russian Federation	66 62 56 56 54 53 51 50 49 47 46 44 43 42	
Estonia Malaysia	40 38	<b>A</b>
Latvia	37	0
Cyprus	36	0
International average Slovenia	<b>35</b>	0
Israel	35 34	0
Serbia and Montenegro	31	0
Indonesia	31	▼
Slovak Republic	30	<u> </u>
Chile	29	<u> </u>
Egypt	28	* * * * * * * * * * * * * * * * * * *
Morocco	28	▼
Romania	28	▼
Macedonia, Republic of	27	▼
Italy	26	▼
Jordan	26	▼
Moldova, Republic of	25	▼
Bulgaria	24	_
Armenia	23	
Lebanon Botswana	23 22	· ·
Philippines	22	¥
Palestinian Nat'l Auth.	21	¥
Bahrain	21	· •
Iran, Islamic Republic of	20	▼
Ghana	19	▼
Saudi Arabia	19	▼
South Africa	19	▼
Tunisia	8	▼

Country average vs. International average:

O ▼

Content Domain	Main Topic	Cognitive Domain
GEOMETRY	Locations and Spatial Relationships	Knowing Facts and Procedures

# Which point could have coordinates (2, -4)



In the coordinate plane above, which point could have coordinates (2,-4)?

- $\bigcirc$  P
- $\bigcirc$  Q
- $\bigcirc$  R
- $\bigcirc$  S

Item Number: M032588

**Correct Response:** 

0

### **Overall Percent Correct**

Chinese Taipei	87	<b>A</b>
Japan	86	<b>A</b>
Korea, Republic of	83	$\blacktriangle$
Estonia	81	$\blacktriangle$
Russian Federation	79	$\blacktriangle$
Singapore	77	$\blacktriangle$
Netherlands	75	$\blacktriangle$
Hong Kong, SAR	74	$\blacktriangle$
Hungary	74	$\blacktriangle$
Lithuania	73	
Latvia	72	<b>A</b>
United States	72	
Malaysia	71	<b>A</b>
Iran, Islamic Republic of	69	<b>A</b>
Belgium (Flemish)	68	<b>A</b>
England	67	<b>A</b>
Lebanon	66	<b>A</b>
Scotland	65	<b>A</b>
Israel	62	<u> </u>
Serbia and Montenegro	61	$\blacktriangle$
Bulgaria	60	0
Romania	59	0
Slovenia	58	0
Macedonia, Republic of	58	0
New Zealand	58	0
New Zealand		
Australia	58	0
Australia	58	0
Australia Italy	58 57 <b>56</b> 55	0
Australia Italy International average	58 57 <b>56</b>	0
Australia Italy International average Jordan	58 57 <b>56</b> 55	0 0
Australia Italy International average Jordan Armenia	58 57 <b>56</b> 55 53	0 0
Australia Italy International average Jordan Armenia Moldova, Republic of	58 57 <b>56</b> 55 53 53	0 0 0 0 0
Australia Italy International average Jordan Armenia Moldova, Republic of Indonesia	58 57 <b>56</b> 55 53 53 47 45	0 0 0 0
Australia Italy International average Jordan Armenia Moldova, Republic of Indonesia Egypt	58 57 <b>56</b> 55 53 53 47	0 0 0 0
Australia Italy International average Jordan Armenia Moldova, Republic of Indonesia Egypt Sweden	58 57 <b>56</b> 55 53 53 47 45	0 0 0 0
Australia Italy International average Jordan Armenia Moldova, Republic of Indonesia Egypt Sweden Slovak Republic	58 57 <b>56</b> 55 53 53 53 47 45 43	0 0 0 0
Australia Italy International average Jordan Armenia Moldova, Republic of Indonesia Egypt Sweden Slovak Republic Norway	58 57 <b>56</b> 55 53 53 47 45 43	0 0 0 0 0
Australia Italy International average Jordan Armenia Moldova, Republic of Indonesia Egypt Sweden Slovak Republic Norway Philippines	58 57 <b>56</b> 55 53 53 47 45 43 43	0 0 0 0
Australia Italy International average Jordan Armenia Moldova, Republic of Indonesia Egypt Sweden Slovak Republic Norway Philippines Bahrain	58 57 <b>56</b> 55 53 53 47 45 43 43 41 38	0 0 0 0
Australia Italy International average Jordan Armenia Moldova, Republic of Indonesia Egypt Sweden Slovak Republic Norway Philippines Bahrain Palestinian Nat'l Auth.	58 57 <b>56</b> 55 53 53 47 45 43 41 38 34	0 0 0 0
Australia Italy International average Jordan Armenia Moldova, Republic of Indonesia Egypt Sweden Slovak Republic Norway Philippines Bahrain Palestinian Nat'l Auth. Saudi Arabia	58 57 56 55 53 53 47 45 43 43 41 38 34 32	
Australia Italy International average Jordan Armenia Moldova, Republic of Indonesia Egypt Sweden Slovak Republic Norway Philippines Bahrain Palestinian Nat'l Auth. Saudi Arabia Morocco	58 57 56 55 53 53 53 47 45 43 41 38 34 32 31	
Australia Italy International average Jordan Armenia Moldova, Republic of Indonesia Egypt Sweden Slovak Republic Norway Philippines Bahrain Palestinian Nat'l Auth. Saudi Arabia Morocco Cyprus	58 57 56 55 53 53 53 47 45 43 41 38 34 32 31 30	
Australia Italy International average Jordan Armenia Moldova, Republic of Indonesia Egypt Sweden Slovak Republic Norway Philippines Bahrain Palestinian Nat'l Auth. Saudi Arabia Morocco Cyprus Tunisia	58 57 56 55 53 53 53 47 45 43 41 38 34 32 31 30 28	
Australia Italy International average Jordan Armenia Moldova, Republic of Indonesia Egypt Sweden Slovak Republic Norway Philippines Bahrain Palestinian Nat'l Auth. Saudi Arabia Morocco Cyprus Tunisia South Africa	58 57 56 55 53 53 53 47 45 43 41 38 34 32 31 30 28 28	0 0 0 0
Australia Italy International average Jordan Armenia Moldova, Republic of Indonesia Egypt Sweden Slovak Republic Norway Philippines Bahrain Palestinian Nat'l Auth. Saudi Arabia Morocco Cyprus Tunisia South Africa Botswana	58 57 56 55 53 53 53 47 45 43 41 38 34 32 31 30 28 28 26	
Australia Italy International average Jordan Armenia Moldova, Republic of Indonesia Egypt Sweden Slovak Republic Norway Philippines Bahrain Palestinian Nat'l Auth. Saudi Arabia Morocco Cyprus Tunisia South Africa Botswana Chile	58 57 56 55 53 53 53 47 45 43 41 38 34 32 31 30 28 28 26 25	

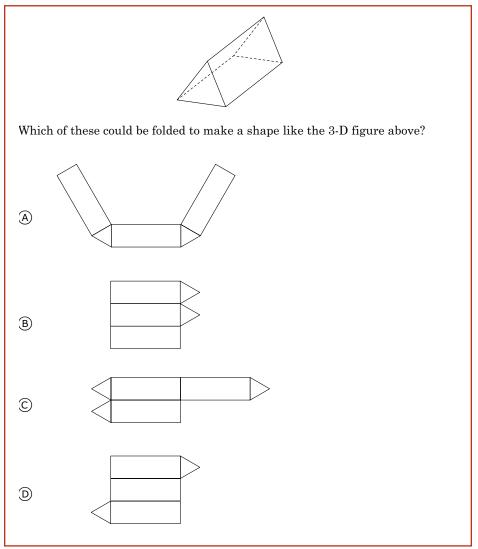
Country average vs. International average:

0

 $\blacksquare$ 

Content Domain	Main Topic	Cognitive Domain
GEOMETRY	Locations and Spatial Relationships	Using Concepts

# Which could be folded to make a 3-D figure



Item Number: M032489

Correct Response: D

### **Overall Percent Correct**

Japan	97	<b>A</b>
Chinese Taipei	96	<b>A</b>
Korea, Republic of	94	<b>A</b>
Hong Kong, SAR	94	<b>A</b>
Singapore	94	<b>A</b>
Netherlands	89	<b>A</b>
Malaysia	89	<b>A</b>
New Zealand	88	<b>A</b>
Estonia	87	<b>A</b>
Belgium (Flemish)	87	<b>A</b>
Australia	86	<b>A</b>
England	86	<b>A</b>
Scotland	86	<b>A</b>
Hungary	85	<b>A</b>
Lithuania	83	<b>A</b>
Slovak Republic	81	<b>A</b>
Serbia and Montenegro	77	<b>A</b>
United States	76	<b>A</b>
Sweden	76	<b>A</b>
Slovenia	75	<b>A</b>
Italy	73	<b>A</b>
Latvia	72	0
Norway	71	0
Bulgaria	70	0
Russian Federation	69	0
Indonesia	68	0 0
Indonesia International average	68 <b>68</b>	0
Indonesia International average Romania	68 <b>68</b> 68	0
Indonesia International average Romania Chile	68 68 68 67	0 0 0
Indonesia International average Romania Chile Cyprus	68 68 68 67 63	0 0
Indonesia International average Romania Chile Cyprus Macedonia, Republic of	68 68 68 67 63 63	0 0 0 •
Indonesia International average Romania Chile Cyprus Macedonia, Republic of Israel	68 68 68 67 63 63 62	0 0 0 •
Indonesia International average Romania Chile Cyprus Macedonia, Republic of Israel Morocco	68 68 68 67 63 63 62 61	0 0 0 •
Indonesia International average Romania Chile Cyprus Macedonia, Republic of Israel Morocco Lebanon	68 68 68 67 63 63 62 61 59	0 0 0 •
Indonesia International average Romania Chile Cyprus Macedonia, Republic of Israel Morocco Lebanon Tunisia	68 68 67 63 63 62 61 59	0 0 0 •
Indonesia International average Romania Chile Cyprus Macedonia, Republic of Israel Morocco Lebanon Tunisia Iran, Islamic Republic of	68 68 68 67 63 63 62 61 59 58	0 0 0 •
Indonesia International average Romania Chile Cyprus Macedonia, Republic of Israel Morocco Lebanon Tunisia Iran, Islamic Republic of Jordan	68 68 68 67 63 63 62 61 59 58 55 52	0 0
Indonesia International average Romania Chile Cyprus Macedonia, Republic of Israel Morocco Lebanon Tunisia Iran, Islamic Republic of Jordan Palestinian Nat'l Auth.	68 68 67 63 63 62 61 59 58 55 52 51	0 0 0 V V V
Indonesia International average Romania Chile Cyprus Macedonia, Republic of Israel Morocco Lebanon Tunisia Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Moldova, Republic of	68 68 67 63 63 62 61 59 58 55 52 51 49	0 0 0 •
Indonesia International average Romania Chile Cyprus Macedonia, Republic of Israel Morocco Lebanon Tunisia Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Moldova, Republic of Bahrain	68 68 67 63 63 62 61 59 58 55 52 51 49	0 0 0 V V V
Indonesia International average Romania Chile Cyprus Macedonia, Republic of Israel Morocco Lebanon Tunisia Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Moldova, Republic of Bahrain Philippines	68 68 67 63 63 62 61 59 58 55 52 51 49 46 46	0 0 0 V V V
Indonesia International average Romania Chile Cyprus Macedonia, Republic of Israel Morocco Lebanon Tunisia Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Moldova, Republic of Bahrain Philippines Botswana	68 68 67 63 63 62 61 59 58 55 52 51 49 46 46 43	0 0 0 V V V V V V V V V V V V V V V V V
Indonesia International average Romania Chile Cyprus Macedonia, Republic of Israel Morocco Lebanon Tunisia Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Moldova, Republic of Bahrain Philippines Botswana Saudi Arabia	68 68 67 63 62 61 59 58 55 52 51 49 46 46 43 40	0 0 0 V V V V V V V V V V V V V V V V V
Indonesia International average Romania Chile Cyprus Macedonia, Republic of Israel Morocco Lebanon Tunisia Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Moldova, Republic of Bahrain Philippines Botswana Saudi Arabia Armenia	68 68 67 63 62 61 59 58 55 52 51 49 46 46 43 40 40	0 0 0 V V V V V V V V V V V V V V V V V
Indonesia International average Romania Chile Cyprus Macedonia, Republic of Israel Morocco Lebanon Tunisia Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Moldova, Republic of Bahrain Philippines Botswana Saudi Arabia Armenia Egypt	68 68 68 67 63 62 61 59 58 55 52 51 49 46 46 43 40 40 31	0 0 0 V V V V V V V V V V V V V V V V V
Indonesia International average Romania Chile Cyprus Macedonia, Republic of Israel Morocco Lebanon Tunisia Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Moldova, Republic of Bahrain Philippines Botswana Saudi Arabia Armenia Egypt South Africa	68 68 67 63 62 61 59 58 55 52 51 49 46 46 43 40 40 31 28	0 0 0 V V V V V V V V V V V V V V V V V
Indonesia International average Romania Chile Cyprus Macedonia, Republic of Israel Morocco Lebanon Tunisia Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Moldova, Republic of Bahrain Philippines Botswana Saudi Arabia Armenia Egypt	68 68 68 67 63 62 61 59 58 55 52 51 49 46 46 43 40 40 31	0 0 0 V V V

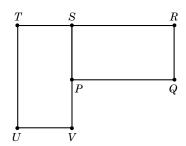
Country average vs. International average:

Higher △
Not different ○
Lower ▼

Content Domain	Main Topic	Cognitive Domain
GEOMETRY	Symmetry and Transformations	Reasoning

### Center point of rotation of rectangle

Rectangle PQRS can be rotated (turned) onto rectangle UVST.



What point is the center of rotation?

- $\bigcirc$  P
- $\bigcirc$  R
- $\bigcirc$  S
- $\bigcirc$  T
- $\bigcirc$  V

Item Number: M022154

**Correct Response:** 

0

### **Overall Percent Correct**

Japan	79	<b>A</b>
Chinese Taipei	76	<b>A</b>
Korea, Republic of	75	<b>A</b>
Hong Kong, SAR	73	<b>A</b>
Slovenia	71	<b>A</b>
Estonia	71	<b>A</b>
Netherlands	65	<b>A</b>
Singapore	64	<b>A</b>
Hungary	63	<b>A</b>
England	63	<b>A</b>
Belgium (Flemish)	62	<b>A</b>
Latvia	61	<b>A</b>
Sweden	60	<b>A</b>
New Zealand	59	<b>A</b>
Lithuania	58	<b>A</b>
Italy	58	<b>A</b>
Slovak Republic	54	<b>A</b>
Australia	54	<b>A</b>
Israel	54	<b>A</b>
Malaysia	54	<b>A</b>
Russian Federation	52	<b>A</b>
Serbia and Montenegro	50	0
Norway	49	0
United States	49	0
International average	47	
Bulgaria	47	0
Bulgaria Moldova, Republic of	47 46	0
Bulgaria Moldova, Republic of Romania	47 46 46	0
Bulgaria Moldova, Republic of Romania Scotland	47 46 46 45	0 0
Bulgaria Moldova, Republic of Romania Scotland Jordan	47 46 46 45 44	0 0 0
Bulgaria Moldova, Republic of Romania Scotland Jordan Armenia	47 46 46 45 44 40	0 0 0
Bulgaria Moldova, Republic of Romania Scotland Jordan Armenia Cyprus	47 46 46 45 44 40 39	0 0 0
Bulgaria Moldova, Republic of Romania Scotland Jordan Armenia Cyprus Iran, Islamic Republic of	47 46 46 45 44 40 39 37	0 0 0
Bulgaria Moldova, Republic of Romania Scotland Jordan Armenia Cyprus Iran, Islamic Republic of Palestinian Nat'l Auth.	47 46 46 45 44 40 39 37 34	0 0 0
Bulgaria Moldova, Republic of Romania Scotland Jordan Armenia Cyprus Iran, Islamic Republic of Palestinian Nat'l Auth. Bahrain	47 46 46 45 44 40 39 37 34	0 0 0
Bulgaria Moldova, Republic of Romania Scotland Jordan Armenia Cyprus Iran, Islamic Republic of Palestinian Nat'l Auth. Bahrain Lebanon	47 46 46 45 44 40 39 37 34 34	0 0 0
Bulgaria Moldova, Republic of Romania Scotland Jordan Armenia Cyprus Iran, Islamic Republic of Palestinian Nat'l Auth. Bahrain Lebanon	47 46 46 45 44 40 39 37 34 34 32	0 0 0
Bulgaria Moldova, Republic of Romania Scotland Jordan Armenia Cyprus Iran, Islamic Republic of Palestinian Nat'l Auth. Bahrain Lebanon Egypt Indonesia	47 46 46 45 44 40 39 37 34 34 32 31	0 0 0
Bulgaria Moldova, Republic of Romania Scotland Jordan Armenia Cyprus Iran, Islamic Republic of Palestinian Nat'l Auth. Bahrain Lebanon Egypt Indonesia Tunisia	47 46 46 45 44 40 39 37 34 32 31 29 29	0 0 0
Bulgaria Moldova, Republic of Romania Scotland Jordan Armenia Cyprus Iran, Islamic Republic of Palestinian Nat'l Auth. Bahrain Lebanon Egypt Indonesia Tunisia Macedonia, Republic of	47 46 46 45 44 40 39 37 34 32 31 29 29 28	0 0 0
Bulgaria Moldova, Republic of Romania Scotland Jordan Armenia Cyprus Iran, Islamic Republic of Palestinian Nat'l Auth. Bahrain Lebanon Egypt Indonesia Tunisia Macedonia, Republic of Morocco	47 46 46 45 44 40 39 37 34 32 31 29 29 28 28	0 0 0
Bulgaria Moldova, Republic of Romania Scotland Jordan Armenia Cyprus Iran, Islamic Republic of Palestinian Nat'l Auth. Bahrain Lebanon Egypt Indonesia Tunisia Macedonia, Republic of Morocco Chile	47 46 46 45 44 40 39 37 34 32 31 29 29 28 28 28	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Bulgaria Moldova, Republic of Romania Scotland Jordan Armenia Cyprus Iran, Islamic Republic of Palestinian Nat'l Auth. Bahrain Lebanon Egypt Indonesia Tunisia Macedonia, Republic of Morocco Chile Philippines	47 46 46 45 44 40 39 37 34 32 31 29 29 28 28 28	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Bulgaria Moldova, Republic of Romania Scotland Jordan Armenia Cyprus Iran, Islamic Republic of Palestinian Nat'l Auth. Bahrain Lebanon Egypt Indonesia Tunisia Macedonia, Republic of Morocco Chile Philippines Botswana	47 46 46 45 44 40 39 37 34 32 31 29 29 28 28 28 25 23	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Bulgaria Moldova, Republic of Romania Scotland Jordan Armenia Cyprus Iran, Islamic Republic of Palestinian Nat'l Auth. Bahrain Lebanon Egypt Indonesia Tunisia Macedonia, Republic of Morocco Chile Philippines Botswana Saudi Arabia	47 46 46 45 44 40 39 37 34 32 31 29 29 28 28 28 25 23 18	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Bulgaria Moldova, Republic of Romania Scotland Jordan Armenia Cyprus Iran, Islamic Republic of Palestinian Nat'l Auth. Bahrain Lebanon Egypt Indonesia Tunisia Macedonia, Republic of Morocco Chile Philippines Botswana Saudi Arabia South Africa	47 46 46 45 44 40 39 37 34 32 31 29 29 28 28 28 25 23 18	0 0 0
Bulgaria Moldova, Republic of Romania Scotland Jordan Armenia Cyprus Iran, Islamic Republic of Palestinian Nat'l Auth. Bahrain Lebanon Egypt Indonesia Tunisia Macedonia, Republic of Morocco Chile Philippines Botswana Saudi Arabia	47 46 46 45 44 40 39 37 34 32 31 29 29 28 28 28 25 23 18	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

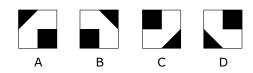
Country average vs. International average:

0

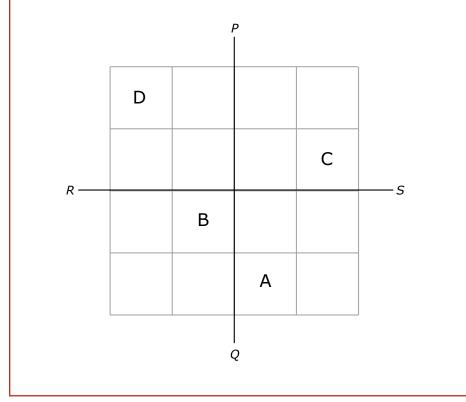
 $\blacksquare$ 

Content Domain	Main Topic	Cognitive Domain
GEOMETRY	Symmetry and Transformations	Reasoning

### Geometry tiling: produce a pattern using letters



Continue to identify the tiles as shown above. On the grid below, write the letters A, B, C, or D to make a symmetrical pattern where PQ and RS would be lines of symmetry. Arrange the tiles to make a pattern.



Item Number: M032745

#### **SCORING**

#### **Correct Response**

 All cells are correct with symmetrical geometric pattern about both axes, PQ and RS (letters or drawings).

#### **Partial Response**

• With respect to at least one of the original tiles the other three tiles are correct.

#### **Incorrect Response**

- · Letters placed symmetrically with respect to both PQ and RS.
- · Other incorrect (including crossed out/erased, stray marks, illegible, or off task).

### **Overall Percent Correct**

Lithuania	16	<b>A</b>
Japan	14	
Korea, Republic of	12	
Singapore	11	
Hong Kong, SAR	10	
Scotland	9	
England	9	<u> </u>
Chinese Taipei	9	_
Netherlands	8	_
Slovenia	8	<u> </u>
Estonia	7	_ _
Australia	7	0
New Zealand	7	0
Belgium (Flemish)	7	<u> </u>
United States	6	0
Morocco	5	0
Russian Federation	5	0
Malaysia	5	0
International average	4	
Hungary	4	0
Slovak Republic	3	0
Latvia	3	0
Norway	3	0
Moldova, Republic of	3	0
Sweden	3	0
Indonesia	2	▼
Romania	2	▼
Israel	2	<b>V</b>
Bulgaria	2	
Italy	1	* * * * * * * * * * * * * * * * * * *
Armenia	1	•
Lebanon	1	<b>V</b>
Macedonia, Republic of	1	•
South Africa	1	•
Egypt	1	<b>V</b>
Chile	1	<b>V</b>
Philippines	1	<b>V</b>
1.1	1	<b>V</b>
Iran Islamic Republic of		*
Iran, Islamic Republic of Botswana	1	$\blacksquare$
Botswana	1 1	<b>V</b>
Botswana Jordan	1 1 1	<b>▼</b>
Botswana Jordan Bahrain	1 1	* * * * * * * * * * * * * * * * * * *
Botswana Jordan Bahrain Cyprus	1	* * * * * * * * * * * * * * * * * * *
Botswana Jordan Bahrain	1 1 0	* * * * * * * * * * * * * * * * * * *
Botswana Jordan Bahrain Cyprus Serbia and Montenegro	1 1 0 0	* * * * * * * * * * * * * * * * * * *
Botswana Jordan Bahrain Cyprus Serbia and Montenegro Tunisia	1 1 0 0	* * * * * * * * * * * * * * * * * * *
Botswana Jordan Bahrain Cyprus Serbia and Montenegro Tunisia	1 1 0 0	* * * * * * * * * * * * * * * * * * *

# Country average vs. International average:

# Geometry tiling: produce a pattern using letters (continued)

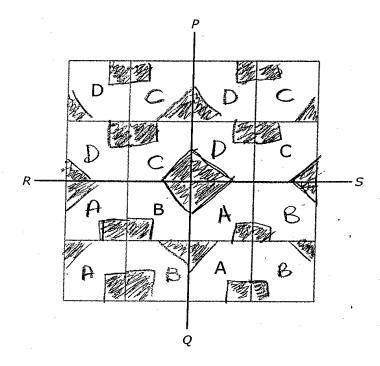
Item Number: M032745

# **Student Responses**

#### **Correct Response:**



Continue to identify the tiles as shown above. On the grid below, write the letters A, B, C, or D to make a symmetrical pattern where PQ and RS would be lines of symmetry. Arrange the tiles to make a pattern.



### Geometry tiling: produce a pattern using letters (continued)

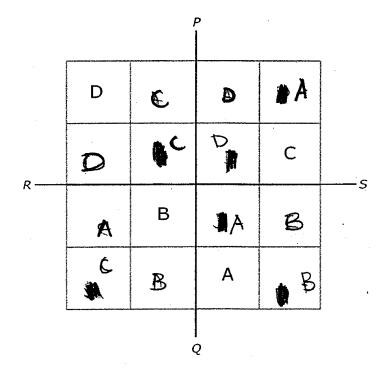
Item Number: M032745

# **Student Responses** (Continued)

### **Partial Response:**



Continue to identify the tiles as shown above. On the grid below, write the letters A, B, C, or D to make a symmetrical pattern where PQ and RS would be lines of symmetry. Arrange the tiles to make a pattern.



### Geometry tiling: produce a pattern using letters (continued)

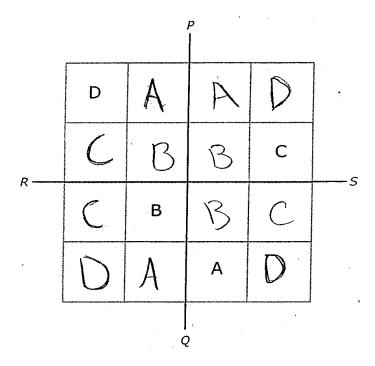
Item Number: M032745

# **Student Responses** (Continued)

#### **Incorrect Response:**



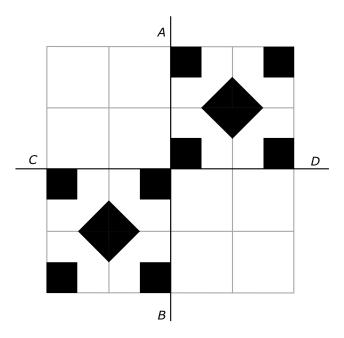
Continue to identify the tiles as shown above. On the grid below, write the letters A, B, C, or D to make a symmetrical pattern where PQ and RS would be lines of symmetry. Arrange the tiles to make a pattern.



Content Domain	Main Topic	Cognitive Domain
GEOMETRY	Symmetry and Transformations	Using Concepts

### Geometry tiling: makes a symmetrical pattern

There are several ways of arranging the tiles so that they form patterns. The grid below has been shaded to show how tiles can be placed on some of the squares. The pattern can be continued so that AB and CD are lines of symmetry.



Shade in all the remaining squares on the grid so that the resulting pattern is symmetrical about line AB, and also is symmetrical about line CD.

Item Number: M032743

#### **SCORING**

#### **Correct Response**

 Both quadrants correctly shaded (pattern shaded or demarcated in some way making symmetrical pattern about both axes, AB and CD).

#### **Incorrect Response**

- One of the two quadrants correctly shaded.
- · Incorrect (including crossed out/erased, stray marks, illegible, or off task).

### **Overall Percent Correct**

Scotland	85	<b>A</b>
Netherlands	82	
Korea, Republic of	82	
New Zealand	80	
England	80	
Singapore	77	
Australia	76	
Hong Kong, SAR	75	
Hungary	69	
Japan	68	
Chinese Taipei	68	
United States	67	
Belgium (Flemish)	65	
Lithuania	63	
Slovenia	60	
Latvia	60	
Jordan	59	
Malaysia	56	<u> </u>
Slovak Republic	54	0
Russian Federation	53	0
Cyprus	51	0
Estonia	50	0
Italy	50	0
International average	49	
Rulgaria	48	$\circ$

iliterilational average	49		
Bulgaria	48	0	
Norway	46	O	
Sweden	46	O	
Romania	44	O	
Bahrain	43	$\blacksquare$	
Israel	42	$\blacksquare$	
Serbia and Montenegro	41	$\blacksquare$	
Palestinian Nat'l Auth.	41	$\blacksquare$	
Indonesia	39	$\blacksquare$	
Morocco	38	$\blacksquare$	
Iran, Islamic Republic of	34	$\blacksquare$	
Saudi Arabia	34	$\blacksquare$	
Philippines	34	* * * * * * * * * * * * * * * * * * *	
Egypt	31	$\blacksquare$	
Tunisia	25	$\blacksquare$	
Macedonia, Republic of	25	$\blacksquare$	
Botswana	20	$\blacksquare$	
Lebanon	18	$\blacksquare$	
South Africa	17	$\blacksquare$	
Armenia	13	$\blacksquare$	
Chile	13	$\blacksquare$	
Moldova, Republic of	1	$\blacksquare$	

Country average vs. International average:

Higher	
Not different	С
Lower	_

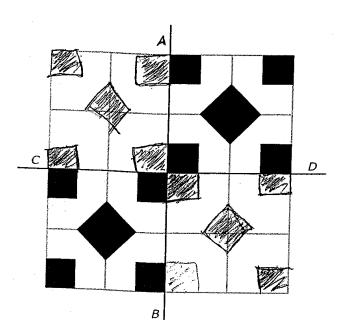
### Geometry tiling: makes a symmetrical pattern (continued)

Item Number: M032743

# **Student Responses**

#### **Correct Response:**

There are several ways of arranging the tiles so that they form patterns. The grid below has been shaded to show how tiles can be placed on some of the squares. The pattern can be continued so that AB and CD are lines of symmetry.



Shade in all the remaining squares on the grid so that the resulting pattern is symmetrical about line AB, and also is symmetrical about line CD.

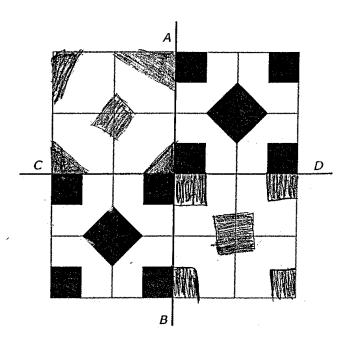
### Geometry tiling: makes a symmetrical pattern (continued)

Item Number: M032743

# **Student Responses** (continued)

#### **Incorrect Response:**

There are several ways of arranging the tiles so that they form patterns. The grid below has been shaded to show how tiles can be placed on some of the squares. The pattern can be continued so that AB and CD are lines of symmetry.

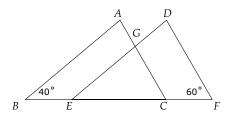


Shade in all the remaining squares on the grid so that the resulting pattern is symmetrical about line AB, and also is symmetrical about line CD.

Content Domain	Main Topic	Cognitive Domain	
GEOMETRY	Two- and Three- Dimensional Shapes	Solving Routine Problems	

### Angle in overlapping congruent triangles

In this figure, triangles ABC and DEF are congruent with BC = EF.



What is the measure of angle *EGC*?

- (A) 20°
- (B) 40°
- © 60°
- (D) 80°
- $\bigcirc$  100°

Item Number: M012026

**Correct Response:** 

D

# **Overall Percent Correct**

Korea, Republic of	84	<b>A</b>
Hong Kong, SAR	81	
Japan	80	
Singapore	79	
Chinese Taipei	73	
Estonia	67	
Belgium (Flemish)	66	
Latvia	63	
Bulgaria	60	
Israel	57	
Russian Federation	55	
Lebanon	55	
Scotland	54	
Slovak Republic	54	
Lithuania	51	
Hungary	50	0
Australia	47	0
England	47	O
Egypt	47	O
Malaysia	47	O
International average	45	
Armenia	45	0

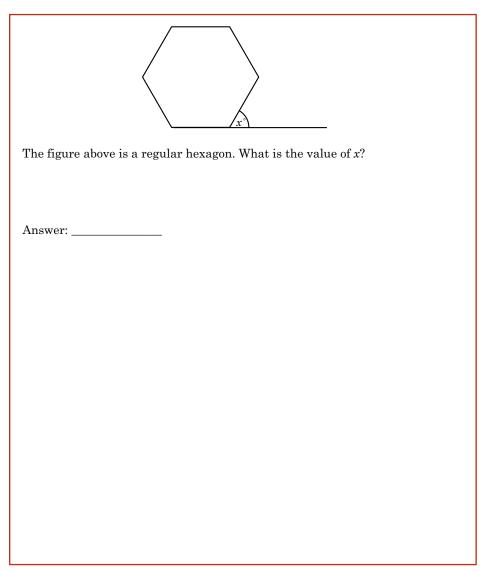
International average	45	
Armenia	45	0
Moldova, Republic of	45	0
Cyprus	44	0
Netherlands	44	0
Serbia and Montenegro	43	0
New Zealand	42	0
Jordan	42	0
Italy	42	0
Tunisia	41	$\blacksquare$
Bahrain	41	$\blacksquare$
Sweden	40	$\blacksquare$
Palestinian Nat'l Auth.	39	$\blacksquare$
Iran, Islamic Republic of	37	$\blacksquare$
Slovenia	37	$\blacksquare$
United States	36	$\blacksquare$
Macedonia, Republic of	33	$\blacksquare$
Norway	32	$\blacksquare$
Indonesia	31	$\blacksquare$
Morocco	31	$\blacksquare$
Chile	30	$\blacksquare$
Saudi Arabia	26	$\blacksquare$
South Africa	21	$\blacksquare$
Ghana	20	$\blacksquare$
Botswana	20	* * * * * * * * * * * * * * * * * * *
Romania	18	$\blacksquare$
Philippines	15	•

Country average vs. International average:

Higher △
Not different ○
Lower ▼

Content Domain	Main Topic	Cognitive Domain	
GEOMETRY	Two- and Three- Dimensional Shapes	Solving Routine Problems	

### The angle by a regular hexagon



#### Item Number: M032693

#### **SCORING**

#### **Correct Response**

• 60 degrees

#### **Incorrect Response**

- 120 degrees
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task).

# Overall Percent Correct

Japan Chinese Taipei Korea, Republic of Hong Kong, SAR Singapore Hungary Slovenia Norway Serbia and Montenegro Romania Belgium (Flemish) Slovak Republic Armenia Russian Federation Netherlands Macedonia, Republic of Moldova, Republic of Estonia	73 70 68 64 62 59 52 50 46 45 45 42 42 40 39 39	
Latvia	33	0
Malaysia	33	0
International average	33	
Italy	32 32	0
Bulgaria Lithuania	32 31	0
England	30	0
Tunisia	29	▼
Lebanon	28	
New Zealand	27	▼
Australia	27	<b>* * * * * * * * * *</b>
Israel	26	▼
Sweden	24	▼
Iran, Islamic Republic of	24	▼
Jordan	23	▼
Palestinian Nat'l Auth.	23	▼
Egypt	23	▼
Scotland	23	▼
Bahrain	22	<b>V</b>
Saudi Arabia	21	<b>V</b>
United States	20	<b>V</b>
Cyprus Indonesia	19 17	<b>*</b>
indonesia Ghana	16	<b>V</b>
Botswana	14	<b>* * *</b>
Chile	9	<u> </u>
Morocco	9	▼
Philippines	6	•
· ·	_	
South Africa	5	▼

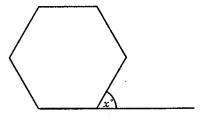
Country average vs. International average:

# The angle by a regular hexagon (continued)

Item Number: M032693

# **Student Responses**

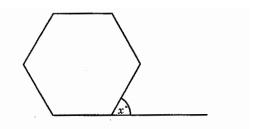
## **Correct Response:**



The figure above is a regular hexagon. What is the value of x?

Answer (000

### **Incorrect Response:**

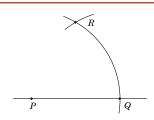


The figure above is a regular hexagon. What is the value of x?

Answer: 55

Content Domain	Main Topic	Cognitive Domain
GEOMETRY	Two- and Three- Dimensional Shapes	Using Concepts

# The size of angle PRQ



In the figure above, an arc of a circle with center P has been drawn to cut the line at Q. Then an arc with the same radius and center Q was drawn to cut the first arc at R. What would be the size of angle PRQ?

- (A) 30°
- (B) 45°
- © 60°
- D 75°

Item Number: M032689

**Correct Response:** 

### **Overall Percent Correct**

Korea, Republic of	70	<b>A</b>
Chinese Taipei	70	<b>A</b>
Hungary	69	<b>A</b>
Tunisia	66	<b>A</b>
Japan	64	<b>A</b>
Malaysia	62	<b>A</b>
Hong Kong, SAR	59	<b>A</b>
Norway	58	<b>A</b>
Slovak Republic	58	<b>A</b>
Lebanon	58	<b>A</b>
Serbia and Montenegro	58	<b>A</b>
Estonia	56	<b>A</b>
Belgium (Flemish)	54	<b>A</b>
Slovenia	52	<b>A</b>
Russian Federation	51	0
Romania	51	0
Macedonia, Republic of	50	0
Singapore	49	<b>A</b>
Bulgaria	48	0
Latvia	46	0
International average	46	
New Zealand	45	0
Maldava Banublic of	11	0
Moldova, Republic of	44	
Netherlands	44	0
Netherlands Saudi Arabia	44 43	0 0
Netherlands Saudi Arabia Lithuania	44 43 43	0 0 0
Netherlands Saudi Arabia Lithuania Palestinian Nat'l Auth.	44 43 43 42	O O O
Netherlands Saudi Arabia Lithuania Palestinian Nat'l Auth. England	44 43 43 42 42	0 0 0 0
Netherlands Saudi Arabia Lithuania Palestinian Nat'l Auth. England Italy	44 43 43 42 42 41	0 0 0 0
Netherlands Saudi Arabia Lithuania Palestinian Nat'l Auth. England Italy Morocco	44 43 43 42 42 41 40	0 0 0 0
Netherlands Saudi Arabia Lithuania Palestinian Nat'l Auth. England Italy Morocco Jordan	44 43 43 42 42 41 40 39	0 0 0 0
Netherlands Saudi Arabia Lithuania Palestinian Nat'l Auth. England Italy Morocco Jordan Ghana	44 43 43 42 42 41 40 39 38	0 0 0 0
Netherlands Saudi Arabia Lithuania Palestinian Nat'l Auth. England Italy Morocco Jordan Ghana Egypt	44 43 43 42 42 41 40 39 38 38	0 0 0 0
Netherlands Saudi Arabia Lithuania Palestinian Nat'l Auth. England Italy Morocco Jordan Ghana Egypt Chile	44 43 42 42 41 40 39 38 38 37	0 0 0 0
Netherlands Saudi Arabia Lithuania Palestinian Nat'l Auth. England Italy Morocco Jordan Ghana Egypt Chile Australia	44 43 42 42 41 40 39 38 38 37 37	0 0 0 0
Netherlands Saudi Arabia Lithuania Palestinian Nat'l Auth. England Italy Morocco Jordan Ghana Egypt Chile Australia Armenia	44 43 42 42 41 40 39 38 38 37 37 36	0 0 0 0
Netherlands Saudi Arabia Lithuania Palestinian Nat'l Auth. England Italy Morocco Jordan Ghana Egypt Chile Australia Armenia Iran, Islamic Republic of	44 43 42 42 41 40 39 38 38 37 37 36 36	0 0 0 0
Netherlands Saudi Arabia Lithuania Palestinian Nat'l Auth. England Italy Morocco Jordan Ghana Egypt Chile Australia Armenia Iran, Islamic Republic of Scotland	44 43 42 42 41 40 39 38 37 37 36 36 35	0 0 0 0
Netherlands Saudi Arabia Lithuania Palestinian Nat'l Auth. England Italy Morocco Jordan Ghana Egypt Chile Australia Armenia Iran, Islamic Republic of Scotland Sweden	44 43 42 42 41 40 39 38 37 37 36 36 35 35	0 0 0 0
Netherlands Saudi Arabia Lithuania Palestinian Nat'l Auth. England Italy Morocco Jordan Ghana Egypt Chile Australia Armenia Iran, Islamic Republic of Scotland Sweden Bahrain	44 43 42 42 41 40 39 38 38 37 37 36 36 35 35	0 0 0 0
Netherlands Saudi Arabia Lithuania Palestinian Nat'l Auth. England Italy Morocco Jordan Ghana Egypt Chile Australia Armenia Iran, Islamic Republic of Scotland Sweden Bahrain Israel	44 43 42 42 41 40 39 38 37 37 36 36 35 35 35	0 0 0 0
Netherlands Saudi Arabia Lithuania Palestinian Nat'l Auth. England Italy Morocco Jordan Ghana Egypt Chile Australia Armenia Iran, Islamic Republic of Scotland Sweden Bahrain Israel United States	44 43 42 42 41 40 39 38 37 37 36 36 35 35 35 34 34	0 0 0 0
Netherlands Saudi Arabia Lithuania Palestinian Nat'l Auth. England Italy Morocco Jordan Ghana Egypt Chile Australia Armenia Iran, Islamic Republic of Scotland Sweden Bahrain Israel United States Botswana	44 43 42 42 41 40 39 38 38 37 37 36 35 35 35 34 34	0 0 0 0
Netherlands Saudi Arabia Lithuania Palestinian Nat'l Auth. England Italy Morocco Jordan Ghana Egypt Chile Australia Armenia Iran, Islamic Republic of Scotland Sweden Bahrain Israel United States	44 43 42 42 41 40 39 38 37 37 36 36 35 35 35 34 34	0 0 0 0

Country average vs. International average:

29

O ▼

Higher Not different Lower

South Africa

Philippines

Content Domain	Main Topic	Cognitive Domain
MEASUREMENT	Attributes and Units	Knowing Facts and Procedures

# 250 ml bottles filled by 400 liters

The number of 250 milliliter bottles that can be filled from 400 liters of water is  $\,$ 

A 16

(B) 160

© 1,600

D 16,000

Item Number: M022005

**Correct Response:** 

0

# Overall Percent Correct

Singapore	68	<b>A</b>
Netherlands	59	
Belgium (Flemish)	55	
Sweden	54	
Malaysia	53	
Latvia	51	
Estonia	50	
Australia	49	
Lithuania	49	
Romania	48	
Hungary	48	
Hong Kong, SAR	47	<u> </u>
Russian Federation	46	<u> </u>
Slovak Republic	44	<u> </u>
Japan	44	<u> </u>
Moldova, Republic of	43	0
Italy	42	0
Norway	42	0
England	42	0
Armenia	42	0
New Zealand	41	0
Slovenia	41	0
Korea, Republic of	41	0
Chinese Taipei	41	0
Cyprus	41	0
Scotland	40	0
Bulgaria	39	0
International average	39	
Serbia and Montenegro	38	0
Israel	38	0
United States	33	
Philippines	32	<b>V</b>
Indonesia	32	<b>V</b>
South Africa	31	<b>V</b>
Palestinian Nat'l Auth.	30	<b>V</b>
Lebanon	30	<u> </u>
Chile	29	Ť
Jordan	29	<u> </u>
Macedonia, Republic of	29	* * * * * * * * *
Egypt	29	·
Iran, Islamic Republic of	28	<b>V</b>
Tunisia	27	·
Bahrain	27	·
Botswana	25	<b>V</b>
Saudi Arabia	25	<b>*</b>
Morocco	22	<b>V</b>
Ghana	20	·
		•

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
MEASUREMENT	Attributes and Units	Knowing Facts and Procedures

#### Which is least amount of time

Which of these is the LEAST amount of time?

- A 1 day
- (B) 20 hours
- © 1,800 minutes
- © 90,000 seconds

Item Number: M022188

**Correct Response:** 

# **Overall Percent Correct**

Korea, Republic of Hungary 63	Chinese Taipei	66	<b>A</b>
Singapore Belgium (Flemish) Japan S4 Hong Kong, SAR S54 Slovenia Sovak Republic S52 Latvia Armenia So Serbia and Montenegro Estonia Macedonia, Republic of Russian Federation United States Malaysia Moldova, Republic of Italy Sweden International average Saveden United States Armania Lithuania Lithuania Lithuania Lebanon Cyprus England Norway Jordan Scotland Palestinian Nat'l Auth. New Zealand Egypt Chile Saudi Arabia Philippines Iran, Islamic Republic of South Africa Barain Morocco Ghana Indonesia Siva A A A A A A A A A A A A A A A A A A A	Korea, Republic of	63	
Belgium (Flemish) 59  A  A  A  A  A  A  A  A  A  A  A  A  A	Hungary	63	
Japan 54 A Hong Kong, SAR 54 A Slovenia 54 A Slovak Republic 52 A Netherlands 52 A Latvia 51 A Armenia 50 A Serbia and Montenegro 49 A Estonia 48 A Macedonia, Republic of 48 A Russian Federation 47 A United States 47 A Malaysia 47 O Moldova, Republic of 45 O Italy 45 O Bulgaria 44 O Sweden 44 O International average 43 D Romania 43 O Lithuania 42 O Israel 41 O Tunisia 41 O Australia 41 O Cyprus 39 V England 39 O Norway 39 V Jordan 38 V Scotland 38 V Palestinian Nat'l Auth. 37 V New Zealand 36 V Egypt 36 V Chile 35 V Saudi Arabia 35 V Philippines 35 Iran, Islamic Republic of 32 V Barrain 32 V Indonesia 26 V	Singapore	60	<b>A</b>
Hong Kong, SAR  Slovenia  Slovak Republic  Netherlands  Latvia  Armenia  Serbia and Montenegro  Estonia  Macedonia, Republic of  Russian Federation  United States  Moldova, Republic of  Italy  Bulgaria  Sweden  International average  Israel  Tunisia  Australia  Lebanon  Cyprus  England  Norway  Jordan  Scotland  Palestinian Nat'l Auth.  New Zealand  Egypt  Chile  Saudi Arabia  Philippines  Iran, Islamic Republic of  South Africa  Barain  Morocco  Ghana  Internation  152  A  Latvia  50  A  A  A  A  A  A  A  A  A  A  A  A  A	Belgium (Flemish)	59	
Slovenia         54         A           Slovak Republic         52         A           Netherlands         52         A           Latvia         51         A           Armenia         50         A           Serbia and Montenegro         49         A           Estonia         48         A           Macedonia, Republic of         48         A           Russian Federation         47         A           United States         47         A           Moldova, Republic of         45         O           Italy         45         O           Italy         45         O           Bulgaria         44         O           Sweden         44         O           International average         43         D           Romania         43         O           Israel         41         O           International average         43         D           Romania         42         O           Israel         41         O           Tunisia         41         O           Australia         41         O           Cyprus	Japan	54	
Slovak Republic         52         ▲           Netherlands         52         ▲           Latvia         51         ▲           Armenia         50         ▲           Serbia and Montenegro         49         ▲           Estonia         48         ▲           Macedonia, Republic of         48         ▲           Russian Federation         47         ▲           United States         47         △           Moldova, Republic of         45         ○           Italy         45         ○           Bulgaria         44         ○           Sweden         44         ○           International average         43         ○           Romania         43         ○           Israel         41         ○           Ithuania         42         ○           Israel         41         ○           Tunisia         41         ○           Australia         41         ○           Lebanon         40         ○           Cyprus         39         ▼           England         39         ▼           Norway         39	Hong Kong, SAR	54	<b>A</b>
Netherlands         52         ▲           Latvia         51         ▲           Armenia         50         ▲           Serbia and Montenegro         49         ▲           Estonia         48         ▲           Macedonia, Republic of         48         ▲           Russian Federation         47         ▲           United States         47         △           Malaysia         47         ○           Moldova, Republic of         45         ○           Italy         45         ○           Bulgaria         44         ○           Sweden         44         ○           International average         43         ○           International average         43         ○           Israel         41         ○           Ithuania         42         ○           Israel         41         ○           Tunisia         41         ○           Australia         41         ○           Lebanon         40         ○           Cyprus         39         ▼           England         39         ▼           Norway	Slovenia	54	
Latvia       51       ▲         Armenia       50       ▲         Serbia and Montenegro       49       ▲         Estonia       48       ▲         Macedonia, Republic of       48       ▲         Russian Federation       47       ▲         United States       47       △         Malaysia       47       ○         Moldova, Republic of       45       ○         Italy       45       ○         Bulgaria       44       ○         Sweden       44       ○         International average       43       ○         International average       43       ○         International average       43       ○         Israel       41       ○         Ithuania       42       ○         Israel       41       ○         Tunisia       41       ○         Australia       41       ○         Lebanon       40       ○         Cyprus       39       ▼         England       39       ▼         Norway       39       ▼         Jordan       38       ▼	Slovak Republic	52	<b>A</b>
Armenia 50 A Serbia and Montenegro 49 A Estonia 48 A Macedonia, Republic of 48 A Russian Federation 47 A United States 47 A Malaysia 47 O Moldova, Republic of 45 O Italy 45 O Bulgaria 44 O Sweden 44 O International average 43 D Romania 43 O Lithuania 42 O Israel 41 O Tunisia 41 O Australia 41 O Cyprus 39 V England 39 O Norway 39 V England 38 V Palestinian Nat'l Auth. 37 V New Zealand 36 V Egypt 36 V Chile 35 V Saudi Arabia 35 V Iran, Islamic Republic of 35 V South Africa 32 V Barrain 12 V Indonesia 26 V	Netherlands	52	<b>A</b>
Serbia and Montenegro Estonia  Macedonia, Republic of Russian Federation United States  Malaysia  Moldova, Republic of Bulgaria Sweden  International average Ithuania Lithuania Lithuania Lebanon Cyprus England Norway Jordan Scotland Palestinian Nat'l Auth. New Zealand Egypt Chile Saudi Arabia Philippines Iran, Islamic Republic of South Africa Barain Morocco Ghana International A48 A A47 A A47 A A47 A A47 A A47 A A47 A A57	Latvia	51	<b>A</b>
Estonia 48 A  Macedonia, Republic of 48 A  Russian Federation 47 A  United States 47 A  Malaysia 47 O  Moldova, Republic of 45 O  Italy 45 O  Bulgaria 44 O  Sweden 44 O  International average 43 D  Romania 43 O  Lithuania 42 O  Israel 41 O  Tunisia 41 O  Australia 41 O  Cyprus 39 V  England 39 O  Norway 39 V  England 38 V  Scotland 38 V  Palestinian Nat'l Auth. 37 V  New Zealand 36 V  Egypt 36 V  Chile 35 V  Saudi Arabia 35 V  Iran, Islamic Republic of 35 V  South Africa 32 V  Bahrain 32 V  Indonesia 26 V	Armenia	50	
Macedonia, Republic of Russian Federation 47	Serbia and Montenegro	49	
Russian Federation 47	Estonia	48	<b>A</b>
United States 47 Malaysia 47 O Moldova, Republic of 45 O Italy 45 O Bulgaria 44 O Sweden 44 O International average 43 D Romania 43 O Lithuania 42 O Israel 41 O Tunisia 41 O Cyprus 39 V England 39 O Norway 39 V England 39 O Norway 39 V England 38 V Scotland 38 V Scotland 38 V Scotland 38 V September 36 V Saudi Arabia 35 V Saudi Arabia 35 V Shilippines 35 V South Africa 32 V Shana 27 V Indonesia 26 V September 37 V Indonesia 26 V September 37 V September 37 V South Africa 32 V September 38 V September 39 V Septe	Macedonia, Republic of	48	<b>A</b>
Malaysia 47 O Moldova, Republic of 45 O Italy 45 O Bulgaria 44 O Sweden 44 O International average 43 D Romania 43 O Lithuania 42 O Israel 41 O Tunisia 41 O Australia 41 O Cyprus 39 V England 39 O Norway 39 V Jordan 38 V Palestinian Nat'l Auth. 37 V New Zealand 36 V Egypt 36 V Chile 35 V Saudi Arabia 35 V Philippines 35 V Iran, Islamic Republic of 35 V South Africa 32 V Bahrain 32 V Indonesia 26 V	Russian Federation	47	
Moldova, Republic of Italy 45 O Italy 45 O Bulgaria 44 O Sweden 44 O International average 43 D Romania 43 O Lithuania 42 O Israel 41 O Tunisia 41 O Australia 41 O Cyprus 39 V England 39 O Norway 39 V England 39 V England 38 V Average 39 V England 38 V Scotland 38 V Scotland 38 V Scotland 38 V Scotland 36 V Egypt 36 V Chile 35 V Saudi Arabia 35 V Shilippines 35 V South Africa 32 V Sahrain 32 V Shana 27 V Indonesia 26 V	United States	47	<b>A</b>
Italy 45 O Bulgaria 44 O Sweden 44 O International average 43 D Romania 43 O Lithuania 42 O Israel 41 O Tunisia 41 O Australia 41 O Cyprus 39 V England 39 O Norway 39 V Jordan 38 V Scotland 38 V Palestinian Nat'l Auth. 37 V New Zealand 36 V Egypt 36 V Chile 35 V Saudi Arabia 35 V Philippines 35 V Iran, Islamic Republic of 35 V South Africa 32 V Bahrain 32 V Indonesia 26 V	Malaysia	47	0
Bulgaria 44 O Sweden 44 O International average 43 D Romania 43 O Lithuania 42 O Israel 41 O Tunisia 41 O Australia 41 O Cyprus 39 V England 39 O Norway 39 V Jordan 38 V Scotland 38 V Scotland 38 V Palestinian Nat'l Auth. 37 V New Zealand 36 V Egypt 36 V Chile 35 V Saudi Arabia 35 V Philippines 35 V Iran, Islamic Republic of 35 V South Africa 32 V Bahrain 32 V Indonesia 26 V	Moldova, Republic of	45	0
Sweden         44         O           International average         43         D           Romania         43         O           Lithuania         42         O           Israel         41         O           Tunisia         41         O           Australia         41         O           Cebanon         40         O           Cyprus         39         V           England         39         V           Norway         39         V           Jordan         38         V           Scotland         38         V           Palestinian Nat'l Auth.         37         V           New Zealand         36         V           Egypt         36         V           Chile         35         V           Saudi Arabia         35         V           Philippines         35         V           Iran, Islamic Republic of         35         V           South Africa         32         V           Bahrain         32         V           Indonesia         26         V	Italy	45	0
Romania 43 D Romania 43 O Lithuania 42 O Israel 41 O Tunisia 41 O Australia 41 O Cyprus 39 V England 39 O Norway 39 V Jordan 38 V Scotland 38 V Palestinian Nat'l Auth. 37 V New Zealand 36 V Egypt 36 V Chile 35 V Saudi Arabia 35 V Philippines 35 V Iran, Islamic Republic of South Africa 32 V Bahrain 32 V Indonesia 26 V	Bulgaria	44	0
Romania       43       ○         Lithuania       42       ○         Israel       41       ○         Tunisia       41       ○         Australia       41       ○         Lebanon       40       ○         Cyprus       39       ▼         England       39       ○         Norway       39       ▼         Jordan       38       ▼         Scotland       38       ▼         Palestinian Nat'l Auth.       37       ▼         New Zealand       36       ▼         Egypt       36       ▼         Chile       35       ▼         Saudi Arabia       35       ▼         Philippines       35       ▼         Iran, Islamic Republic of       35       ▼         South Africa       32       ▼         Bahrain       32       ▼         Morocco       32       ▼         Ghana       27       ▼         Indonesia       26       ▼	Sweden		0
Lithuania 42 O Israel 41 O Tunisia 41 O Australia 41 O Cyprus 39 V England 39 O Norway 39 V Jordan 38 V Scotland 38 V Palestinian Nat'l Auth. 37 V New Zealand 36 V Egypt 36 V Chile 35 V Saudi Arabia 35 V Philippines 35 V Iran, Islamic Republic of South Africa 32 V Bahrain 32 V Indonesia 26 V	International average	43	D
Israel 41 O Tunisia 41 O Australia 41 O Lebanon 40 O Cyprus 39 ▼ England 39 O Norway 39 ▼ Jordan 38 ▼ Scotland 38 ▼ Palestinian Nat'l Auth. 37 ▼ New Zealand 36 ▼ Egypt 36 ▼ Chile 35 ▼ Saudi Arabia 35 ▼ Philippines 35 ▼ Iran, Islamic Republic of 35 South Africa 32 ▼ Bahrain 32 ▼ Morocco 32 ▼ Indonesia 26 ▼	Romania	13	$\circ$
Tunisia 41 O Australia 41 O Lebanon 40 O Cyprus 39 ▼ England 39 O Norway 39 ▼ Jordan 38 ▼ Scotland 38 ▼ Palestinian Nat'l Auth. 37 ▼ New Zealand 36 ▼ Egypt 36 ▼ Chile 35 ▼ Saudi Arabia 35 ▼ Philippines 35 ▼ Iran, Islamic Republic of 35 South Africa 32 ▼ Bahrain 32 ▼ Morocco 32 ▼ Indonesia 26 ▼	Nomania	40	U
Australia 41 O Lebanon 40 O Cyprus 39 ▼ England 39 O Norway 39 ▼ Jordan 38 ▼ Scotland 38 ▼ Palestinian Nat'l Auth. 37 ▼ New Zealand 36 ▼ Egypt 36 ▼ Chile 35 ▼ Saudi Arabia 35 ▼ Philippines 35 ▼ Iran, Islamic Republic of 35 South Africa 32 ▼ Bahrain 32 ▼ Morocco 32 ▼ Indonesia 26 ▼			
Lebanon 40 O Cyprus 39 ▼ England 39 O Norway 39 ▼ Jordan 38 ▼ Scotland 38 ▼ Palestinian Nat'l Auth. 37 ▼ New Zealand 36 ▼ Egypt 36 ▼ Chile 35 ▼ Saudi Arabia 35 ▼ Philippines 35 ▼ Iran, Islamic Republic of 35 South Africa 32 ▼ Bahrain 32 ▼ Morocco 32 ▼ Indonesia 26 ▼	Lithuania	42	0 0
Cyprus 39 V England 39 O Norway 39 V Jordan 38 V Scotland 38 V Palestinian Nat'l Auth. 37 V New Zealand 36 V Egypt 36 V Chile 35 V Saudi Arabia 35 V Philippines 35 V Iran, Islamic Republic of 35 V South Africa 32 V Bahrain 32 V Morocco 32 V Indonesia 26 V	Lithuania Israel	42 41	0 0 0
England 39 O Norway 39 ▼ Jordan 38 ▼ Scotland 38 ▼ Palestinian Nat'l Auth. 37 ▼ New Zealand 36 ▼ Egypt 36 ▼ Chile 35 ▼ Saudi Arabia 35 ▼ Philippines 35 ▼ Iran, Islamic Republic of 35 ▼ South Africa 32 ▼ Bahrain 32 ▼ Morocco 32 ▼ Indonesia 26 ▼	Lithuania Israel Tunisia	42 41 41	0 0 0
Norway 39 V Jordan 38 V Scotland 38 V Palestinian Nat'l Auth. 37 V New Zealand 36 V Egypt 36 V Chile 35 V Saudi Arabia 35 V Philippines 35 V Iran, Islamic Republic of 35 V South Africa 32 V Bahrain 32 V Morocco 32 V Indonesia 26 V	Lithuania Israel Tunisia Australia	42 41 41 41	0 0 0 0
Philippines 35 ▼ Iran, Islamic Republic of 35 ▼ South Africa 32 ▼ Bahrain 32 ▼ Morocco 32 ▼ Ghana 27 ▼ Indonesia 26 ▼	Lithuania Israel Tunisia Australia Lebanon Cyprus	42 41 41 41 40	0 0 0 0
Philippines 35 ▼ Iran, Islamic Republic of 35 ▼ South Africa 32 ▼ Bahrain 32 ▼ Morocco 32 ▼ Ghana 27 ▼ Indonesia 26 ▼	Lithuania Israel Tunisia Australia Lebanon Cyprus England	42 41 41 41 40 39	0 0 0 0 •
Philippines 35 ▼ Iran, Islamic Republic of 35 ▼ South Africa 32 ▼ Bahrain 32 ▼ Morocco 32 ▼ Ghana 27 ▼ Indonesia 26 ▼	Lithuania Israel Tunisia Australia Lebanon Cyprus England	42 41 41 41 40 39 39	0 0 0 0 •
Philippines 35 ▼ Iran, Islamic Republic of 35 ▼ South Africa 32 ▼ Bahrain 32 ▼ Morocco 32 ▼ Ghana 27 ▼ Indonesia 26 ▼	Lithuania Israel Tunisia Australia Lebanon Cyprus England Norway	42 41 41 41 40 39 39 39	0 0 0 0 •
Philippines 35 ▼ Iran, Islamic Republic of 35 ▼ South Africa 32 ▼ Bahrain 32 ▼ Morocco 32 ▼ Ghana 27 ▼ Indonesia 26 ▼	Lithuania Israel Tunisia Australia Lebanon Cyprus England Norway Jordan Scotland	42 41 41 40 39 39 39 38	0 0 0 0 •
Philippines 35 ▼ Iran, Islamic Republic of 35 ▼ South Africa 32 ▼ Bahrain 32 ▼ Morocco 32 ▼ Ghana 27 ▼ Indonesia 26 ▼	Lithuania Israel Tunisia Australia Lebanon Cyprus England Norway Jordan Scotland	42 41 41 40 39 39 39 38 38	0 0 0 0 •
Philippines 35 ▼ Iran, Islamic Republic of 35 ▼ South Africa 32 ▼ Bahrain 32 ▼ Morocco 32 ▼ Ghana 27 ▼ Indonesia 26 ▼	Lithuania Israel Tunisia Australia Lebanon Cyprus England Norway Jordan Scotland Palestinian Nat'l Auth.	42 41 41 40 39 39 39 38 38 37	0 0 0 0 •
Philippines 35 ▼ Iran, Islamic Republic of 35 ▼ South Africa 32 ▼ Bahrain 32 ▼ Morocco 32 ▼ Ghana 27 ▼ Indonesia 26 ▼	Lithuania Israel Tunisia Australia Lebanon Cyprus England Norway Jordan Scotland Palestinian Nat'l Auth. New Zealand	42 41 41 40 39 39 39 38 38 37 36 36	0 0 0 0 •
Iran, Islamic Republic of 35 ▼ South Africa 32 ▼ Bahrain 32 ▼ Morocco 32 ▼ Ghana 27 ▼ Indonesia 26 ▼	Lithuania Israel Tunisia Australia Lebanon Cyprus England Norway Jordan Scotland Palestinian Nat'l Auth. New Zealand Egypt	42 41 41 40 39 39 39 38 38 37 36 36	0 0 0 0 •
South Africa32▼Bahrain32▼Morocco32▼Ghana27▼Indonesia26▼	Lithuania Israel Tunisia Australia Lebanon Cyprus England Norway Jordan Scotland Palestinian Nat'l Auth. New Zealand Egypt Chile	42 41 41 40 39 39 39 38 38 37 36 36 35	0 0 0 0 •
Bahrain32▼Morocco32▼Ghana27▼Indonesia26▼	Lithuania Israel Tunisia Australia Lebanon Cyprus England Norway Jordan Scotland Palestinian Nat'l Auth. New Zealand Egypt Chile Saudi Arabia	42 41 41 40 39 39 39 38 38 37 36 36 35 35	0 0 0 0 •
	Lithuania Israel Tunisia Australia Lebanon Cyprus England Norway Jordan Scotland Palestinian Nat'l Auth. New Zealand Egypt Chile Saudi Arabia Philippines	42 41 41 40 39 39 39 38 38 37 36 35 35	0 0 0 0 •
	Lithuania Israel Tunisia Australia Lebanon Cyprus England Norway Jordan Scotland Palestinian Nat'l Auth. New Zealand Egypt Chile Saudi Arabia Philippines Iran, Islamic Republic of	42 41 41 40 39 39 39 38 38 37 36 35 35 35	0 0 0 0 0 0 0 0 0 0 0
	Lithuania Israel Tunisia Australia Lebanon Cyprus England Norway Jordan Scotland Palestinian Nat'l Auth. New Zealand Egypt Chile Saudi Arabia Philippines Iran, Islamic Republic of South Africa	42 41 41 40 39 39 38 38 37 36 35 35 35 35 32	0 0 0 0 0 0 0 0 0 0 0
	Lithuania Israel Tunisia Australia Lebanon Cyprus England Norway Jordan Scotland Palestinian Nat'l Auth. New Zealand Egypt Chile Saudi Arabia Philippines Iran, Islamic Republic of South Africa Bahrain	42 41 41 40 39 39 38 38 37 36 35 35 35 35 32 32	0 0 0 0 0 0 0 0 0 0 0
Botswana 26 ▼	Lithuania Israel Tunisia Australia Lebanon Cyprus England Norway Jordan Scotland Palestinian Nat'l Auth. New Zealand Egypt Chile Saudi Arabia Philippines Iran, Islamic Republic of South Africa Bahrain Morocco	42 41 41 40 39 39 38 38 37 36 35 35 35 35 32 32	0 0 0 0 0 0 0 0 0 0 0
	Lithuania Israel Tunisia Australia Lebanon Cyprus England Norway Jordan Scotland Palestinian Nat'l Auth. New Zealand Egypt Chile Saudi Arabia Philippines Iran, Islamic Republic of South Africa Bahrain Morocco Ghana Indonesia	42 41 41 40 39 39 38 38 37 36 35 35 35 35 32 32 32	0 0 0 0 0 0 0 0 0 0 0

Country average vs. International average:

Higher △
Not different ○
Lower ▼

В

Content Domain	Main Topic	Cognitive Domain
MEASUREMENT	Attributes and Units	Knowing Facts and Procedures

### The unit used for a soccer field

Which of these units would usually be used for an area the size of a soccer field?

- (A) square centimeters
- (B) cubic centimeters
- © square meters
- (D) cubic meters

Item Number: M032699

**Correct Response:** 

# **Overall Percent Correct**

Estonia	90	<b>A</b>
Sweden	89	<b>A</b>
New Zealand	89	<b>A</b>
Italy	88	<b>A</b>
Singapore	88	<b>A</b>
Hungary	88	<b>A</b>
Australia	87	<b>A</b>
Slovak Republic	87	<b>A</b>
Chile	87	<b>A</b>
Belgium (Flemish)	86	<b>A</b>
Netherlands	86	<b>A</b>
Latvia	86	<b>A</b>
Romania	86	<b>A</b>
Lithuania	84	<b>A</b>
Serbia and Montenegro	84	<b>A</b>
Bulgaria	84	<b>A</b>
Russian Federation	83	<b>A</b>
Hong Kong, SAR	82	<b>A</b>
Chinese Taipei	82	<b>A</b>
Japan	82	<b>A</b>
England	82	<b>A</b>
Moldova, Republic of	82	<b>A</b>
Scotland	81	<b>A</b>
Norway	80	<b>A</b>
Malaysia	77	0
United States	76	0
United States Macedonia, Republic of	76 76	
United States Macedonia, Republic of International average	76 76 <b>75</b>	0
United States Macedonia, Republic of International average Korea, Republic of	76 76 <b>75</b> 74	0 0
United States Macedonia, Republic of International average Korea, Republic of Slovenia	76 76 <b>75</b> 74 74	0 0
United States Macedonia, Republic of International average Korea, Republic of Slovenia Israel	76 76 <b>75</b> 74 74 73	0 0 0 0 0
United States Macedonia, Republic of International average Korea, Republic of Slovenia Israel Armenia	76 76 <b>75</b> 74 74 73 71	0 0 0 0 0
United States Macedonia, Republic of International average Korea, Republic of Slovenia Israel Armenia Cyprus	76 76 <b>75</b> 74 74 73 71 69	0 0 0 0 0
United States Macedonia, Republic of International average Korea, Republic of Slovenia Israel Armenia Cyprus Tunisia	76 76 75 74 74 73 71 69 68	0 0 0 0 0
United States Macedonia, Republic of International average Korea, Republic of Slovenia Israel Armenia Cyprus Tunisia Indonesia	76 76 75 74 74 73 71 69 68 66	0 0 0 0 0
United States Macedonia, Republic of International average Korea, Republic of Slovenia Israel Armenia Cyprus Tunisia Indonesia Bahrain	76 76 75 74 74 73 71 69 68 66 66	0 0 0 0 0
United States Macedonia, Republic of International average Korea, Republic of Slovenia Israel Armenia Cyprus Tunisia Indonesia Bahrain Morocco	76 76 75 74 74 73 71 69 68 66 66 66	0 0 0 0 0
United States Macedonia, Republic of International average Korea, Republic of Slovenia Israel Armenia Cyprus Tunisia Indonesia Bahrain Morocco Jordan	76 76 75 74 74 73 71 69 68 66 66 64 64	0 0
United States Macedonia, Republic of International average Korea, Republic of Slovenia Israel Armenia Cyprus Tunisia Indonesia Bahrain Morocco Jordan Egypt	76 76 75 74 74 73 71 69 68 66 66 64 64 64	0 0 0 0 0
United States Macedonia, Republic of International average Korea, Republic of Slovenia Israel Armenia Cyprus Tunisia Indonesia Bahrain Morocco Jordan Egypt Botswana	76 75 74 74 73 71 69 68 66 66 64 64 62 61	0 0 0 0 0
United States Macedonia, Republic of International average Korea, Republic of Slovenia Israel Armenia Cyprus Tunisia Indonesia Bahrain Morocco Jordan Egypt Botswana Philippines	76 75 74 74 73 71 69 68 66 64 64 62 61 60	0 0 0 0 0
United States Macedonia, Republic of International average Korea, Republic of Slovenia Israel Armenia Cyprus Tunisia Indonesia Bahrain Morocco Jordan Egypt Botswana Philippines Palestinian Nat'l Auth.	76 75 74 74 73 71 69 68 66 64 64 62 61 60 58	0 0 0 0 0
United States Macedonia, Republic of International average Korea, Republic of Slovenia Israel Armenia Cyprus Tunisia Indonesia Bahrain Morocco Jordan Egypt Botswana Philippines Palestinian Nat'l Auth. Lebanon	76 75 74 74 73 71 69 68 66 64 64 62 61 60 58 56	0 0 0 0 0
United States Macedonia, Republic of International average Korea, Republic of Slovenia Israel Armenia Cyprus Tunisia Indonesia Bahrain Morocco Jordan Egypt Botswana Philippines Palestinian Nat'l Auth. Lebanon Saudi Arabia	76 75 74 74 73 71 69 68 66 64 64 62 61 60 58 56	0 0 0 0 0
United States Macedonia, Republic of International average Korea, Republic of Slovenia Israel Armenia Cyprus Tunisia Indonesia Bahrain Morocco Jordan Egypt Botswana Philippines Palestinian Nat'l Auth. Lebanon Saudi Arabia Iran, Islamic Republic of	76 75 74 74 73 71 69 68 66 64 64 62 61 60 58 56 55	0 0 0 0 0
United States Macedonia, Republic of International average Korea, Republic of Slovenia Israel Armenia Cyprus Tunisia Indonesia Bahrain Morocco Jordan Egypt Botswana Philippines Palestinian Nat'l Auth. Lebanon Saudi Arabia Iran, Islamic Republic of South Africa	76 76 75 74 74 73 71 69 68 66 64 62 61 60 58 56 55 52	0 0 0 0 0
United States Macedonia, Republic of International average Korea, Republic of Slovenia Israel Armenia Cyprus Tunisia Indonesia Bahrain Morocco Jordan Egypt Botswana Philippines Palestinian Nat'l Auth. Lebanon Saudi Arabia Iran, Islamic Republic of	76 75 74 74 73 71 69 68 66 64 64 62 61 60 58 56 55	0 0 0 0 0

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
MEASUREMENT	Attributes and Units	Knowing Facts and Procedures

# Measure of the area of a triangle

Which of these could be the measure of the area of a triangle?

- $\bigcirc \hspace{-0.5cm} A \hspace{-0.5cm} 2 \hspace{.5cm} cm$
- (B) 3 m
- $\bigcirc$  5 cm<sup>2</sup>
- $\bigcirc$  8 m<sup>3</sup>

Item Number: M032732

**Correct Response:** 

0

# **Overall Percent Correct**

Japan	84	
Singapore	81	<u> </u>
Estonia	78	<u> </u>
Chinese Taipei	76	
Belgium (Flemish)	75	
Russian Federation	75	
Hong Kong, SAR	73	
Slovenia Slovenia	71	
Sweden	70	
Netherlands	70	
Lithuania	70	
Korea, Republic of	69	
Hungary	68	
Slovak Republic	67	
Serbia and Montenegro	67	
Italy	67	
Malaysia	64	
Romania	62	
Latvia	61	
New Zealand	57	0
Moldova, Republic of	56	0
International average	55	þ
Lebanon	55	0
Norway	54	0
Bulgaria	52	0
Macedonia, Republic of	52	0
Macedonia, Republic of Australia	52 52	0
Macedonia, Republic of Australia Cyprus	52 52 52	0 0
Macedonia, Republic of Australia Cyprus England	52 52 52 51	0 0 0
Macedonia, Republic of Australia Cyprus England Scotland	52 52 52 51 48	0 0 0
Macedonia, Republic of Australia Cyprus England Scotland Botswana	52 52 52 51 48 48	0 0 0 0
Macedonia, Republic of Australia Cyprus England Scotland Botswana United States	52 52 52 51 48 48 47	0 0 0 0 •
Macedonia, Republic of Australia Cyprus England Scotland Botswana United States Egypt	52 52 52 51 48 48 47 46	0 0 0 0 •
Macedonia, Republic of Australia Cyprus England Scotland Botswana United States Egypt Jordan	52 52 52 51 48 48 47	0 0 0 0 •
Macedonia, Republic of Australia Cyprus England Scotland Botswana United States Egypt Jordan Indonesia	52 52 52 51 48 48 47 46 45	0 0 0 0 •
Macedonia, Republic of Australia Cyprus England Scotland Botswana United States Egypt Jordan Indonesia Armenia	52 52 52 51 48 48 47 46 45	0 0 0 0 •
Macedonia, Republic of Australia Cyprus England Scotland Botswana United States Egypt Jordan Indonesia	52 52 52 51 48 48 47 46 45 44 44	0 0 0 0 •
Macedonia, Republic of Australia Cyprus England Scotland Botswana United States Egypt Jordan Indonesia Armenia Israel	52 52 52 51 48 48 47 46 45 44	0 0 0 0 •
Macedonia, Republic of Australia Cyprus England Scotland Botswana United States Egypt Jordan Indonesia Armenia Israel Tunisia	52 52 52 51 48 48 47 46 45 44 44 43 43	0 0 0 0 •
Macedonia, Republic of Australia Cyprus England Scotland Botswana United States Egypt Jordan Indonesia Armenia Israel Tunisia Palestinian Nat'l Auth.	52 52 52 51 48 48 47 46 45 44 44 43 43 43	0 0 0 0 •
Macedonia, Republic of Australia Cyprus England Scotland Botswana United States Egypt Jordan Indonesia Armenia Israel Tunisia Palestinian Nat'l Auth. Bahrain	52 52 52 51 48 48 47 46 45 44 44 43 43 42 37	0 0 0 0 •
Macedonia, Republic of Australia Cyprus England Scotland Botswana United States Egypt Jordan Indonesia Armenia Israel Tunisia Palestinian Nat'l Auth. Bahrain Chile	52 52 52 51 48 48 47 46 45 44 43 43 42 37 36	0 0 0 0 •
Macedonia, Republic of Australia Cyprus England Scotland Botswana United States Egypt Jordan Indonesia Armenia Israel Tunisia Palestinian Nat'l Auth. Bahrain Chile Ghana	52 52 52 51 48 48 47 46 45 44 43 43 42 37 36 34	0 0 0 0 •
Macedonia, Republic of Australia Cyprus England Scotland Botswana United States Egypt Jordan Indonesia Armenia Israel Tunisia Palestinian Nat'l Auth. Bahrain Chile Ghana South Africa	52 52 52 51 48 48 47 46 45 44 43 43 42 37 36 34 34	0 0 0 0 •
Macedonia, Republic of Australia Cyprus England Scotland Botswana United States Egypt Jordan Indonesia Armenia Israel Tunisia Palestinian Nat'l Auth. Bahrain Chile Ghana South Africa Saudi Arabia	52 52 52 51 48 48 47 46 45 44 43 43 42 37 36 34 34 32	0 0 0 0 •
Macedonia, Republic of Australia Cyprus England Scotland Botswana United States Egypt Jordan Indonesia Armenia Israel Tunisia Palestinian Nat'l Auth. Bahrain Chile Ghana South Africa Saudi Arabia Morocco	52 52 52 51 48 48 47 46 45 44 43 43 42 37 36 34 34 32 30	0 0 0 0 •

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
MEASUREMENT	Tools, Techniques, and Formulas	Knowing Facts and Procedures

# Actual length of box from rounded measure

The length of a box is 9 cm to the nearest centimeter. Which of these could be the actual length of the box?

- (A) 10 cm
- (B) 9.9 cm
- © 9.6 cm
- (D) 8.6 cm

Item Number: M012003

**Correct Response:** 

D

### **Overall Percent Correct**

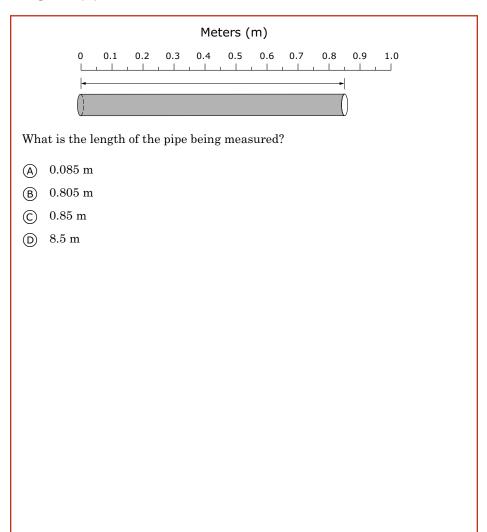
Korea, Republic of	90	<b>A</b>
Hungary	89	<b>A</b>
Netherlands	88	<b>A</b>
Hong Kong, SAR	87	<b>A</b>
Singapore	87	$\blacktriangle$
Belgium (Flemish)	82	
Slovak Republic	81	<b>A</b>
Chinese Taipei	80	
Sweden	80	<b>A</b>
Scotland	76	
England	75	<b>A</b>
Australia	73	<b>A</b>
Russian Federation	73	<b>A</b>
Latvia	70	<b>A</b>
Estonia	67	$\blacktriangle$
United States	67	<b>A</b>
New Zealand	65	<b>A</b>
Israel	64	<b>A</b>
Japan	64	_ _
Malaysia	62	<u> </u>
Norway	61	_ _
Romania	58	<u> </u>
Serbia and Montenegro	55	<u> </u>
Slovenia	53	0
Italy	52	0
Italy International average	52 <b>50</b>	0
,		<ul><li>○</li><li>▼</li></ul>
International average	50	▼
International average Armenia	<b>50</b> 45	▼
International average Armenia Macedonia, Republic of	<b>50</b> 45 42	▼
International average Armenia Macedonia, Republic of Moldova, Republic of	50 45 42 42	▼
International average Armenia Macedonia, Republic of Moldova, Republic of Jordan	50 45 42 42 39	▼
International average Armenia Macedonia, Republic of Moldova, Republic of Jordan Chile	45 42 42 39 38	▼
International average Armenia Macedonia, Republic of Moldova, Republic of Jordan Chile Cyprus	50 45 42 42 39 38 37	▼
International average Armenia Macedonia, Republic of Moldova, Republic of Jordan Chile Cyprus Bahrain	50 45 42 42 39 38 37 33	▼
International average Armenia Macedonia, Republic of Moldova, Republic of Jordan Chile Cyprus Bahrain Palestinian Nat'l Auth.	50 45 42 42 39 38 37 33 33	▼
International average Armenia Macedonia, Republic of Moldova, Republic of Jordan Chile Cyprus Bahrain Palestinian Nat'l Auth. Egypt	50 45 42 42 39 38 37 33 33 30	▼
International average Armenia Macedonia, Republic of Moldova, Republic of Jordan Chile Cyprus Bahrain Palestinian Nat'l Auth. Egypt Indonesia	50 45 42 42 39 38 37 33 33 30 30	* * * * * * * * * * * * * * * * * * *
International average Armenia Macedonia, Republic of Moldova, Republic of Jordan Chile Cyprus Bahrain Palestinian Nat'l Auth. Egypt Indonesia Bulgaria	50 45 42 42 39 38 37 33 33 30 30 28	
International average Armenia Macedonia, Republic of Moldova, Republic of Jordan Chile Cyprus Bahrain Palestinian Nat'l Auth. Egypt Indonesia Bulgaria Lebanon	50 45 42 42 39 38 37 33 30 30 28 23	* * * * * * * * * * * * * * * * * * *
International average Armenia Macedonia, Republic of Moldova, Republic of Jordan Chile Cyprus Bahrain Palestinian Nat'l Auth. Egypt Indonesia Bulgaria Lebanon Philippines	50 45 42 42 39 38 37 33 33 30 30 28 23 23	* * * * * * * * * * * * * * * * * * *
International average Armenia Macedonia, Republic of Moldova, Republic of Jordan Chile Cyprus Bahrain Palestinian Nat'l Auth. Egypt Indonesia Bulgaria Lebanon Philippines Lithuania	50 45 42 42 39 38 37 33 30 30 28 23 23 21	* * * * * * * * * * * * * * * * * * *
International average Armenia Macedonia, Republic of Moldova, Republic of Jordan Chile Cyprus Bahrain Palestinian Nat'l Auth. Egypt Indonesia Bulgaria Lebanon Philippines Lithuania Botswana	50 45 42 42 39 38 37 33 30 28 23 23 21 20	* * * * * * * * * * * * * * * * * * *
International average Armenia Macedonia, Republic of Moldova, Republic of Jordan Chile Cyprus Bahrain Palestinian Nat'l Auth. Egypt Indonesia Bulgaria Lebanon Philippines Lithuania Botswana Iran, Islamic Republic of	50 45 42 42 39 38 37 33 30 30 28 23 21 20 15	* * * * * * * * * * * * * * * * * * *
International average Armenia Macedonia, Republic of Moldova, Republic of Jordan Chile Cyprus Bahrain Palestinian Nat'l Auth. Egypt Indonesia Bulgaria Lebanon Philippines Lithuania Botswana Iran, Islamic Republic of Saudi Arabia	50 45 42 42 39 38 37 33 30 28 23 23 21 20 15 13	* * * * * * * * * * * * * * * * * * *
International average Armenia Macedonia, Republic of Moldova, Republic of Jordan Chile Cyprus Bahrain Palestinian Nat'l Auth. Egypt Indonesia Bulgaria Lebanon Philippines Lithuania Botswana Iran, Islamic Republic of Saudi Arabia South Africa	50 45 42 42 39 38 37 33 30 28 23 23 21 20 15 13	* * * * * * * * * * * * * * * * * * *
International average Armenia Macedonia, Republic of Moldova, Republic of Jordan Chile Cyprus Bahrain Palestinian Nat'l Auth. Egypt Indonesia Bulgaria Lebanon Philippines Lithuania Botswana Iran, Islamic Republic of Saudi Arabia South Africa Ghana	50 45 42 42 39 38 37 33 30 28 23 23 21 20 15 13 8	* * * * * * * * * * * * * * * * * * *

Country average vs. International average:

O ▼

Content Domain	Main Topic	Cognitive Domain
MEASUREMENT	Tools, Techniques, and Formulas	Knowing Facts and Procedures

# Length of pipe from meter scale



Item Number: M012038

**Correct Response:** 

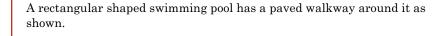
### **Overall Percent Correct**

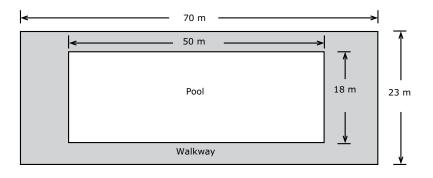
Singapore Hong Kong, SAR	95 94	<b>A</b>
Japan	93	<b>A</b>
Estonia	91	<b>A</b>
Chinese Taipei	90	<b>A</b>
Korea, Republic of	89	<u> </u>
Netherlands	89	<b>A</b>
Belgium (Flemish)	87 86	<b>A</b>
Hungary Malaysia	86	
Sweden	86	
Latvia	83	
Russian Federation	82	<b>A</b>
Lithuania	81	<u> </u>
Scotland	81	<u> </u>
England	80	<u> </u>
New Zealand	79	<b>A</b>
Slovak Republic	79	<b>A</b>
Slovenia	79	<b>A</b>
Australia	78	$\blacktriangle$
Italy	74	<b>A</b>
Norway	74	<b>A</b>
United States	73	<b>A</b>
Bulgaria	72	<b>A</b>
Israel	72	<b>A</b>
Serbia and Montenegro	72	<b>A</b>
Macedonia, Republic of	70	0
International average	67	
International average Lebanon	<b>67</b> 64	0
International average Lebanon Moldova, Republic of	<b>67</b> 64 64	0
International average Lebanon Moldova, Republic of Romania	67 64 64 64	0 0
International average Lebanon Moldova, Republic of Romania Botswana	67 64 64 64 61	0 0 0
International average Lebanon Moldova, Republic of Romania Botswana Cyprus	64 64 64 61 61	0 0 0
International average Lebanon Moldova, Republic of Romania Botswana Cyprus Chile	64 64 64 61 61 58	0 0 0
International average Lebanon Moldova, Republic of Romania Botswana Cyprus Chile Armenia	64 64 64 61 61 58	0 0 0
International average Lebanon Moldova, Republic of Romania Botswana Cyprus Chile Armenia Indonesia	64 64 64 61 61 58	0 0 0
International average Lebanon Moldova, Republic of Romania Botswana Cyprus Chile Armenia	67 64 64 64 61 61 58 54	0 0 0
International average Lebanon Moldova, Republic of Romania Botswana Cyprus Chile Armenia Indonesia Morocco Tunisia	67 64 64 64 61 61 58 54 54	0 0
International average Lebanon Moldova, Republic of Romania Botswana Cyprus Chile Armenia Indonesia Morocco	67 64 64 64 61 61 58 54 54 50 49	0 0 0
International average Lebanon Moldova, Republic of Romania Botswana Cyprus Chile Armenia Indonesia Morocco Tunisia Iran, Islamic Republic of	67 64 64 64 61 61 58 54 54 50 49	0 0 0
International average Lebanon Moldova, Republic of Romania Botswana Cyprus Chile Armenia Indonesia Morocco Tunisia Iran, Islamic Republic of Philippines	67 64 64 61 61 58 54 54 50 49 48	0 0 0
International average Lebanon Moldova, Republic of Romania Botswana Cyprus Chile Armenia Indonesia Morocco Tunisia Iran, Islamic Republic of Philippines South Africa	67 64 64 61 61 58 54 54 50 49 48 42 40	0 0 0
International average Lebanon Moldova, Republic of Romania Botswana Cyprus Chile Armenia Indonesia Morocco Tunisia Iran, Islamic Republic of Philippines South Africa Ghana	67 64 64 61 61 58 54 50 49 48 42 40 39	0 0 0
International average Lebanon Moldova, Republic of Romania Botswana Cyprus Chile Armenia Indonesia Morocco Tunisia Iran, Islamic Republic of Philippines South Africa Ghana Jordan	67 64 64 61 61 58 54 50 49 48 42 40 39 38	0 0 0
International average Lebanon Moldova, Republic of Romania Botswana Cyprus Chile Armenia Indonesia Morocco Tunisia Iran, Islamic Republic of Philippines South Africa Ghana Jordan Palestinian Nat'l Auth.	67 64 64 61 61 58 54 50 49 48 42 40 39 38 34	0 0 0
International average Lebanon Moldova, Republic of Romania Botswana Cyprus Chile Armenia Indonesia Morocco Tunisia Iran, Islamic Republic of Philippines South Africa Ghana Jordan Palestinian Nat'l Auth. Bahrain	67 64 64 61 61 58 54 50 49 48 42 40 39 38 34 32	0 0 0

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
MEASUREMENT	Tools, Techniques, and Formulas	Knowing Facts and Procedures

# Area of paved walkway around pool





What is the area of the paved walkway?

- (A) 100 m<sup>2</sup>
- $\bigcirc$  161 m<sup>2</sup>
- $\bigcirc$  710 m<sup>2</sup>
- (D) 1,610 m<sup>2</sup>

Item Number: M022021

# **Correct Response:**

C

# **Overall Percent Correct**

Singapore	86	
Hong Kong, SAR	82	<u> </u>
Korea, Republic of	77	_
Chinese Taipei	77	_
Japan	76	_
Malaysia	60	_
Netherlands	57	_
Estonia	53	_
Belgium (Flemish)	51	
Slovak Republic	50	
Sweden	48	
31100011	46 46	
Australia		_
Italy	45	
New Zealand	44	0
Lithuania	43	
Hungary	43	
England	40	0
Slovenia	40	0
United States	40	0
Cyprus	39	0
Scotland	39	O
International average	38	
Serbia and Montenegro	38	0

Serbia and Montenegro	38	0
Latvia	38	0
Bulgaria	38	0
Russian Federation	38	0
Israel	37	0
Egypt	33	▼
Moldova, Republic of	33	▼
Norway	32	▼
Romania	30	<b>* *</b>
Iran, Islamic Republic of	28	
Armenia	28	▼
Jordan	26	<b>*</b>
Indonesia	25	▼
Bahrain	23	▼
Palestinian Nat'l Auth.	22	▼
Macedonia, Republic of	20	▼
Lebanon	19	▼
Chile	19	
Tunisia	18	▼
Morocco	18	▼
Saudi Arabia	17	▼
Botswana	16	▼
Philippines	16	<b>*</b>
South Africa	16	▼
Ghana	13	▼

Country average vs. International average:

Content Domain	Main Topic	Cognitive Domain
MEASUREMENT	Tools, Techniques, and Formulas	Reasoning

## Oranges are packed in boxes

Oranges are packed in boxes. The average diameter of the oranges is  $6~{\rm cm}$ , and the boxes are  $60~{\rm cm}$  long,  $36~{\rm cm}$  wide, and  $24~{\rm cm}$  deep.

Which of these is the BEST approximation of the number of oranges that can be packed in a box?

(A) 30

(B) 240

(c) 360

D 1,920

Item Number: M032647

**Correct Response:** 

В

# **Overall Percent Correct**

62	<b>A</b>
61	
57	<b>A</b>
57	
56	
56	<b>A A A</b>
55	
55	
55	
55	
54	
53	
53	
53	
51	
51	
51	
51	
50	<b>A</b>
50	
48	
46	0
45	0
44	
43	0
42	0
42	0
41	Ο
40	•
39	•
27	_
57	•
37	▼
	▼ ▼
37	<b>* * * * *</b>
	61 57 57 56 56 55 55 55 55 53 53 51 51 51 50 50 48 46 45 44 43 42 41 40

Country average vs. International average:

Lebanon

Bahrain Egypt

Tunisia

Indonesia

Armenia

Jordan

Ghana

South Africa

Saudi Arabia

Iran, Islamic Republic of

Palestinian Nat'l Auth.

34

32

32

31

31

31

31

31

29 29

28

28

 $\blacksquare$ 

Content Domain	Main Topic	Cognitive Domain
MEASUREMENT	Tools, Techniques, and Formulas	Solving Routine Problems

# Length of rectangle from width/perimeter

A thin wire 20 centimeters long is formed into a rectangle. If the width of this rectangle is 4 centimeters, what is its length?

- (A) 5 centimeters
- (B) 6 centimeters
- (c) 12 centimeters
- (D) 16 centimeters

Item Number: M012030

**Correct Response:** 

# **Overall Percent Correct**

Singapore	81	$\blacktriangle$
Japan	65	<b>A</b>
Chinese Taipei	62	$\blacktriangle$
Hong Kong, SAR	62	<b>A</b>
Korea, Republic of	62	<b>A</b>
Netherlands	56	<b>A</b>
Belgium (Flemish)	56	<b>A</b>
Sweden	54	<b>A</b>
Estonia	53	<b>A</b>
Latvia	52	<b>A</b>
Australia	50	<b>A</b>
Russian Federation	47	<b>A</b>
England	46	<b>A</b>
Slovak Republic	45	<b>A</b>
Serbia and Montenegro	45	<b>A</b>
New Zealand	45	<b>A</b>
Israel	44	<b>A</b>
Bulgaria	43	<b>A</b>
Romania	43	<b>A</b>
Italy	42	<b>A</b>
Malaysia	41	0
Norway	40	0
Moldova, Republic of	39	0
United States	39	0
Lithuania	38	0
International average	37	
International average Scotland	<b>37</b> 37	0
International average Scotland Hungary	<b>37</b> 37 37	0
International average Scotland Hungary Cyprus	37 37 37 36	0 0 0
International average Scotland Hungary Cyprus Slovenia	37 37 37 36 33	0 0 0
International average Scotland Hungary Cyprus Slovenia Armenia	37 37 37 36 33 31	0 0 0
International average Scotland Hungary Cyprus Slovenia Armenia Iran, Islamic Republic of	37 37 37 36 33 31 28	0 0 0
International average Scotland Hungary Cyprus Slovenia Armenia Iran, Islamic Republic of Macedonia, Republic of	37 37 37 36 33 31 28 27	0 0 0
International average Scotland Hungary Cyprus Slovenia Armenia Iran, Islamic Republic of Macedonia, Republic of Chile	37 37 37 36 33 31 28 27	0 0 0
International average Scotland Hungary Cyprus Slovenia Armenia Iran, Islamic Republic of Macedonia, Republic of Chile Tunisia	37 37 37 36 33 31 28 27 27	0 0 0
International average Scotland Hungary Cyprus Slovenia Armenia Iran, Islamic Republic of Macedonia, Republic of Chile Tunisia Lebanon	37 37 37 36 33 31 28 27 27 26 23	0 0 0
International average Scotland Hungary Cyprus Slovenia Armenia Iran, Islamic Republic of Macedonia, Republic of Chile Tunisia Lebanon Jordan	37 37 37 36 33 31 28 27 27 26 23 22	0 0 0
International average Scotland Hungary Cyprus Slovenia Armenia Iran, Islamic Republic of Macedonia, Republic of Chile Tunisia Lebanon Jordan Palestinian Nat'l Auth.	37 37 37 36 33 31 28 27 27 26 23 22 19	0
International average Scotland Hungary Cyprus Slovenia Armenia Iran, Islamic Republic of Macedonia, Republic of Chile Tunisia Lebanon Jordan Palestinian Nat'l Auth. Egypt	37 37 37 36 33 31 28 27 27 26 23 22 19	0 0 0
International average Scotland Hungary Cyprus Slovenia Armenia Iran, Islamic Republic of Macedonia, Republic of Chile Tunisia Lebanon Jordan Palestinian Nat'l Auth. Egypt Bahrain	37 37 37 36 33 31 28 27 27 26 23 22 19 18	0 0 0
International average Scotland Hungary Cyprus Slovenia Armenia Iran, Islamic Republic of Macedonia, Republic of Chile Tunisia Lebanon Jordan Palestinian Nat'l Auth. Egypt Bahrain Botswana	37 37 37 36 33 31 28 27 27 26 23 22 19 18 18	0 0 0
International average Scotland Hungary Cyprus Slovenia Armenia Iran, Islamic Republic of Macedonia, Republic of Chile Tunisia Lebanon Jordan Palestinian Nat'l Auth. Egypt Bahrain Botswana South Africa	37 37 37 36 33 31 28 27 27 26 23 22 19 18 18 17	0 0 0
International average Scotland Hungary Cyprus Slovenia Armenia Iran, Islamic Republic of Macedonia, Republic of Chile Tunisia Lebanon Jordan Palestinian Nat'l Auth. Egypt Bahrain Botswana South Africa Saudi Arabia	37 37 37 36 33 31 28 27 27 26 23 22 19 18 18 17 16	0 0 0
International average Scotland Hungary Cyprus Slovenia Armenia Iran, Islamic Republic of Macedonia, Republic of Chile Tunisia Lebanon Jordan Palestinian Nat'l Auth. Egypt Bahrain Botswana South Africa Saudi Arabia Morocco	37 37 37 36 33 31 28 27 27 26 23 22 19 18 18 17 16 14	0 0 0
International average Scotland Hungary Cyprus Slovenia Armenia Iran, Islamic Republic of Macedonia, Republic of Chile Tunisia Lebanon Jordan Palestinian Nat'l Auth. Egypt Bahrain Botswana South Africa Saudi Arabia Morocco Philippines	37 37 37 36 33 31 28 27 27 26 23 22 19 18 18 17 16 14 14	0 0 0
International average Scotland Hungary Cyprus Slovenia Armenia Iran, Islamic Republic of Macedonia, Republic of Chile Tunisia Lebanon Jordan Palestinian Nat'l Auth. Egypt Bahrain Botswana South Africa Saudi Arabia Morocco Philippines Indonesia	37 37 37 36 33 31 28 27 27 26 23 22 19 18 18 17 16 14 14 14	0 0 0
International average Scotland Hungary Cyprus Slovenia Armenia Iran, Islamic Republic of Macedonia, Republic of Chile Tunisia Lebanon Jordan Palestinian Nat'l Auth. Egypt Bahrain Botswana South Africa Saudi Arabia Morocco Philippines	37 37 37 36 33 31 28 27 27 26 23 22 19 18 18 17 16 14 14	0 0 0

Country average vs. International average:

0

 $\blacksquare$ 

Higher Not different Lower

В

Content Domain	Main Topic	Cognitive Domain
MEASUREMENT	Tools, Techniques, and Formulas	Solving Routine Problems

### Time when finish homework

Kris begins her homework at 6:40. If it takes Kris three-quarters of an hour to do her homework, at what time will she finish?
Answer:
Allswer.

#### Item Number: M022148

#### **SCORING**

#### **Correct Response**

- 7:25
- Other response equivalent to 7:25.

#### **Incorrect Response**

- 7:20
- 7:30
- 6:25
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task).

# **Overall Percent Correct**

Netherlands	91	<b>A</b>
Belgium (Flemish)	85	<b>A</b>
Hungary	84	$\blacktriangle$
England	80	<b>A</b>
Sweden	78	$\blacktriangle$
Singapore	78	$\blacktriangle$
Scotland	76	<b>A</b>
Australia	72	<b>A</b>
Norway	71	<b>A</b>
New Zealand	68	<b>A</b>
Hong Kong, SAR	67	
Slovenia	67	<b>A</b>
Italy	65	<b>A</b>
Romania	63	<b>A</b>
Japan	63	<b>A</b>
Israel	63	<b>A</b>
Slovak Republic	59	
Chinese Taipei	59	<b>A</b>
Estonia	58	<b>A</b>
Cyprus	58	<b>A</b>
Korea, Republic of	57	<b>A</b>
United States	55	<b>A</b>
Malaysia	51	<b>A</b>
Latvia	46	0
International average	45	
Lebanon	45	0
Lebanon Moldova, Republic of	45 42	0
Lebanon Moldova, Republic of Russian Federation	45 42 41	0 0
Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro	45 42 41 36	0 0
Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro Bulgaria	45 42 41 36 36	0 0
Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro Bulgaria Armenia	45 42 41 36 36 35	0 0
Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro Bulgaria Armenia Lithuania	45 42 41 36 36 35 34	0 0
Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro Bulgaria Armenia Lithuania Chile	45 42 41 36 36 35 34 29	0 0
Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro Bulgaria Armenia Lithuania Chile Tunisia	45 42 41 36 36 35 34 29	0 0
Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro Bulgaria Armenia Lithuania Chile Tunisia Egypt	45 42 41 36 36 35 34 29 20	0 0
Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro Bulgaria Armenia Lithuania Chile Tunisia Egypt Jordan	45 42 41 36 36 35 34 29 20 20	0 0
Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro Bulgaria Armenia Lithuania Chile Tunisia Egypt Jordan Macedonia, Republic of	45 42 41 36 35 34 29 20 20	0 0
Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro Bulgaria Armenia Lithuania Chile Tunisia Egypt Jordan Macedonia, Republic of Indonesia	45 42 41 36 35 34 29 20 20 19 18	0
Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro Bulgaria Armenia Lithuania Chile Tunisia Egypt Jordan Macedonia, Republic of Indonesia Palestinian Nat'l Auth.	45 42 41 36 35 34 29 20 19 18 18	0 0
Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro Bulgaria Armenia Lithuania Chile Tunisia Egypt Jordan Macedonia, Republic of Indonesia Palestinian Nat'l Auth. Morocco	45 42 41 36 35 34 29 20 19 18 18 16	0 0
Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro Bulgaria Armenia Lithuania Chile Tunisia Egypt Jordan Macedonia, Republic of Indonesia Palestinian Nat'l Auth. Morocco Iran, Islamic Republic of	45 42 41 36 36 35 34 29 20 20 19 18 18 16 15	0 0
Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro Bulgaria Armenia Lithuania Chile Tunisia Egypt Jordan Macedonia, Republic of Indonesia Palestinian Nat'l Auth. Morocco Iran, Islamic Republic of Bahrain	45 42 41 36 35 34 29 20 19 18 18 16 15 15	0 0
Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro Bulgaria Armenia Lithuania Chile Tunisia Egypt Jordan Macedonia, Republic of Indonesia Palestinian Nat'l Auth. Morocco Iran, Islamic Republic of Bahrain Botswana	45 42 41 36 35 34 29 20 19 18 18 16 15 14	0 0
Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro Bulgaria Armenia Lithuania Chile Tunisia Egypt Jordan Macedonia, Republic of Indonesia Palestinian Nat'l Auth. Morocco Iran, Islamic Republic of Bahrain Botswana Saudi Arabia	45 42 41 36 35 34 29 20 19 18 16 15 15 14 11 9	0 0
Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro Bulgaria Armenia Lithuania Chile Tunisia Egypt Jordan Macedonia, Republic of Indonesia Palestinian Nat'l Auth. Morocco Iran, Islamic Republic of Bahrain Botswana Saudi Arabia South Africa	45 42 41 36 36 35 34 29 20 19 18 16 15 15 14 11 9 8	0 0
Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro Bulgaria Armenia Lithuania Chile Tunisia Egypt Jordan Macedonia, Republic of Indonesia Palestinian Nat'l Auth. Morocco Iran, Islamic Republic of Bahrain Botswana Saudi Arabia South Africa Philippines	45 42 41 36 36 35 34 29 20 19 18 16 15 15 14 11 9 8	0 0
Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro Bulgaria Armenia Lithuania Chile Tunisia Egypt Jordan Macedonia, Republic of Indonesia Palestinian Nat'l Auth. Morocco Iran, Islamic Republic of Bahrain Botswana Saudi Arabia South Africa	45 42 41 36 36 35 34 29 20 19 18 16 15 15 14 11 9 8	0 0

# Country average vs. International average:

Higher	
Not different	C
Lower	_

# Time when finish homework (continued)

Item Number: M022148

# **Student Responses**

### **Correct Response:**

Kris begins her homework at 6:40. If it takes Kris three-quarters of an hour to do her homework, at what time will she finish?

## **Incorrect Response:**

Kris begins her homework at 6:40. If it takes Kris three-quarters of an hour to do her homework, at what time will she finish?

Answer: 7:20

Content Domain	Main Topic	Cognitive Domain
MEASUREMENT	Tools, Techniques, and Formulas	Solving Routine Problems

# 5 squares: area of one square

The figure consists of 5 squares of equal area. The area of the whole figure is 245 cm<sup>2</sup>. A. Find the area of one square. Answer: \_\_\_\_\_ cm<sup>2</sup> B. Find the length of one side of one square. Answer: \_\_\_\_\_ cm C. Find the perimeter of the whole figure in centimeters. Answer: cm

#### Item Number: M022227A

#### **SCORING**

#### **Correct Response**

• 49

#### **Incorrect Response**

• 1

• Other incorrect (including crossed out/erased, stray marks, illegible, or off task).

### **Overall Percent Correct**

Singapore	89	
Hong Kong, SAR	88	<u> </u>
Korea, Republic of	87	<u> </u>
Japan	86	_ _
Armenia	84	$\blacktriangle$
Chinese Taipei	83	<b>A</b>
Estonia	69	<u> </u>
Netherlands	69	<b>A</b>
Russian Federation	68	lack
Belgium (Flemish)	67	lack
Slovenia	66	<b>A</b>
Scotland	63	lack
United States	60	lack
Malaysia	60	$\blacktriangle$
Hungary	60	lack
Bulgaria	59	lack
Romania	58	lack
Tunisia	57	lack
Moldova, Republic of	57	lack
Italy	57	$\blacktriangle$
Slovak Republic	57	lack
Lithuania	57	lack
Australia	56	0
International average	51	
Lebanon	49	0
	49 48	0
Lebanon		0
Lebanon Sweden	48	0 0 <b>V</b>
Lebanon Sweden England	48 47	<ul><li>○</li><li>○</li><li>▼</li><li>▼</li></ul>
Lebanon Sweden England Serbia and Montenegro	48 47 47	<ul><li>○</li><li>○</li><li>▼</li><li>▼</li></ul>
Lebanon Sweden England Serbia and Montenegro Israel	48 47 47 47	<ul><li>○</li><li>○</li><li>▼</li><li>▼</li></ul>
Lebanon Sweden England Serbia and Montenegro Israel Egypt	48 47 47 47 46	<ul><li>○</li><li>○</li><li>▼</li><li>▼</li><li>▼</li></ul>
Lebanon Sweden England Serbia and Montenegro Israel Egypt New Zealand	48 47 47 47 46 45	<ul><li>○</li><li>○</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li></ul>
Lebanon Sweden England Serbia and Montenegro Israel Egypt New Zealand Jordan Cyprus Macedonia, Republic of	48 47 47 47 46 45 45	<ul><li>○</li><li>○</li><li>○</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li></ul>
Lebanon Sweden England Serbia and Montenegro Israel Egypt New Zealand Jordan Cyprus	48 47 47 47 46 45 45 43	<ul><li>○</li><li>○</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li></ul>
Lebanon Sweden England Serbia and Montenegro Israel Egypt New Zealand Jordan Cyprus Macedonia, Republic of	48 47 47 47 46 45 45 43	<ul><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li>&lt;</ul>
Lebanon Sweden England Serbia and Montenegro Israel Egypt New Zealand Jordan Cyprus Macedonia, Republic of Iran, Islamic Republic of	48 47 47 47 46 45 45 43 41 38	<ul><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li>&lt;</ul>
Lebanon Sweden England Serbia and Montenegro Israel Egypt New Zealand Jordan Cyprus Macedonia, Republic of Iran, Islamic Republic of Bahrain	48 47 47 46 45 45 43 41 38 37 33 32	<ul><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li>&lt;</ul>
Lebanon Sweden England Serbia and Montenegro Israel Egypt New Zealand Jordan Cyprus Macedonia, Republic of Iran, Islamic Republic of Bahrain Indonesia Philippines Norway	48 47 47 46 45 45 43 41 38 37 33 32 32	<ul><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li>&lt;</ul>
Lebanon Sweden England Serbia and Montenegro Israel Egypt New Zealand Jordan Cyprus Macedonia, Republic of Iran, Islamic Republic of Bahrain Indonesia Philippines Norway Morocco	48 47 47 46 45 45 43 41 38 37 33 32	<ul><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li>&lt;</ul>
Lebanon Sweden England Serbia and Montenegro Israel Egypt New Zealand Jordan Cyprus Macedonia, Republic of Iran, Islamic Republic of Bahrain Indonesia Philippines Norway	48 47 47 46 45 45 43 41 38 37 33 32 32 31 30	<ul><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li>&lt;</ul>
Lebanon Sweden England Serbia and Montenegro Israel Egypt New Zealand Jordan Cyprus Macedonia, Republic of Iran, Islamic Republic of Bahrain Indonesia Philippines Norway Morocco Palestinian Nat'l Auth. Botswana	48 47 47 46 45 45 43 41 38 37 33 32 32 31 30 28	<ul><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li>&lt;</ul>
Lebanon Sweden England Serbia and Montenegro Israel Egypt New Zealand Jordan Cyprus Macedonia, Republic of Iran, Islamic Republic of Bahrain Indonesia Philippines Norway Morocco Palestinian Nat'l Auth. Botswana Chile	48 47 47 46 45 45 43 41 38 37 33 32 32 31 30 28 24	<ul><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li>&lt;</ul>
Lebanon Sweden England Serbia and Montenegro Israel Egypt New Zealand Jordan Cyprus Macedonia, Republic of Iran, Islamic Republic of Bahrain Indonesia Philippines Norway Morocco Palestinian Nat'l Auth. Botswana Chile Saudi Arabia	48 47 47 46 45 45 43 41 38 37 33 32 32 31 30 28	<ul><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li>&lt;</ul>
Lebanon Sweden England Serbia and Montenegro Israel Egypt New Zealand Jordan Cyprus Macedonia, Republic of Iran, Islamic Republic of Bahrain Indonesia Philippines Norway Morocco Palestinian Nat'l Auth. Botswana Chile Saudi Arabia Ghana	48 47 47 46 45 45 43 41 38 37 33 32 32 31 30 28 24	<ul><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li>&lt;</ul>
Lebanon Sweden England Serbia and Montenegro Israel Egypt New Zealand Jordan Cyprus Macedonia, Republic of Iran, Islamic Republic of Bahrain Indonesia Philippines Norway Morocco Palestinian Nat'l Auth. Botswana Chile Saudi Arabia	48 47 47 46 45 45 43 41 38 37 33 32 32 31 30 28 24 15	<ul><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li><li>○</li>&lt;</ul>
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# Country average vs. International average:

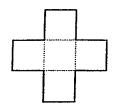
5 squares: area of one square (continued)

Item Number: M022227A

# **Student Responses**

## **Correct Response:**

18. The figure consists of 5 squares of equal area. The area of the whole figure is  $\frac{1245 \text{ cm}^2}{1245 \text{ cm}^2}$ .



245

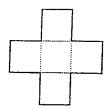
Find the area of one square.

Answer: \_\_\_\_\_cm²

# **Incorrect Response:**

55. The figure consists of 5 squares of equal area. The area of the whole figure is  $\frac{7}{245}$  cm<sup>2</sup>





a. Find the area of one square.

Answer: \_\_\_\_\_ cm<sup>2</sup>

Content Domain	Main Topic	Cognitive Domain
MEASUREMENT	Tools, Techniques, and Formulas	Solving Routine Problems

# 5 squares: length of one side

The figure consists of 5 squares of equal area. The area of the whole figure is 245 cm<sup>2</sup>. A. Find the area of one square. Answer: \_\_\_\_\_ cm<sup>2</sup> B. Find the length of one side of one square. Answer: \_\_\_\_\_ cm C. Find the perimeter of the whole figure in centimeters. Answer: cm

#### Item Number: M022227B

#### **SCORING**

#### **Correct Response**

- 7 (or 49)
- Correct square root of incorrect answer to part a.

#### **Incorrect Response**

- 1 only if the answer to part A is not 1.
- Indication of division of area of one square (as obtained in part a) by 4 (e.g., 12.25, 49/4, etc.).
- 24.5 or other indication of division by 2.
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task).

### **Overall Percent Correct**

Singapore	80	
Hong Kong, SAR	78	
Korea, Republic of	70	
Chinese Taipei	65	
Armenia	62	
Romania	45	
Russian Federation	43	
Italy	43	
Japan	42	
Estonia	39	
Netherlands	38	
Belgium (Flemish)	37	
Serbia and Montenegro	36	
Moldova, Republic of	35	
Hungary	35	
Malaysia	34	<u> </u>
Lithuania	33	<u> </u>
Bulgaria	32	0
United States	29	0
Slovak Republic	29	0
Slovenia	29	0
International average	28	
Scotland	27	0
Australia	26	0
England	23	0
England Sweden	23 23	
3		
Sweden	23	
Sweden New Zealand	23 23	
Sweden New Zealand Cyprus	23 23 21	
Sweden New Zealand Cyprus Israel	23 23 21 20	
Sweden New Zealand Cyprus Israel Macedonia, Republic of	23 23 21 20 20	
Sweden New Zealand Cyprus Israel Macedonia, Republic of Egypt	23 23 21 20 20 20	
Sweden New Zealand Cyprus Israel Macedonia, Republic of Egypt Lebanon	23 23 21 20 20 20 18	
Sweden New Zealand Cyprus Israel Macedonia, Republic of Egypt Lebanon Latvia	23 23 21 20 20 20 18 17	
Sweden New Zealand Cyprus Israel Macedonia, Republic of Egypt Lebanon Latvia Jordan	23 23 21 20 20 20 18 17	
Sweden New Zealand Cyprus Israel Macedonia, Republic of Egypt Lebanon Latvia Jordan Palestinian Nat'l Auth.	23 23 21 20 20 20 18 17 16	
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Sweden New Zealand Cyprus Israel Macedonia, Republic of Egypt Lebanon Latvia Jordan Palestinian Nat'l Auth. Indonesia Bahrain Norway Iran, Islamic Republic of	23 23 21 20 20 20 18 17 16 16 15 14	
Sweden New Zealand Cyprus Israel Macedonia, Republic of Egypt Lebanon Latvia Jordan Palestinian Nat'l Auth. Indonesia Bahrain Norway	23 23 21 20 20 20 18 17 16 16 15 14 11	
Sweden New Zealand Cyprus Israel Macedonia, Republic of Egypt Lebanon Latvia Jordan Palestinian Nat'l Auth. Indonesia Bahrain Norway Iran, Islamic Republic of Philippines	23 23 21 20 20 20 18 17 16 16 15 14 11 11	* * * * * * * * * * * * * * * * * * *
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Sweden New Zealand Cyprus Israel Macedonia, Republic of Egypt Lebanon Latvia Jordan Palestinian Nat'l Auth. Indonesia Bahrain Norway Iran, Islamic Republic of Philippines Tunisia Morocco	23 23 21 20 20 20 18 17 16 16 15 14 11 11 10 9	* * * * * * * * * * * * * * * * * * *
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Sweden New Zealand Cyprus Israel Macedonia, Republic of Egypt Lebanon Latvia Jordan Palestinian Nat'l Auth. Indonesia Bahrain Norway Iran, Islamic Republic of Philippines Tunisia Morocco Saudi Arabia Chile	23 23 21 20 20 20 18 17 16 16 15 14 11 11 10 9 8 8	
Sweden New Zealand Cyprus Israel Macedonia, Republic of Egypt Lebanon Latvia Jordan Palestinian Nat'l Auth. Indonesia Bahrain Norway Iran, Islamic Republic of Philippines Tunisia Morocco Saudi Arabia Chile Botswana	23 23 21 20 20 20 18 17 16 16 15 14 11 11 10 9 8 8 6 4	* * * * * * * * * * * * * * * * * * *
Sweden New Zealand Cyprus Israel Macedonia, Republic of Egypt Lebanon Latvia Jordan Palestinian Nat'l Auth. Indonesia Bahrain Norway Iran, Islamic Republic of Philippines Tunisia Morocco Saudi Arabia Chile Botswana South Africa	23 23 21 20 20 20 18 17 16 16 15 14 11 11 10 9 8 8 6 4 3	* * * * * * * * * * * * * * * * * * *

# Country average vs. International average:

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Not different	C
Lower	•

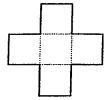
5 squares: length of one side (continued)

Item Number: M022227B

# **Student Responses**

## **Correct Response:**

18. The figure consists of 5 squares of equal area. The area of the whole figure is 245 cm<sup>2</sup>.

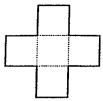


b. Find the length of one side of one square.



## **Incorrect Response:**

18. The figure consists of 5 squares of equal area. The area of the whole figure is 245 cm<sup>2</sup>.



b. Find the length of one side of one square.

Answer: 16 cm

Content Domain	Main Topic	Cognitive Domain
MEASUREMENT	Tools, Techniques, and Formulas	Solving Routine Problems

# 5 squares: perimeter whole figure

The figure consists of 5 squares of equal area. The area of the whole figure is 245 cm<sup>2</sup>. A. Find the area of one square. Answer: \_\_\_\_\_ cm<sup>2</sup> B. Find the length of one side of one square. Answer: \_\_\_\_\_ cm C. Find the perimeter of the whole figure in centimeters. Answer: cm

#### Item Number: M022227C

#### **SCORING**

#### **Correct Response**

- 84
- 12, on condition 1 was the response for part b.
- Other responses consistent with answer to part b, using multiplication by 12 (e.g., 147, 294, etc.).

#### **Incorrect Response**

- An answer that is 4 times the response to part b.
- Indication of multiplication by 12 but multiplication is incorrect.
- 245 [Confusion between area and perimeter].
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task).

#### **Overall Percent Correct**

Singapore Hong Kong, SAR Korea, Republic of		
	72 58	<b>A</b>
	53	<b>A</b>
Chinese Taipei	51	•
'	47	<b>A</b>
Japan Armenia	47	
	38	<b>A</b>
Malaysia Netherlands	38	<b>A</b>
	30	<b>A</b>
Australia	30 27	
Scotland		<b>A</b>
England	27	<b>A</b>
Estonia	26	<u> </u>
Belgium (Flemish)	25	<b>A</b>
Hungary	24	<b>A</b>
Slovenia	24	<b>A</b>
Slovak Republic	24	<b>A</b>
New Zealand	23	0
Russian Federation	23	0
United States	23	0
Italy	22	0
Lithuania	22	0
Sweden	21	0
International average	20	
Serbia and Montenegro	18	0
Latvia	17	0
Cyprus	17	0
Norway	16	0
Moldova, Republic of	16	0
Romania	16	▼
Bulgaria	14	▼
Bulgaria Israel	14 12	<b>▼</b>
		<b>▼</b>
Israel	12	<b>▼ ▼ ▼</b>
Israel Macedonia, Republic of	12 8	<b>* * * *</b>
Israel Macedonia, Republic of Tunisia	12 8 7 5 5	* * * * * * * * * * * * * * * * * * *
Israel Macedonia, Republic of Tunisia Indonesia	12 8 7 5	* * * * * * * * * * * * * * * * * * *
Israel Macedonia, Republic of Tunisia Indonesia Chile	12 8 7 5 5	* * * * * * * * * * * * * * * * * * *
Israel Macedonia, Republic of Tunisia Indonesia Chile Egypt	12 8 7 5 5	* * * * * * * * * * * * * * * * * * *
Israel Macedonia, Republic of Tunisia Indonesia Chile Egypt Jordan	12 8 7 5 5 5	* * * * * * * * * * * * * * * * * * *
Israel Macedonia, Republic of Tunisia Indonesia Chile Egypt Jordan Bahrain	12 8 7 5 5 5 5	* * * * * * * * * * * * * * * * * * *
Israel Macedonia, Republic of Tunisia Indonesia Chile Egypt Jordan Bahrain Palestinian Nat'l Auth.	12 8 7 5 5 5 5 4 4	* * * * * * * * * * * * * * * * * * *
Israel Macedonia, Republic of Tunisia Indonesia Chile Egypt Jordan Bahrain Palestinian Nat'l Auth. Botswana	12 8 7 5 5 5 4 4 3	* * * * * * * * * * * * * * * * * * *
Israel Macedonia, Republic of Tunisia Indonesia Chile Egypt Jordan Bahrain Palestinian Nat'l Auth. Botswana Lebanon	12 8 7 5 5 5 5 4 4 3 3	* * * * * * * * * * * * * * * * * * *
Israel Macedonia, Republic of Tunisia Indonesia Chile Egypt Jordan Bahrain Palestinian Nat'l Auth. Botswana Lebanon Morocco	12 8 7 5 5 5 5 4 4 3 3 2	* * * * * * * * * * * * * * * * * * *
Israel Macedonia, Republic of Tunisia Indonesia Chile Egypt Jordan Bahrain Palestinian Nat'l Auth. Botswana Lebanon Morocco Iran, Islamic Republic of	12 8 7 5 5 5 4 4 3 3 2 2	* * * * * * * * * * * * * * * * * * *
Israel Macedonia, Republic of Tunisia Indonesia Chile Egypt Jordan Bahrain Palestinian Nat'l Auth. Botswana Lebanon Morocco Iran, Islamic Republic of South Africa	12 8 7 5 5 5 4 4 3 3 2 2	* * * * * * * * * * * * * * * * * * *
Israel Macedonia, Republic of Tunisia Indonesia Chile Egypt Jordan Bahrain Palestinian Nat'l Auth. Botswana Lebanon Morocco Iran, Islamic Republic of South Africa Philippines	12 8 7 5 5 5 4 4 3 3 2 2 2	* * * * * * * * * * * * * * * * * * *

# Country average vs. International average:

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Not different	0
Lower	_

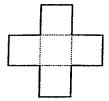
5 squares: perimeter whole figure (continued)

Item Number: M022227C

# **Student Responses**

## **Correct Response:**

18. The figure consists of 5 squares of equal area. The area of the whole figure is  $\frac{1245 \text{ cm}^2}{1245 \text{ cm}^2}$ .

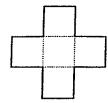


c. Find the perimeter of the whole figure in centimeters.



# **Incorrect Response:**

18. The figure consists of 5 squares of equal area. The area of the whole figure is 245 cm<sup>2</sup>.



c. Find the perimeter of the whole figure in centimeters.

Answer: 49 cm

Content Domain	Main Topic	Cognitive Domain
A. MEASUREMENT B. MEASUREMENT	Tools, Techniques, and Formulas Tools, Techniques, and Formulas	Solving Routine Problems Reasoning

# Car rally: average speed

In a car rally two checkpoints are 160 km apart. Drivers must travel from one checkpoint to the other in exactly 2.5 hours to earn maximum points.
A. What must the average speed be to travel the 160 km in this time?
Answer:
B. A driver took 1 hour to travel through a 40 km hilly section at the beginning of the course.
What must the average speed, in kilometers per hour, be for the remaining 120 km if the total time between checkpoints is to be 2.5 hours?
Answer:

#### Item Number: M032649A

#### **SCORING**

#### **Correct Response**

• 64 kph or 64 or equivalent.

#### **Incorrect Response**

• Incorrect (including crossed out/erased, stray marks, illegible or off task).

# **Overall Percent Correct**

Cinganoro	70	
Singapore	78 76	<b>A</b>
Hong Kong, SAR Netherlands	76 70	<b>A</b>
Russian Federation	67	<u> </u>
Armenia	65	<b>A</b>
Estonia	64	
Chinese Taipei	59	
Japan	59	
Hungary	59	
Lithuania	56	
United States	55	
Belgium (Flemish)	54	
Latvia	50	
Slovak Republic	49	
Sweden	45	
Korea, Republic of	43	
Scotland	43	
Italy	42	
Moldova, Republic of	38	0
England	37	0
Norway	37	0
Australia	36	0
Israel	36	0
New Zealand	35	0
International average	35	
International average Serbia and Montenegro	<b>35</b>	0
International average Serbia and Montenegro Slovenia	34	0
Serbia and Montenegro Slovenia		0 0 •
Serbia and Montenegro Slovenia Malaysia	34 33 29	O ▼
Serbia and Montenegro Slovenia Malaysia Romania	34 33 29 29	<ul><li>○</li><li>▼</li></ul>
Serbia and Montenegro Slovenia Malaysia Romania Bulgaria	34 33 29 29 28	<ul><li>○</li><li>▼</li><li>▼</li></ul>
Serbia and Montenegro Slovenia Malaysia Romania Bulgaria Tunisia	34 33 29 29 28 27	<ul><li>○</li><li>▼</li><li>▼</li><li>▼</li></ul>
Serbia and Montenegro Slovenia Malaysia Romania Bulgaria Tunisia Macedonia, Republic of	34 33 29 29 28 27 26	<ul><li>○</li><li>▼</li><li>▼</li><li>▼</li></ul>
Serbia and Montenegro Slovenia Malaysia Romania Bulgaria Tunisia Macedonia, Republic of Jordan	34 33 29 29 28 27 26 24	<ul><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li></li><li><!--</td--></li></ul>
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Serbia and Montenegro Slovenia Malaysia Romania Bulgaria Tunisia Macedonia, Republic of Jordan Indonesia Botswana Palestinian Nat'l Auth. Cyprus Lebanon	34 33 29 29 28 27 26 24 22 21 18 16	O V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V
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Serbia and Montenegro Slovenia Malaysia Romania Bulgaria Tunisia Macedonia, Republic of Jordan Indonesia Botswana Palestinian Nat'l Auth. Cyprus Lebanon Chile Philippines Bahrain Iran, Islamic Republic of Egypt South Africa	34 33 29 29 28 27 26 24 22 21 18 16 15 15 15 14 12 8 7	· · · · · · · · · · · · · · · · · · ·
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Serbia and Montenegro Slovenia Malaysia Romania Bulgaria Tunisia Macedonia, Republic of Jordan Indonesia Botswana Palestinian Nat'l Auth. Cyprus Lebanon Chile Philippines Bahrain Iran, Islamic Republic of Egypt South Africa Morocco Saudi Arabia	34 33 29 28 27 26 24 22 21 18 16 15 15 14 12 8 7 6	O V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V V
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# Country average vs. International average:

Car rally: average speed (continued)

Item Number: M032649A

# **Student Responses**

### **Correct Response:**

In a car rally two checkpoints are 160 km apart. Drivers must travel from one checkpoint to the other in exactly 2.5 hours to earn maximum points.

A. What must the average speed be to travel the 160 km in this time?

Answer: 64 tun

#### **Incorrect Response:**

In a car rally two checkpoints are 160 km apart. Drivers must travel from one checkpoint to the other in exactly 2.5 hours to earn maximum points.

A. What must the average speed be to travel the 160 km in this time?

Answer:

Content Domain	Main Topic	Cognitive Domain
A. MEASUREMENT	Tools, Techniques, and Formulas	Solving Routine Problems
B. MEASUREMENT	Tools, Techniques, and Formulas	Reasoning

# Car rally: average speed for one section

In a car rally two checkpoints are 160 km apart. Drivers must travel from one checkpoint to the other in exactly 2.5 hours to earn maximum points.
A. What must the average speed be to travel the 160 km in this time?
Answer:
B. A driver took 1 hour to travel through a 40 km hilly section at the beginning of the course.
What must the average speed, in kilometers per hour, be for the remaining 120 km if the total time between checkpoints is to be 2.5 hours?
Answer:

#### Item Number: M032649B

#### **SCORING**

#### **Correct Response**

• 80 kph or 80

#### **Incorrect Response**

- 5, 2, 120 or 48 shown.
- Other incorrect (including crossed out/erased, stray marks, illegible or off task).

# **Overall Percent Correct**

Armenia	54	
Singapore	52	
Netherlands	50	
Hong Kong, SAR	47	
Chinese Taipei	39	
Estonia	35	
Russian Federation	34	
Hungary	33	
Japan	33	
Belgium (Flemish)	30	
Sweden	28	
Lithuania	27	
Korea, Republic of	27	
Latvia	24	
United States	24	
Scotland	23	_
England	22	0
Australia	22	0
Slovak Republic	21	0
New Zealand	19	0
Norway	19	0
International average	18	
Israel	17	0
Moldova, Republic of	17	0
moladva, nepablic of	. ,	_
Bulgaria	17	Ο
Bulgaria Slovenia	17 16	0
Slovenia	16	0
Slovenia Italy	16 15	0
Slovenia Italy Romania	16 15 13	0
Slovenia Italy Romania Serbia and Montenegro	16 15 13 10	<ul><li>○</li><li>○</li><li>▼</li><li>▼</li></ul>
Slovenia Italy Romania Serbia and Montenegro Macedonia, Republic of	16 15 13 10 8	<ul><li>○</li><li>○</li><li>▼</li><li>▼</li></ul>
Slovenia Italy Romania Serbia and Montenegro Macedonia, Republic of Malaysia	16 15 13 10 8 7	<ul><li>○</li><li>○</li><li>▼</li><li>▼</li></ul>
Slovenia Italy Romania Serbia and Montenegro Macedonia, Republic of Malaysia Cyprus	16 15 13 10 8 7 6	○ ○ ▼ ▼
Slovenia Italy Romania Serbia and Montenegro Macedonia, Republic of Malaysia Cyprus Jordan	16 15 13 10 8 7 6	○ ○ ▼ ▼ ▼
Slovenia Italy Romania Serbia and Montenegro Macedonia, Republic of Malaysia Cyprus Jordan Iran, Islamic Republic of	16 15 13 10 8 7 6 6	0 0 •
Slovenia Italy Romania Serbia and Montenegro Macedonia, Republic of Malaysia Cyprus Jordan Iran, Islamic Republic of Tunisia	16 15 13 10 8 7 6 6 5	0 0 •
Slovenia Italy Romania Serbia and Montenegro Macedonia, Republic of Malaysia Cyprus Jordan Iran, Islamic Republic of Tunisia Chile	16 15 13 10 8 7 6 6 5 5	0 0 •
Slovenia Italy Romania Serbia and Montenegro Macedonia, Republic of Malaysia Cyprus Jordan Iran, Islamic Republic of Tunisia Chile Egypt	16 15 13 10 8 7 6 6 5 5	0 0 •
Slovenia Italy Romania Serbia and Montenegro Macedonia, Republic of Malaysia Cyprus Jordan Iran, Islamic Republic of Tunisia Chile Egypt Botswana	16 15 13 10 8 7 6 6 5 5	○ ○ ▼ ▼ ▼
Slovenia Italy Romania Serbia and Montenegro Macedonia, Republic of Malaysia Cyprus Jordan Iran, Islamic Republic of Tunisia Chile Egypt Botswana Bahrain	16 15 13 10 8 7 6 6 5 5 5 4 4	0 0 •
Slovenia Italy Romania Serbia and Montenegro Macedonia, Republic of Malaysia Cyprus Jordan Iran, Islamic Republic of Tunisia Chile Egypt Botswana Bahrain Indonesia	16 15 13 10 8 7 6 6 5 5 5 4 4 4	0 0 •
Slovenia Italy Romania Serbia and Montenegro Macedonia, Republic of Malaysia Cyprus Jordan Iran, Islamic Republic of Tunisia Chile Egypt Botswana Bahrain Indonesia Palestinian Nat'l Auth.	16 15 13 10 8 7 6 6 5 5 5 4 4 4 4	· · · · · · · · · · · · · · · · · · ·
Slovenia Italy Romania Serbia and Montenegro Macedonia, Republic of Malaysia Cyprus Jordan Iran, Islamic Republic of Tunisia Chile Egypt Botswana Bahrain Indonesia Palestinian Nat'l Auth. South Africa	16 15 13 10 8 7 6 6 5 5 5 4 4 4 4 4 4 3	· · · · · · · · · · · · · · · · · · ·
Slovenia Italy Romania Serbia and Montenegro Macedonia, Republic of Malaysia Cyprus Jordan Iran, Islamic Republic of Tunisia Chile Egypt Botswana Bahrain Indonesia Palestinian Nat'l Auth. South Africa Lebanon	16 15 13 10 8 7 6 6 5 5 5 4 4 4 4 4 4 3 2	· · · · · · · · · · · · · · · · · · ·
Slovenia Italy Romania Serbia and Montenegro Macedonia, Republic of Malaysia Cyprus Jordan Iran, Islamic Republic of Tunisia Chile Egypt Botswana Bahrain Indonesia Palestinian Nat'l Auth. South Africa Lebanon Philippines	16 15 13 10 8 7 6 6 5 5 5 4 4 4 4 4 4 3 2 2	· · · · · · · · · · · · · · · · · · ·
Slovenia Italy Romania Serbia and Montenegro Macedonia, Republic of Malaysia Cyprus Jordan Iran, Islamic Republic of Tunisia Chile Egypt Botswana Bahrain Indonesia Palestinian Nat'l Auth. South Africa Lebanon Philippines Saudi Arabia	16 15 13 10 8 7 6 6 5 5 5 4 4 4 4 4 4 3 2 2 2	· · · · · · · · · · · · · · · · · · ·
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Slovenia Italy Romania Serbia and Montenegro Macedonia, Republic of Malaysia Cyprus Jordan Iran, Islamic Republic of Tunisia Chile Egypt Botswana Bahrain Indonesia Palestinian Nat'l Auth. South Africa Lebanon Philippines Saudi Arabia	16 15 13 10 8 7 6 6 5 5 5 4 4 4 4 4 4 3 2 2 2	· · · · · · · · · · · · · · · · · · ·

# Country average vs. International average:

Car rally: average speed for one section (continued)

Item Number: M032649B

# **Student Responses**

## **Correct Response:**

In a car rally two checkpoints are 160 km apart. Drivers must travel from one checkpoint to the other in exactly 2.5 hours to earn maximum points.

B. A driver took 1 hour to travel through a 40 km hilly section at the beginning of the course.

What must the average speed, in kilometers per hour, be for the remaining 120 km if the total time between checkpoints is to be 2.5 hours?

Answer: 80 Km

### **Incorrect Response:**

In a car rally two checkpoints are 160 km apart. Drivers must travel from one checkpoint to the other in exactly 2.5 hours to earn maximum points.

B. A driver took 1 hour to travel through a 40 km hilly section at the beginning of the course.

What must the average speed, in kilometers per hour, be for the remaining 120 km if the total time between checkpoints is to be 2.5 hours?

Answer: 3 Kilometers

Content Domain	Main Topic	Cognitive Domain
MEASUREMENT	Tools, Techniques, and Formulas	Using Concepts

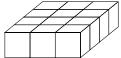
### Volumes of stacks of blocks

All the small blocks are the same size. Which stack of blocks has a different volume from the others?

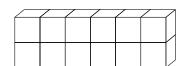


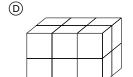












Item Number: M012013

**Correct Response:** 

A

# **Overall Percent Correct**

Korea, Republic of	88	•
Singapore	86	
3 1	83	
Hong Kong, SAR		_
Japan	81	<b>A</b>
Chinese Taipei	81	
Netherlands	78	
Australia	73	
Estonia	69	
Slovak Republic	68	
Belgium (Flemish)	67	
Scotland	67	
Lithuania	66	
Latvia	64	
Malaysia	62	
Slovenia	62	
New Zealand	60	
Hungary	58	
England	58	
Russian Federation	57	
Norway	56	
Italy	55	
United States	50	Ο
International average	50	

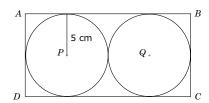
Officed States	50	U
International average	50	
Sweden	50	O
Israel	49	0
Bulgaria	48	0
Moldova, Republic of	48	0
Romania	46	0
Serbia and Montenegro	45	$\blacksquare$
Armenia	42	$\blacksquare$
Cyprus	42	$\blacksquare$
Bahrain	41	$\blacksquare$
Philippines	35	* * * * * * * * * * * * * * * * * * *
Lebanon	34	$\blacksquare$
Macedonia, Republic of	33	$\blacksquare$
Saudi Arabia	32	* * * * * * * * * * * * * * * * * * *
Indonesia	32	$\blacksquare$
Palestinian Nat'l Auth.	30	$\blacksquare$
Jordan	29	$\blacksquare$
Chile	27	$\blacksquare$
Morocco	26	$\blacksquare$
Botswana	26	$\blacksquare$
Tunisia	26	<b>V</b>
Iran, Islamic Republic of	26	<b>V</b>
Egypt	24	$\blacksquare$
South Africa	22	$\blacksquare$
Ghana	20	$\blacksquare$
1		

Country average vs. International average:

O ▼

Content Domain	Main Topic	Cognitive Domain
MEASUREMENT	Tools, Techniques, and Formulas	Using Concepts

# The area of the rectangle ABCD



In the figure above, ABCD is a rectangle, and circles P and Q each have a radius of 5 cm. What is the area of the rectangle?

- $\bigcirc$  50 cm<sup>2</sup>
- (B) 60 cm<sup>2</sup>
- $\bigcirc$  100 cm<sup>2</sup>
- 200 cm<sup>2</sup>

Item Number: M032678

**Correct Response:** 

D

# **Overall Percent Correct**

Singapore	82	<b>A</b>
Hong Kong, SAR	82	<b>A</b>
Korea, Republic of	75	<b>A</b>
Chinese Taipei	74	<b>A</b>
Japan	73	<b>A</b>
Netherlands	65	<b>A</b>
Belgium (Flemish)	61	<b>A</b>
Estonia	53	<b>A</b>
Russian Federation	51	<b>A</b>
Italy	51	
Slovak Republic	51	<b>A</b>
Hungary	48	<b>A</b>
Malaysia	48	<b>A</b>
Latvia	46	<b>A</b>
Lithuania	45	<b>A</b>
Sweden	45	<b>A</b>
Scotland	44	<b>A</b>
England	43	0
Serbia and Montenegro	43	0
Australia	42	0
New Zealand	41	0
Slovenia	41	0
Romania	39	0 0
Romania International average		- 1
Romania	39 <b>39</b> 39	0
Romania International average	39 39 39 38	0 0
Romania International average United States Bulgaria Cyprus	39 39 39 38 37	0 0 0
Romania International average United States Bulgaria Cyprus Armenia	39 39 39 38 37 36	0 0 0 0
Romania International average United States Bulgaria Cyprus	39 39 39 38 37 36 35	0 0 0 0 0
Romania International average United States Bulgaria Cyprus Armenia Lebanon Norway	39 39 39 38 37 36 35	0 0 0 0 0
Romania International average United States Bulgaria Cyprus Armenia Lebanon Norway Israel	39 39 39 38 37 36 35	0 0 0 0 0
Romania International average United States Bulgaria Cyprus Armenia Lebanon Norway	39 39 39 38 37 36 35	0 0 0 0 0
Romania International average United States Bulgaria Cyprus Armenia Lebanon Norway Israel Moldova, Republic of Tunisia	39 39 39 38 37 36 35 35 34 33 30	0 0 0 0 0
Romania International average United States Bulgaria Cyprus Armenia Lebanon Norway Israel Moldova, Republic of Tunisia Macedonia, Republic of	39 39 39 38 37 36 35 35 34 33	0 0 0 0 0
Romania International average United States Bulgaria Cyprus Armenia Lebanon Norway Israel Moldova, Republic of Tunisia Macedonia, Republic of Iran, Islamic Republic of	39 39 39 38 37 36 35 35 34 33 30	0 0 0 0 0
Romania International average United States Bulgaria Cyprus Armenia Lebanon Norway Israel Moldova, Republic of Tunisia Macedonia, Republic of Iran, Islamic Republic of Jordan	39 39 39 38 37 36 35 35 34 33 30 30 27 25	0 0 0 0 0
Romania International average United States Bulgaria Cyprus Armenia Lebanon Norway Israel Moldova, Republic of Tunisia Macedonia, Republic of Iran, Islamic Republic of	39 39 39 38 37 36 35 35 34 33 30 30 27	0 0 0 0 0
Romania International average United States Bulgaria Cyprus Armenia Lebanon Norway Israel Moldova, Republic of Tunisia Macedonia, Republic of Iran, Islamic Republic of Jordan Indonesia Egypt	39 39 39 38 37 36 35 35 34 33 30 27 25 24 21	0 0 0 0 0
Romania International average United States Bulgaria Cyprus Armenia Lebanon Norway Israel Moldova, Republic of Tunisia Macedonia, Republic of Iran, Islamic Republic of Jordan Indonesia	39 39 39 38 37 36 35 35 34 33 30 30 27 25 24	0 0 0 0 0
Romania International average United States Bulgaria Cyprus Armenia Lebanon Norway Israel Moldova, Republic of Tunisia Macedonia, Republic of Iran, Islamic Republic of Jordan Indonesia Egypt Bahrain Morocco	39 39 39 38 37 36 35 35 34 33 30 27 25 24 21	0 0 0 0 0
Romania International average United States Bulgaria Cyprus Armenia Lebanon Norway Israel Moldova, Republic of Tunisia Macedonia, Republic of Iran, Islamic Republic of Jordan Indonesia Egypt Bahrain	39 39 39 38 37 36 35 35 34 33 30 27 25 24 21 20	0 0 0 0

Country average vs. International average:

16

15

10 10

10

Higher △
Not different ○
Lower ▼

Botswana

Philippines

South Africa

Saudi Arabia

Ghana

Content Domain	Main Topic	Cognitive Domain
NUMBER	Fractions and Decimals	Knowing Facts and Procedures

# Pair of numbers bracketing 2.25

In which of these pairs of numbers is 2.25 larger than the first number but smaller than the second number?

- (A) 1 and 2
- $\bigcirc$   $\frac{5}{2}$  and  $\frac{11}{4}$

Item Number: M012016

**Correct Response:** 

В

# **Overall Percent Correct**

Korea, Republic of Singapore Belgium (Flemish) Lithuania Hong Kong, SAR Chinese Taipei Russian Federation Hungary Estonia Israel Slovak Republic Japan Sweden United States Serbia and Montenegro Slovenia Romania Italy Australia Latvia	77 71 63 61 60 58 57 57 55 55 54 54 53 52 52 52	
Philippines Netherlands	52 51	0 0
Scotland	51	0
Norway	51	0
Cyprus	51	0
The Annual Control of the Control of	50	
International average		
Bulgaria	50	0
Bulgaria Malaysia	50 50	0
Bulgaria Malaysia England	50 50 50	0
Bulgaria Malaysia England Moldova, Republic of	50 50 50 48	0 0
Bulgaria Malaysia England Moldova, Republic of New Zealand	50 50 50 48 47	0 0 0
Bulgaria Malaysia England Moldova, Republic of New Zealand Botswana	50 50 50 48 47 46	0 0 0 0
Bulgaria Malaysia England Moldova, Republic of New Zealand Botswana Armenia	50 50 50 48 47 46 46	0 0 0 0 •
Bulgaria Malaysia England Moldova, Republic of New Zealand Botswana	50 50 50 48 47 46 46 46	0 0 0 0 •
Bulgaria Malaysia England Moldova, Republic of New Zealand Botswana Armenia Saudi Arabia	50 50 50 48 47 46 46	0 0 0 0 •
Bulgaria Malaysia England Moldova, Republic of New Zealand Botswana Armenia Saudi Arabia Lebanon	50 50 50 48 47 46 46 46 45	0 0 0 0 •
Bulgaria Malaysia England Moldova, Republic of New Zealand Botswana Armenia Saudi Arabia Lebanon Ghana	50 50 48 47 46 46 46 45	0 0 0 0 •
Bulgaria Malaysia England Moldova, Republic of New Zealand Botswana Armenia Saudi Arabia Lebanon Ghana Macedonia, Republic of	50 50 50 48 47 46 46 46 45 44	0 0 0 0
Bulgaria Malaysia England Moldova, Republic of New Zealand Botswana Armenia Saudi Arabia Lebanon Ghana Macedonia, Republic of Tunisia	50 50 48 47 46 46 46 45 44 44	0 0 0 0 •
Bulgaria Malaysia England Moldova, Republic of New Zealand Botswana Armenia Saudi Arabia Lebanon Ghana Macedonia, Republic of Tunisia Morocco Egypt Bahrain	50 50 48 47 46 46 46 45 44 44 43 41 40 40	0 0 0 0 •
Bulgaria Malaysia England Moldova, Republic of New Zealand Botswana Armenia Saudi Arabia Lebanon Ghana Macedonia, Republic of Tunisia Morocco Egypt Bahrain South Africa	50 50 48 47 46 46 46 45 44 43 41 40 40 39	0 0 0 0 •
Bulgaria Malaysia England Moldova, Republic of New Zealand Botswana Armenia Saudi Arabia Lebanon Ghana Macedonia, Republic of Tunisia Morocco Egypt Bahrain South Africa Chile	50 50 48 47 46 46 46 45 44 43 41 40 40 39	0 0 0 0 •
Bulgaria Malaysia England Moldova, Republic of New Zealand Botswana Armenia Saudi Arabia Lebanon Ghana Macedonia, Republic of Tunisia Morocco Egypt Bahrain South Africa Chile Palestinian Nat'l Auth.	50 50 48 47 46 46 45 44 43 41 40 40 39 39	0 0 0 0 •
Bulgaria Malaysia England Moldova, Republic of New Zealand Botswana Armenia Saudi Arabia Lebanon Ghana Macedonia, Republic of Tunisia Morocco Egypt Bahrain South Africa Chile	50 50 48 47 46 46 46 45 44 43 41 40 40 39	0 0 0 0 •

Country average vs. International average:

O ▼

Content Domain	Main Topic	Cognitive Domain
NUMBER	Fractions and Decimals	Knowing Facts and Procedures

# Scoops of flour needed to fill bag

A scoop holds $\frac{1}{5}$ kg of flour. How many scoops of flour are needed to fill a bag with 6 kg of flour?
Answer:

Item Number: M022156

#### **SCORING**

#### **Correct Response**

• 30

#### **Incorrect Response**

- 30 kg [incorrect unit]
- 6/5 [6 x 1/5]
- 4 [4/5 more needed to complete 1 kg]
- 5 [5 scoops = 1 kg flour]
- 6 [from stem]
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task).

# **Overall Percent Correct**

Singapore	79	
Hong Kong, SAR	76	
Chinese Taipei	75	
Netherlands	74	
Korea, Republic of	68	
Japan	62	<u> </u>
Belgium (Flemish)	62	<u> </u>
Sweden	60	_ _
Australia	53	<u> </u>
United States	52	<u> </u>
Scotland	51	
Estonia	51	
Latvia	51	<u> </u>
Hungary	51	<b>A</b>
• •	50	<b>A</b>
England Russian Federation	49	
Israel	48 47	
Malaysia		
New Zealand	46	<b>A</b>
Slovenia	46	<u> </u>
Armenia	45	<u> </u>
Lithuania	43	<b>A</b>
Slovak Republic	43	
Norway	39	O
•		
Romania	39	Ο
Romania Serbia and Montenegro	38	0
Romania Serbia and Montenegro Bulgaria	38 38	
Romania Serbia and Montenegro	38	0
Romania Serbia and Montenegro Bulgaria	38 38	0
Romania Serbia and Montenegro Bulgaria International average	38 38 <b>38</b>	0 0
Romania Serbia and Montenegro Bulgaria International average Cyprus	38 38 <b>38</b> 37	0 0 0
Romania Serbia and Montenegro Bulgaria International average Cyprus Moldova, Republic of	38 38 38 37 37	0 0
Romania Serbia and Montenegro Bulgaria International average Cyprus Moldova, Republic of Italy	38 38 38 37 37 34	0 0 0 0 0
Romania Serbia and Montenegro Bulgaria International average Cyprus Moldova, Republic of Italy Indonesia	38 38 37 37 34 26	0 0 0 0 0
Romania Serbia and Montenegro Bulgaria International average Cyprus Moldova, Republic of Italy Indonesia Macedonia, Republic of	38 38 38 37 37 34 26 22	0 0 0 0 0
Romania Serbia and Montenegro Bulgaria International average Cyprus Moldova, Republic of Italy Indonesia Macedonia, Republic of Iran, Islamic Republic of	38 38 37 37 34 26 22 20	0 0 0 0 0
Romania Serbia and Montenegro Bulgaria International average Cyprus Moldova, Republic of Italy Indonesia Macedonia, Republic of Iran, Islamic Republic of Tunisia	38 38 37 37 34 26 22 20 18	0 0 0 0 0
Romania Serbia and Montenegro Bulgaria International average Cyprus Moldova, Republic of Italy Indonesia Macedonia, Republic of Iran, Islamic Republic of Tunisia Egypt	38 38 37 37 34 26 22 20 18 17	0 0 0 0 0
Romania Serbia and Montenegro Bulgaria International average Cyprus Moldova, Republic of Italy Indonesia Macedonia, Republic of Iran, Islamic Republic of Tunisia Egypt Jordan	38 38 37 37 34 26 22 20 18 17 16	0 0 0 0 0
Romania Serbia and Montenegro Bulgaria International average Cyprus Moldova, Republic of Italy Indonesia Macedonia, Republic of Iran, Islamic Republic of Tunisia Egypt Jordan Lebanon Chile	38 38 37 37 34 26 22 20 18 17 16 15	0 0 0 0 0
Romania Serbia and Montenegro Bulgaria International average Cyprus Moldova, Republic of Italy Indonesia Macedonia, Republic of Iran, Islamic Republic of Tunisia Egypt Jordan Lebanon	38 38 37 37 34 26 22 20 18 17 16 15	0 0 0 0 0
Romania Serbia and Montenegro Bulgaria International average Cyprus Moldova, Republic of Italy Indonesia Macedonia, Republic of Iran, Islamic Republic of Tunisia Egypt Jordan Lebanon Chile Philippines	38 38 37 37 34 26 22 20 18 17 16 15 13	0 0 0 0 0
Romania Serbia and Montenegro Bulgaria International average Cyprus Moldova, Republic of Italy Indonesia Macedonia, Republic of Iran, Islamic Republic of Tunisia Egypt Jordan Lebanon Chile Philippines Bahrain Botswana	38 38 37 37 34 26 22 20 18 17 16 15 13 13	0 0 0 0 0
Romania Serbia and Montenegro Bulgaria International average Cyprus Moldova, Republic of Italy Indonesia Macedonia, Republic of Iran, Islamic Republic of Tunisia Egypt Jordan Lebanon Chile Philippines Bahrain	38 38 37 37 34 26 22 20 18 17 16 15 13 11	0 0 0 0 0
Romania Serbia and Montenegro Bulgaria International average Cyprus Moldova, Republic of Italy Indonesia Macedonia, Republic of Iran, Islamic Republic of Tunisia Egypt Jordan Lebanon Chile Philippines Bahrain Botswana Palestinian Nat'l Auth.	38 38 37 37 34 26 22 20 18 17 16 15 13 11 11	0 0 0 0 0
Romania Serbia and Montenegro Bulgaria International average Cyprus Moldova, Republic of Italy Indonesia Macedonia, Republic of Iran, Islamic Republic of Tunisia Egypt Jordan Lebanon Chile Philippines Bahrain Botswana Palestinian Nat'l Auth. Morocco South Africa	38 38 37 37 34 26 22 20 18 17 16 15 13 11 11 10 8	0 0 0 0 0
Romania Serbia and Montenegro Bulgaria International average Cyprus Moldova, Republic of Italy Indonesia Macedonia, Republic of Iran, Islamic Republic of Tunisia Egypt Jordan Lebanon Chile Philippines Bahrain Botswana Palestinian Nat'l Auth. Morocco	38 38 37 37 34 26 22 20 18 17 16 15 13 11 11 10 8 7	0 0 0 0 0
Romania Serbia and Montenegro Bulgaria International average Cyprus Moldova, Republic of Italy Indonesia Macedonia, Republic of Iran, Islamic Republic of Tunisia Egypt Jordan Lebanon Chile Philippines Bahrain Botswana Palestinian Nat'l Auth. Morocco South Africa Saudi Arabia	38 38 37 37 34 26 22 20 18 17 16 15 13 11 11 10 8 7	0 0 0 0 0

# Country average vs. International average:

Higher	
Not different	0
Lower	_

# Scoops of flour needed to fill bag (continued)

Item Number: M022156

# **Student Responses**

## **Correct Response:**

A scoop holds  $\frac{1}{5}$  kilograms of flour. How many scoops of flour are needed to fill a bag with 6 kilograms of flour?

Answer: 30 3600 p5

## **Incorrect Response:**

A scoop holds  $\frac{1}{5}$  kilograms of flour. How many scoops of flour are needed to fill a bag with 6 kilograms of flour? 占x6=岩

Content Domain	Main Topic	Cognitive Domain
NUMBER	Fractions and Decimals	Knowing Facts and Procedures

# Addition/multiplication with fractions

$$\frac{3}{5} + (\frac{3}{10} \times \frac{4}{15}) =$$

- $\bigcirc$
- (C)
- 11 D 25
- E

Item Number: M022199

**Correct Response:** 

E

# **Overall Percent Correct**

Chinese Taipei Korea, Republic of Japan Singapore Hong Kong, SAR Egypt Romania Italy Belgium (Flemish) Slovenia Slovak Republic Hungary Estonia Malaysia Bulgaria Russian Federation	82 80 75 72 69 58 54 53 51 51 50 50 48 48	
Latvia	46	<b>A</b>
Serbia and Montenegro Lithuania	45 44	<b>A</b>
Armenia	42	0
International average	40	
Lebanon	40	0
Israel Netherlands	40	0
Moldova, Republic of	40 39	0
Cyprus	36	▼
United States	36	<b>▼</b>
Jordan	35	▼
Iran, Islamic Republic of	34	•
Bahrain	29	•
Australia	28	•
Indonesia	28	_
England	28	_
New Zealand Palestinian Nat'l Auth.	28 27	<b>*</b>
Macedonia, Republic of	27	<b>* * * * * * * * * *</b>
Tunisia	26	<b>*</b>
Scotland	26	<b>V</b>
Morocco	25	•
Botswana	24	▼
Sweden	22	▼
Philippines	22	•
Chile	21	<b>* * *</b>
Norway South Africa	21	<b>*</b>
South Africa Saudi Arabia	18 16	<b>*</b>
	-	

Country average vs. International average:

0

 $\blacksquare$ 

Content Domain	Main Topic	Cognitive Domain
NUMBER	Fractions and Decimals	Reasoning

# Number of men/women at meeting

Two-thirds of the people present at the beginning of a meeting are men. Nobody leaves but 10 more men and 10 more women arrive at the meeting. Which of the following statements is true?

- There would then be more men than women at the meeting.
- There would then be the same number of men as there are women at the meeting.
- © There would then be more women than men at the meeting.
- (D) From the information given, you cannot tell whether there would be more women or men.

Item Number: M022191

**Correct Response:** 

### **Overall Percent Correct**

Korea, Republic of	89	
Japan	87	<u> </u>
Netherlands	86	<u> </u>
Belgium (Flemish)	83	<u> </u>
Singapore	81	<u> </u>
Sweden	79	<u> </u>
Norway	77	<u> </u>
Chinese Taipei	77	<u> </u>
Malaysia	74	<b>A</b>
Hong Kong, SAR	73	
Hungary	73 71	
<b>J</b> ,		
Italy	70	
Slovenia	68	<b>A</b>
Slovak Republic	68	<u> </u>
Estonia	67	<u> </u>
Scotland	67	<b>A</b>
England	67	<b>A</b>
Bulgaria	67	<b>A</b>
Australia	66	<b>A</b>
Israel	65	<b>A</b>
Cyprus	64	<b>A</b>
Serbia and Montenegro	63	<b>A</b>
New Zealand	63	0
Latvia	62	0
and the second s		
Lithuania	60	0
International average	59	
International average Russian Federation	<b>59</b> 57	0
International average Russian Federation Moldova, Republic of	<b>59</b> 57 56	0
International average Russian Federation Moldova, Republic of Iran, Islamic Republic of	<b>59</b> 57 56 56	0 0
International average Russian Federation Moldova, Republic of Iran, Islamic Republic of United States	59 57 56 56 56	0 0 0
International average Russian Federation Moldova, Republic of Iran, Islamic Republic of	<b>59</b> 57 56 56	0 0 0
International average Russian Federation Moldova, Republic of Iran, Islamic Republic of United States	59 57 56 56 56	0 0 0
International average Russian Federation Moldova, Republic of Iran, Islamic Republic of United States Chile	59 57 56 56 52 51	0 0 0
International average Russian Federation Moldova, Republic of Iran, Islamic Republic of United States Chile Jordan	59 57 56 56 52 51 51	0 0 0
International average Russian Federation Moldova, Republic of Iran, Islamic Republic of United States Chile Jordan Indonesia	59 57 56 56 52 51 51 50	0 0 0
International average Russian Federation Moldova, Republic of Iran, Islamic Republic of United States Chile Jordan Indonesia Romania	59 57 56 56 52 51 51 50 48	0 0 0
International average Russian Federation Moldova, Republic of Iran, Islamic Republic of United States Chile Jordan Indonesia Romania Bahrain	59 57 56 56 52 51 51 50 48 46	0 0 0
International average Russian Federation Moldova, Republic of Iran, Islamic Republic of United States Chile Jordan Indonesia Romania Bahrain Palestinian Nat'l Auth. Morocco	59 57 56 56 52 51 51 50 48 46 46	0 0 0
International average Russian Federation Moldova, Republic of Iran, Islamic Republic of United States Chile Jordan Indonesia Romania Bahrain Palestinian Nat'l Auth. Morocco Egypt	59 57 56 56 52 51 51 50 48 46 46 46	0 0
International average Russian Federation Moldova, Republic of Iran, Islamic Republic of United States Chile Jordan Indonesia Romania Bahrain Palestinian Nat'l Auth. Morocco	59 57 56 56 52 51 51 50 48 46 46 46	0 0 0
International average Russian Federation Moldova, Republic of Iran, Islamic Republic of United States Chile Jordan Indonesia Romania Bahrain Palestinian Nat'l Auth. Morocco Egypt Macedonia, Republic of	59 57 56 56 52 51 51 50 48 46 46 46 46 45 42	0 0 0
International average Russian Federation Moldova, Republic of Iran, Islamic Republic of United States Chile Jordan Indonesia Romania Bahrain Palestinian Nat'l Auth. Morocco Egypt Macedonia, Republic of Botswana	59 57 56 56 52 51 51 50 48 46 46 46 46 46	0 0 0
International average Russian Federation Moldova, Republic of Iran, Islamic Republic of United States Chile Jordan Indonesia Romania Bahrain Palestinian Nat'l Auth. Morocco Egypt Macedonia, Republic of Botswana Tunisia	59 57 56 56 52 51 51 50 48 46 46 46 46 45 42	0 0 0
International average Russian Federation Moldova, Republic of Iran, Islamic Republic of United States Chile Jordan Indonesia Romania Bahrain Palestinian Nat'l Auth. Morocco Egypt Macedonia, Republic of Botswana Tunisia Armenia Saudi Arabia	59 57 56 56 52 51 51 50 48 46 46 46 45 42 40 40 37	0 0 0
International average Russian Federation Moldova, Republic of Iran, Islamic Republic of United States Chile Jordan Indonesia Romania Bahrain Palestinian Nat'l Auth. Morocco Egypt Macedonia, Republic of Botswana Tunisia Armenia Saudi Arabia Ghana	59 57 56 56 52 51 51 50 48 46 46 46 45 42 40 40 37 31	0 0 0
International average Russian Federation Moldova, Republic of Iran, Islamic Republic of United States Chile Jordan Indonesia Romania Bahrain Palestinian Nat'l Auth. Morocco Egypt Macedonia, Republic of Botswana Tunisia Armenia Saudi Arabia Ghana Philippines	59 57 56 56 52 51 50 48 46 46 46 45 42 40 40 37 31 27	0 0 0
International average Russian Federation Moldova, Republic of Iran, Islamic Republic of United States Chile Jordan Indonesia Romania Bahrain Palestinian Nat'l Auth. Morocco Egypt Macedonia, Republic of Botswana Tunisia Armenia Saudi Arabia Ghana Philippines Lebanon	59 57 56 56 52 51 50 48 46 46 46 45 42 40 40 37 31 27 24	0 0 0
International average Russian Federation Moldova, Republic of Iran, Islamic Republic of United States Chile Jordan Indonesia Romania Bahrain Palestinian Nat'l Auth. Morocco Egypt Macedonia, Republic of Botswana Tunisia Armenia Saudi Arabia Ghana Philippines	59 57 56 56 52 51 50 48 46 46 46 45 42 40 40 37 31 27	0 0 0

Country average vs. International average:

> 0 ▼

Content Domain	Main Topic	Cognitive Domain
NUMBER	Fractions and Decimals	Solving Routine Problems

# Fraction of hour between two time points

What fraction of an hour has passed between 1:10 a.m. and 1:30 a.m.?

- $\bigcirc$
- $\bigcirc$
- (C)
- (D)
- E

Item Number: M012027

**Correct Response:** 

В

### **Overall Percent Correct**

Cingganara	85	
Singapore Hong Kong, SAR	80	<b>A</b>
Korea, Republic of	77	
Chinese Taipei	77	<u> </u>
Sweden	73	<u> </u>
England	68	<u> </u>
Netherlands	67	
Japan	67	
Belgium (Flemish)	66	<u> </u>
Hungary	66	
Australia	65	•
Slovak Republic	64	
Scotland	63	
United States	62	
Latvia	62	
Israel	61	
Malaysia	61	
New Zealand	60	
Slovenia	58	
Norway	57	
•	56	
Bulgaria	56	
Cyprus Estonia	55	0
ESTOLIIA	22	U
Pussian Endoration	52	$\circ$
Russian Federation	53 <b>52</b>	0
International average	52	
	<b>52</b> 52	0
International average Moldova, Republic of Armenia	<b>52</b> 52 50	0
International average Moldova, Republic of Armenia Lithuania	<b>52</b> 52 50 50	0 0
International average Moldova, Republic of Armenia Lithuania Serbia and Montenegro	52 52 50 50 48	0 0 0
International average Moldova, Republic of Armenia Lithuania Serbia and Montenegro Jordan	52 52 50 50 48 46	0 0 0 0
International average Moldova, Republic of Armenia Lithuania Serbia and Montenegro Jordan Romania	52 52 50 50 48 46 43	0 0 0 0
International average Moldova, Republic of Armenia Lithuania Serbia and Montenegro Jordan Romania Palestinian Nat'l Auth.	52 50 50 48 46 43 43	0 0 0 0 •
International average Moldova, Republic of Armenia Lithuania Serbia and Montenegro Jordan Romania Palestinian Nat'l Auth. Egypt	52 52 50 50 48 46 43	0 0 0 0 •
International average Moldova, Republic of Armenia Lithuania Serbia and Montenegro Jordan Romania Palestinian Nat'l Auth. Egypt Italy	52 50 50 48 46 43 43 43	0 0 0 0 •
International average Moldova, Republic of Armenia Lithuania Serbia and Montenegro Jordan Romania Palestinian Nat'l Auth. Egypt Italy Lebanon	52 50 50 48 46 43 43 43	0 0 0 0 •
International average Moldova, Republic of Armenia Lithuania Serbia and Montenegro Jordan Romania Palestinian Nat'l Auth. Egypt Italy Lebanon Philippines	52 50 50 48 46 43 43 43 41 40	0 0 0 0 •
International average Moldova, Republic of Armenia Lithuania Serbia and Montenegro Jordan Romania Palestinian Nat'l Auth. Egypt Italy Lebanon	52 52 50 50 48 46 43 43 43 41 40 40	0 0 0 0 •
International average Moldova, Republic of Armenia Lithuania Serbia and Montenegro Jordan Romania Palestinian Nat'l Auth. Egypt Italy Lebanon Philippines Macedonia, Republic of Bahrain	52 52 50 50 48 46 43 43 43 41 40 40	0 0 0 0 •
International average Moldova, Republic of Armenia Lithuania Serbia and Montenegro Jordan Romania Palestinian Nat'l Auth. Egypt Italy Lebanon Philippines Macedonia, Republic of	52 52 50 50 48 46 43 43 43 41 40 40 40	0 0 0 0 •
International average Moldova, Republic of Armenia Lithuania Serbia and Montenegro Jordan Romania Palestinian Nat'l Auth. Egypt Italy Lebanon Philippines Macedonia, Republic of Bahrain Iran, Islamic Republic of	52 50 50 48 46 43 43 41 40 40 40 40 38	0 0 0 0 0 0 0 0 0
International average Moldova, Republic of Armenia Lithuania Serbia and Montenegro Jordan Romania Palestinian Nat'l Auth. Egypt Italy Lebanon Philippines Macedonia, Republic of Bahrain Iran, Islamic Republic of Indonesia	52 52 50 50 48 46 43 43 41 40 40 40 40 38 38	0 0 0 0 0 0 0 0 0
International average Moldova, Republic of Armenia Lithuania Serbia and Montenegro Jordan Romania Palestinian Nat'l Auth. Egypt Italy Lebanon Philippines Macedonia, Republic of Bahrain Iran, Islamic Republic of Indonesia Saudi Arabia	52 52 50 50 48 46 43 43 41 40 40 40 40 38 38 30	0 0 0 0 0 0 0 0 0
International average Moldova, Republic of Armenia Lithuania Serbia and Montenegro Jordan Romania Palestinian Nat'l Auth. Egypt Italy Lebanon Philippines Macedonia, Republic of Bahrain Iran, Islamic Republic of Indonesia Saudi Arabia Botswana	52 52 50 50 48 46 43 43 41 40 40 40 40 38 38 30 29	0 0 0 0 0 0 0 0 0
International average Moldova, Republic of Armenia Lithuania Serbia and Montenegro Jordan Romania Palestinian Nat'l Auth. Egypt Italy Lebanon Philippines Macedonia, Republic of Bahrain Iran, Islamic Republic of Indonesia Saudi Arabia Botswana Chile	52 52 50 50 48 46 43 43 41 40 40 40 40 38 38 30 29 28	0 0 0 0 •
International average Moldova, Republic of Armenia Lithuania Serbia and Montenegro Jordan Romania Palestinian Nat'l Auth. Egypt Italy Lebanon Philippines Macedonia, Republic of Bahrain Iran, Islamic Republic of Indonesia Saudi Arabia Botswana Chile South Africa	52 52 50 50 48 46 43 43 41 40 40 40 40 40 38 38 30 29 28 27	0 0 0 0 0 0 0 0 0

Country average vs. International average:

20

Tunisia

Higher Not different 0 Lower  $\blacksquare$ 

Content Domain	Main Topic	Cognitive Domain
NUMBER	Fractions and Decimals	Solving Routine Problems

# Fraction birthdays in first half of year

In a group of children, 16 have birthdays during the first half of the year, and 14 have birthdays during the second half of the year. What fraction of the group have birthdays during the first half of the year?

- 14 (A) 30
- $\bigcirc$ 16
- (C) 14
- 16 (D)
- E 16

Item Number: M012041

**Correct Response:** 

D

### **Overall Percent Correct**

Korea, Republic of Singapore Hong Kong, SAR Netherlands Chinese Taipei	90 90 86 82 79	<b>A A A A</b>
Belgium (Flemish) Sweden	76 76	<b>A</b>
England Malaysia Israel	75 75 74	<b>A</b>
United States Norway	72 71	<b>A</b>
Australia New Zealand Scotland	69 69 69	<b>A</b>
Japan Estonia	68 62	<b>A</b>
Slovenia Cyprus Hungary	60 59 58	<b>A</b>
Italy Latvia	57 57	<b>A</b>
Lithuania Russian Federation Slovak Republic	57 55 54	0 0 0
International average	52	
International average Iran, Islamic Republic of	<b>52</b> 46	▼
	52	<b>V</b>
Iran, Islamic Republic of	<b>52</b> 46	<b>V</b>
Iran, Islamic Republic of Bulgaria Romania Botswana	<b>52</b> 46 43	<b>V</b>
Iran, Islamic Republic of Bulgaria Romania Botswana Moldova, Republic of	52 46 43 41 40 38	<b>V</b>
Iran, Islamic Republic of Bulgaria Romania Botswana Moldova, Republic of Jordan	52 46 43 41 40 38 37	<b>V</b>
Iran, Islamic Republic of Bulgaria Romania Botswana Moldova, Republic of Jordan Chile	46 43 41 40 38 37 36	<b>V</b>
Iran, Islamic Republic of Bulgaria Romania Botswana Moldova, Republic of Jordan Chile Indonesia	46 43 41 40 38 37 36 36	<b>V</b>
Iran, Islamic Republic of Bulgaria Romania Botswana Moldova, Republic of Jordan Chile Indonesia Egypt	52 46 43 41 40 38 37 36 36 35	<b>V</b>
Iran, Islamic Republic of Bulgaria Romania Botswana Moldova, Republic of Jordan Chile Indonesia Egypt Lebanon	52 46 43 41 40 38 37 36 36 35 33	<b>V</b>
Iran, Islamic Republic of Bulgaria Romania Botswana Moldova, Republic of Jordan Chile Indonesia Egypt Lebanon Macedonia, Republic of	52 46 43 41 40 38 37 36 36 35 33 31	<b>V</b>
Iran, Islamic Republic of Bulgaria Romania Botswana Moldova, Republic of Jordan Chile Indonesia Egypt Lebanon	52 46 43 41 40 38 37 36 36 35 33	V V V V V V V V V V V V V V V V V V V
Iran, Islamic Republic of Bulgaria Romania Botswana Moldova, Republic of Jordan Chile Indonesia Egypt Lebanon Macedonia, Republic of Palestinian Nat'l Auth.	52 46 43 41 40 38 37 36 36 35 33 31 31	<b>V</b>
Iran, Islamic Republic of Bulgaria Romania Botswana Moldova, Republic of Jordan Chile Indonesia Egypt Lebanon Macedonia, Republic of Palestinian Nat'l Auth. Serbia and Montenegro	52 46 43 41 40 38 37 36 36 35 33 31 31	<b>V</b>
Iran, Islamic Republic of Bulgaria Romania Botswana Moldova, Republic of Jordan Chile Indonesia Egypt Lebanon Macedonia, Republic of Palestinian Nat'l Auth. Serbia and Montenegro Tunisia	52 46 43 41 40 38 37 36 36 35 33 31 31 31 31 30 28	<b>V</b>
Iran, Islamic Republic of Bulgaria Romania Botswana Moldova, Republic of Jordan Chile Indonesia Egypt Lebanon Macedonia, Republic of Palestinian Nat'l Auth. Serbia and Montenegro Tunisia Bahrain Philippines Armenia	52 46 43 41 40 38 37 36 36 35 33 31 31 31 30 28 27	<b>V</b>
Iran, Islamic Republic of Bulgaria Romania Botswana Moldova, Republic of Jordan Chile Indonesia Egypt Lebanon Macedonia, Republic of Palestinian Nat'l Auth. Serbia and Montenegro Tunisia Bahrain Philippines Armenia Morocco	52 46 43 41 40 38 37 36 36 35 33 31 31 31 30 28 27 21	<b>V</b>
Iran, Islamic Republic of Bulgaria Romania Botswana Moldova, Republic of Jordan Chile Indonesia Egypt Lebanon Macedonia, Republic of Palestinian Nat'l Auth. Serbia and Montenegro Tunisia Bahrain Philippines Armenia	52 46 43 41 40 38 37 36 36 35 33 31 31 31 30 28 27	<b>V</b>

Country average vs. International average:

> 0  $\blacksquare$

Content Domain	Main Topic	Cognitive Domain
NUMBER	Fractions and Decimals	Solving Routine Problems

#### 4/5 of books more than 2/3

A teacher and a doctor each have 45 books. If  $\frac{4}{5}$  of the teacher's books and  $\frac{2}{3}$  of the doctor's books are novels, how many more novels does the teacher have than the doctor?

- 2 (A)
- (B) 3
- 6
- D 30
- (E) 36

Item Number: M022004

**Correct Response:** 

### **Overall Percent Correct**

Singapore	85	<b>A</b>
Korea, Republic of	80	<b>A</b>
Hong Kong, SAR	78	<b>A</b>
Chinese Taipei	78	<b>A</b>
Malaysia	69	<b>A</b>
Netherlands	68	<b>A</b>
Japan	66	<b>A</b>
Sweden	65	<b>A</b>
Belgium (Flemish)	63	<b>A</b>
Scotland	61	<b>A</b>
Hungary	60	<b>A</b>
England	57	<b>A</b>
Latvia	57	<b>A</b>
Slovenia	57	<b>A</b>
Italy	56	<b>A</b>
Estonia	54	<b>A</b>
Romania	53	<b>A</b>
Australia	53	<b>A</b>
Slovak Republic	52	0
Israel	52	0
Cyprus	51	0
Lithuania	50	0
New Zealand	50	0
United States	50	0
Bulgaria	49	0
Serbia and Montenegro	48	0 0
Serbia and Montenegro International average	48 <b>48</b>	0
Serbia and Montenegro International average Russian Federation	48 <b>48</b> 45	0
Serbia and Montenegro International average Russian Federation Moldova, Republic of	48 48 45 44	0 0 0
Serbia and Montenegro International average Russian Federation Moldova, Republic of Norway	48 48 45 44 43	0 0 0
Serbia and Montenegro International average Russian Federation Moldova, Republic of Norway Macedonia, Republic of	48 48 45 44 43 38	0 0 0
Serbia and Montenegro International average Russian Federation Moldova, Republic of Norway Macedonia, Republic of Armenia	48 48 45 44 43 38 38	0 0 0
Serbia and Montenegro International average Russian Federation Moldova, Republic of Norway Macedonia, Republic of Armenia Iran, Islamic Republic of	48 48 45 44 43 38 38 38	0 0 0
Serbia and Montenegro International average Russian Federation Moldova, Republic of Norway Macedonia, Republic of Armenia Iran, Islamic Republic of Egypt	48 45 44 43 38 38 38 37	0 0 0
Serbia and Montenegro International average Russian Federation Moldova, Republic of Norway Macedonia, Republic of Armenia Iran, Islamic Republic of Egypt Philippines	48 45 44 43 38 38 38 37 35	0 0 0
Serbia and Montenegro International average Russian Federation Moldova, Republic of Norway Macedonia, Republic of Armenia Iran, Islamic Republic of Egypt Philippines Indonesia	48 45 44 43 38 38 38 37 35 35	0 0 0
Serbia and Montenegro International average Russian Federation Moldova, Republic of Norway Macedonia, Republic of Armenia Iran, Islamic Republic of Egypt Philippines Indonesia Palestinian Nat'l Auth.	48 45 44 43 38 38 38 37 35 35 34	0 0 0
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Serbia and Montenegro International average Russian Federation Moldova, Republic of Norway Macedonia, Republic of Armenia Iran, Islamic Republic of Egypt Philippines Indonesia Palestinian Nat'l Auth. Botswana Jordan Chile Lebanon Bahrain	48 45 44 43 38 38 38 37 35 35 34 33 33 28 27	0 0 0
Serbia and Montenegro International average Russian Federation Moldova, Republic of Norway Macedonia, Republic of Armenia Iran, Islamic Republic of Egypt Philippines Indonesia Palestinian Nat'l Auth. Botswana Jordan Chile Lebanon Bahrain South Africa	48 45 44 43 38 38 37 35 35 34 33 33 28 27 27	0 0 0
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Serbia and Montenegro International average Russian Federation Moldova, Republic of Norway Macedonia, Republic of Armenia Iran, Islamic Republic of Egypt Philippines Indonesia Palestinian Nat'l Auth. Botswana Jordan Chile Lebanon Bahrain South Africa Ghana Tunisia	48 45 44 43 38 38 37 35 34 33 33 33 28 27 27 25 25	0 0 0
Serbia and Montenegro International average Russian Federation Moldova, Republic of Norway Macedonia, Republic of Armenia Iran, Islamic Republic of Egypt Philippines Indonesia Palestinian Nat'l Auth. Botswana Jordan Chile Lebanon Bahrain South Africa Ghana Tunisia Morocco	48 45 44 43 38 38 37 35 34 33 33 33 28 27 27 25 25 24	0 0 0
Serbia and Montenegro International average Russian Federation Moldova, Republic of Norway Macedonia, Republic of Armenia Iran, Islamic Republic of Egypt Philippines Indonesia Palestinian Nat'l Auth. Botswana Jordan Chile Lebanon Bahrain South Africa Ghana Tunisia	48 45 44 43 38 38 37 35 34 33 33 33 28 27 27 25 25	0 0 0

Country average vs. International average:

Higher Not different 0  $\blacksquare$ Lower

Content Domain	Main Topic	Cognitive Domain
NUMBER	Fractions and Decimals	Solving Routine Problems

# Time for Betty to run race

Alice ran a race in 49.86 seconds. Betty ran the same race in 52.30 seconds. How much longer did it take Betty to run the race than Alice?

- (A) 2.44 seconds
- (B) 2.54 seconds
- 3.56 seconds
- (D) 3.76 seconds

Item Number: M022010

**Correct Response:** 

Α

### **Overall Percent Correct**

Singapore	88	<b>A</b>
Korea, Republic of	87	
Malaysia	81	<b>A</b>
Netherlands	81	_
Hungary	80	<b>A</b>
Chinese Taipei	80	<u> </u>
Japan	78	<u> </u>
Russian Federation	76	<u> </u>
Hong Kong, SAR	75 75	
Slovak Republic	73 74	<b>A</b>
United States	74 74	<b>A</b>
Slovenia	74 73	
Estonia	72	<b>A</b>
Belgium (Flemish)	71	<b>A</b>
Scotland	71	<u> </u>
Moldova, Republic of	69	<b>A</b>
Serbia and Montenegro	68	<b>A</b>
Latvia	67	<b>A</b>
Bulgaria	66	<b>A</b>
Lithuania	65	<b>A</b>
Romania	64	0
Tunisia	63	0
Australia	63	0
Sweden	63	0
Italy	62	0
Italy Botswana	62 61	0
,		
Botswana	61	0
Botswana Lebanon	61 61	0
Botswana Lebanon International average	61 61	0
Botswana Lebanon International average Armenia	61 61 <b>61</b>	0 0
Botswana Lebanon International average Armenia Macedonia, Republic of Cyprus	61 61 <b>61</b> 60 59	0 0
Botswana Lebanon International average Armenia Macedonia, Republic of	61 61 <b>61</b> 60 59 59	0 0 0 0 0
Botswana Lebanon International average Armenia Macedonia, Republic of Cyprus Egypt	61 61 60 59 59 58	0 0 0 0 0
Botswana Lebanon International average Armenia Macedonia, Republic of Cyprus Egypt Israel Indonesia	61 61 61 60 59 59 58 58	0 0 0 0 0
Botswana Lebanon International average Armenia Macedonia, Republic of Cyprus Egypt Israel Indonesia England	61 61 61 60 59 59 58 58 55 54	0 0 0 0 0
Botswana Lebanon International average Armenia Macedonia, Republic of Cyprus Egypt Israel Indonesia England New Zealand	61 61 60 59 59 58 58 55 54 53	0 0 0 0 0
Botswana Lebanon International average Armenia Macedonia, Republic of Cyprus Egypt Israel Indonesia England New Zealand Jordan	61 61 61 60 59 59 58 58 55 54	0 0 0 0 0
Botswana Lebanon International average Armenia Macedonia, Republic of Cyprus Egypt Israel Indonesia England New Zealand Jordan Norway	61 61 60 59 58 58 55 54 53 46 46	0 0 0 0 0
Botswana Lebanon International average Armenia Macedonia, Republic of Cyprus Egypt Israel Indonesia England New Zealand Jordan Norway Philippines	61 61 60 59 58 58 55 54 53 46 46 45	0 0 0 0 0
Botswana Lebanon International average Armenia Macedonia, Republic of Cyprus Egypt Israel Indonesia England New Zealand Jordan Norway Philippines Morocco	61 61 60 59 59 58 58 55 54 53 46 46 45 45	0 0 0 0 0
Botswana Lebanon International average Armenia Macedonia, Republic of Cyprus Egypt Israel Indonesia England New Zealand Jordan Norway Philippines Morocco Bahrain	61 61 60 59 58 58 55 54 53 46 46 45 45	0 0 0 0 0
Botswana Lebanon International average Armenia Macedonia, Republic of Cyprus Egypt Israel Indonesia England New Zealand Jordan Norway Philippines Morocco Bahrain Iran, Islamic Republic of	61 61 60 59 59 58 58 55 54 53 46 46 45 45 45	0 0 0 0 0
Botswana Lebanon International average Armenia Macedonia, Republic of Cyprus Egypt Israel Indonesia England New Zealand Jordan Norway Philippines Morocco Bahrain Iran, Islamic Republic of Chile	61 61 60 59 58 58 55 54 53 46 46 45 45 45 44	0 0 0 0 0
Botswana Lebanon International average Armenia Macedonia, Republic of Cyprus Egypt Israel Indonesia England New Zealand Jordan Norway Philippines Morocco Bahrain Iran, Islamic Republic of Chile Palestinian Nat'l Auth.	61 61 60 59 58 58 55 54 46 45 45 45 44 42 37	0 0 0 0 0
Botswana Lebanon International average Armenia Macedonia, Republic of Cyprus Egypt Israel Indonesia England New Zealand Jordan Norway Philippines Morocco Bahrain Iran, Islamic Republic of Chile Palestinian Nat'l Auth. Ghana	61 61 60 59 58 58 55 54 53 46 45 45 45 44 42 37 32	0 0 0 0 0
Botswana Lebanon International average Armenia Macedonia, Republic of Cyprus Egypt Israel Indonesia England New Zealand Jordan Norway Philippines Morocco Bahrain Iran, Islamic Republic of Chile Palestinian Nat'l Auth. Ghana South Africa	61 61 60 59 58 58 55 54 53 46 45 45 45 44 42 37 32	0 0 0 0 0
Botswana Lebanon International average Armenia Macedonia, Republic of Cyprus Egypt Israel Indonesia England New Zealand Jordan Norway Philippines Morocco Bahrain Iran, Islamic Republic of Chile Palestinian Nat'l Auth. Ghana	61 61 60 59 58 58 55 54 53 46 45 45 45 44 42 37 32	0 0 0 0 0

Country average vs. International average:

Higher Not different 0  $\blacksquare$ Lower

Content Domain	Main Topic	Cognitive Domain
NUMBER	Fractions and Decimals	Solving Routine Problems

# Fuel remaining in tank at end of trip

A car has a fuel tank that holds  $45\ L$  of fuel. The car consumes  $8.5\ L$  of fuel for each 100 km driven. A trip of 350 km was started with a full tank of fuel. How much remained in the tank at the end of the trip?

- $\bigcirc$  15.25 L
- $\bigcirc$  16.25 L
- © 24.75 L
- (D) 29.75 L

Item Number: M022127

**Correct Response:** 

A

### **Overall Percent Correct**

Singapore Chinese Taipei Hong Kong, SAR Korea, Republic of Japan Netherlands Malaysia Moldova, Republic of Lithuania Hungary Estonia Romania Romania Belgium (Flemish) Russian Federation Australia Armenia Latvia Latvia  International average Slovenia Slove			
Chinese Taipei Hong Kong, SAR Korea, Republic of Japan Netherlands Malaysia Moldova, Republic of Lithuania Hungary Estonia Romania Belgium (Flemish) Russian Federation Australia Armenia Latvia Latvia Latvia Latvia Latvia Rowacedonia, Republic of United States Slovek Republic Slovek Republic Sloveh Australia Armenia Latvia Lore Latvia Lore Latvia Lore Lore Lore Lore Lore Lore Lore Lore	Singapore	56	
Hong Kong, SAR Korea, Republic of Japan Netherlands Malaysia Moldova, Republic of Lithuania Lithuania Hungary Estonia Romania Belgium (Flemish) Russian Federation Australia Armenia Latvia Latvia Latvia Latvia Latvia Lote Slovenia Romania		50	
Korea, Republic of Japan 38 A Netherlands 38 A Malaysia 34 A Moldova, Republic of 33 A Lithuania 32 A Hungary 32 Estonia 31 A Romania 30 O Belgium (Flemish) 30 A Russian Federation 29 O Australia 28 O Armenia 27 O Latvia 26 O International average 26 Slovenia 26 O Macedonia, Republic of 25 O United States 25 Slovak Republic 24 O Indonesia 23 O Sweden 23 O Jordan 23 O Sweden 23 O Jordan 23 O Bulgaria 23 O Cyprus 22 V Saudi Arabia 22 O Israel 22 V Serbia and Montenegro 22 V Italy Egypt 21 V E		43	
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Russian Federation         29         O           Australia         28         O           Armenia         27         O           Latvia         26         O           International average         26         O           Slovenia         26         O           Macedonia, Republic of         25         O           United States         25         O           Slovak Republic         24         O           New Zealand         24         O           Indonesia         23         O           Sweden         23         O           Jordan         23         O           Bulgaria         23         O           Cyprus         22         Y           Saudi Arabia         22         Y           Israel         22         Y           Serbia and Montenegro         22         Y           Italy         21         Y           Botswana         20         Y           Chile         20         Y           Ghana         20         Y           England         20         Y           Scotland         19			
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South Africa 18 ▼ Iran, Islamic Republic of 18 ▼ Palestinian Nat'l Auth. 17 ▼ Philippines 17 ▼ Bahrain 16 ▼ Norway 16	Morocco	19	$\blacksquare$
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Palestinian Nat'l Auth. 17 ▼ Philippines 17 ▼ Bahrain 16 ▼ Norway 16 ▼	South Africa	18	$\blacksquare$
Palestinian Nat'l Auth. 17 ▼ Philippines 17 ▼ Bahrain 16 ▼ Norway 16 ▼	Iran, Islamic Republic of	18	$\blacksquare$
Bahrain 16 ▼ Norway 16 ▼		17	$\blacksquare$
Norway 16 ▼	Philippines	17	$\blacksquare$
Norway 16 ▼	Bahrain	16	$\blacksquare$
,	Norway		$\blacksquare$
	•		$\blacksquare$

Country average vs. International average:

> 0  $\blacksquare$

Content Domain	Main Topic	Cognitive Domain
NUMBER	Fractions and Decimals	Solving Routine Problems

# John and Cathy to divide a number by 100

John and Cathy were told to divide a number by 100. By mistake John multiplied the number by 100 and obtained an answer of 450. Cathy correctly divided the number by 100. What was her answer?

- $\bigcirc$  0.0045
- (B) 0.045
- © 0.45
- $\bigcirc$  4.5

Item Number: M032079

**Correct Response:** 

В

### **Overall Percent Correct**

Singapore Belgium (Flemish) Estonia Japan Hong Kong, SAR Korea, Republic of Russian Federation Hungary Netherlands Chinese Taipei Slovak Republic Lithuania Israel Sweden Latvia New Zealand Australia Scotland International average Italy England Cyprus Slovenia United States Moldova, Republic of Serbia and Montenegro Norway Romania	58 58 56 56 56 52 51 51 46 45 43 41 41 37 36 35 35 34 34 34 33 32 32 32 32 31 29	
Armenia Egypt Malaysia Saudi Arabia Lebanon Macedonia, Republic of Bahrain Philippines Morocco Chile Iran, Islamic Republic of Ghana Bulgaria Indonesia Palestinian Nat'l Auth. South Africa Tunisia Botswana	28 27 27 26 26 23 23 23 23 22 22 22 21 21 20 18 16	* * * * * * * * * * * * * * * * * * *

Country average vs. International average:

Higher Not different 0  $\blacksquare$ Lower

Content Domain	Main Topic	Cognitive Domain
NUMBER	Fractions and Decimals	Using Concepts

## Number of squares in shaded fraction

In the figure, how many MORE small squares need to be shaded so that  $\frac{4}{5}$  of the small squares are shaded?

- $\bigcirc$  5
- (B) 4
- $\bigcirc$  2
- E 1

Item Number: M012001

**Correct Response:** 

## **Overall Percent Correct**

Singapore	88	<b>A</b>
Hong Kong, SAR	87	<b>A</b>
Belgium (Flemish)	84	
Korea, Republic of	82	<b>A</b>
Netherlands	80	<b>A</b>
Japan	79	
Chinese Taipei	78	<b>A</b>
Sweden	71	<b>A</b>
Malaysia	67	<b>A</b>
Israel	67	<b>A</b>
Hungary	66	<b>A</b>
Australia	66	<b>A</b>
Scotland	63	<b>A</b>
Norway	62	<b>A</b>
England	62	<b>A</b>
United States	61	<b>A</b>
New Zealand	60	<b>A</b>
Slovenia	59	<b>A</b>
Estonia	59	<b>A</b>
Cyprus	56	<b>A</b>
Latvia	56	<b>A</b>
Russian Federation	52	0
Slovak Republic	52	0
Moldova, Republic of	50	0
		_
Italy	50	0
International average	49	
International average Lithuania	<b>49</b> 47	0
International average Lithuania Bulgaria	<b>49</b> 47 46	0
International average Lithuania Bulgaria Romania	49 47 46 45	0 0
International average Lithuania Bulgaria Romania Armenia	49 47 46 45 42	0 0
International average Lithuania Bulgaria Romania Armenia Serbia and Montenegro	49 47 46 45 42 42	0 0
International average Lithuania Bulgaria Romania Armenia Serbia and Montenegro Iran, Islamic Republic of	49 47 46 45 42 42 41	0 0
International average Lithuania Bulgaria Romania Armenia Serbia and Montenegro Iran, Islamic Republic of Macedonia, Republic of	49 47 46 45 42 42 41 37	0 0
International average Lithuania Bulgaria Romania Armenia Serbia and Montenegro Iran, Islamic Republic of Macedonia, Republic of Jordan	49 47 46 45 42 42 41 37 32	0 0
International average Lithuania Bulgaria Romania Armenia Serbia and Montenegro Iran, Islamic Republic of Macedonia, Republic of Jordan Egypt	49 47 46 45 42 42 41 37 32 30	0 0
International average Lithuania Bulgaria Romania Armenia Serbia and Montenegro Iran, Islamic Republic of Macedonia, Republic of Jordan Egypt Palestinian Nat'l Auth.	49 47 46 45 42 42 41 37 32 30 29	0 0
International average Lithuania Bulgaria Romania Armenia Serbia and Montenegro Iran, Islamic Republic of Macedonia, Republic of Jordan Egypt Palestinian Nat'l Auth. Tunisia	49 47 46 45 42 41 37 32 30 29 26	0 0
International average Lithuania Bulgaria Romania Armenia Serbia and Montenegro Iran, Islamic Republic of Macedonia, Republic of Jordan Egypt Palestinian Nat'l Auth. Tunisia Bahrain	49 47 46 45 42 41 37 32 30 29 26 25	0 0
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International average Lithuania Bulgaria Romania Armenia Serbia and Montenegro Iran, Islamic Republic of Macedonia, Republic of Jordan Egypt Palestinian Nat'l Auth. Tunisia Bahrain Philippines Lebanon	49 47 46 45 42 41 37 32 30 29 26 25 23 22	0 0
International average Lithuania Bulgaria Romania Armenia Serbia and Montenegro Iran, Islamic Republic of Macedonia, Republic of Jordan Egypt Palestinian Nat'l Auth. Tunisia Bahrain Philippines Lebanon Morocco	49 47 46 45 42 41 37 32 30 29 26 25 23 22 22	0 0
International average Lithuania Bulgaria Romania Armenia Serbia and Montenegro Iran, Islamic Republic of Macedonia, Republic of Jordan Egypt Palestinian Nat'l Auth. Tunisia Bahrain Philippines Lebanon Morocco Chile	49 47 46 45 42 41 37 32 30 29 26 25 23 22 22 21	0 0
International average Lithuania Bulgaria Romania Armenia Serbia and Montenegro Iran, Islamic Republic of Macedonia, Republic of Jordan Egypt Palestinian Nat'l Auth. Tunisia Bahrain Philippines Lebanon Morocco Chile Indonesia	49 47 46 45 42 41 37 32 30 29 26 25 23 22 21 21	0 0
International average Lithuania Bulgaria Romania Armenia Serbia and Montenegro Iran, Islamic Republic of Macedonia, Republic of Jordan Egypt Palestinian Nat'l Auth. Tunisia Bahrain Philippines Lebanon Morocco Chile Indonesia Saudi Arabia	49 47 46 45 42 41 37 32 30 29 26 25 23 22 21 21 19	0 0
International average Lithuania Bulgaria Romania Armenia Serbia and Montenegro Iran, Islamic Republic of Macedonia, Republic of Jordan Egypt Palestinian Nat'l Auth. Tunisia Bahrain Philippines Lebanon Morocco Chile Indonesia Saudi Arabia South Africa	49 47 46 45 42 41 37 32 30 29 26 25 23 22 21 21 19 16	0 0
International average Lithuania Bulgaria Romania Armenia Serbia and Montenegro Iran, Islamic Republic of Macedonia, Republic of Jordan Egypt Palestinian Nat'l Auth. Tunisia Bahrain Philippines Lebanon Morocco Chile Indonesia Saudi Arabia South Africa Botswana	49 47 46 45 42 41 37 32 30 29 26 25 23 22 21 21 19 16	0 0
International average Lithuania Bulgaria Romania Armenia Serbia and Montenegro Iran, Islamic Republic of Macedonia, Republic of Jordan Egypt Palestinian Nat'l Auth. Tunisia Bahrain Philippines Lebanon Morocco Chile Indonesia Saudi Arabia South Africa	49 47 46 45 42 41 37 32 30 29 26 25 23 22 21 21 19 16	0 0

Country average vs. International average:

0

 $\blacksquare$ 

Content Domain	Main Topic	Cognitive Domain
NUMBER	Fractions and Decimals	Using Concepts

#### Fraction less than 4/9

Write a fraction that is less than $\frac{4}{9}$ .	
Answer:	

#### Item Number: M022012

#### **SCORING**

#### **Correct Response**

- A fraction with numerator smaller than 4 and denominator equal to 9, includes 3/9 = 1/3 OR 1/3.
- A fraction with numerator equal to 4 and denominator greater than 9, includes 4/10 = 2/5 OR 2/5.
- 3/8
- · Other correct fraction

#### **Incorrect Response**

- 5/9
- 2/3
- Any fraction equivalent to 4/9.
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task).

### **Overall Percent Correct**

Singapore Korea, Republic of	84 81	<b>A</b>
Japan	81	<b>A</b>
Hong Kong, SAR	79	<b>A</b>
Chinese Taipei	77	<b>A</b>
Israel	74	<b>A</b>
Hungary	72	<b>A</b>
Armenia	72	<b>A</b>
Australia	71	<b>A</b>
Sweden	70	<b>A</b>
United States	69	<b>A</b>
Netherlands	69	<b>A</b>
England	68	<b>A</b>
Slovak Republic	66	<b>A</b>
New Zealand	64	<b>A</b>
Norway	64	<b>A</b>
Slovenia	64	<b>A</b>
Estonia	63	<b>A</b>
Belgium (Flemish)	62	<b>A</b>
Russian Federation	62	<b>A</b>
Scotland	60	<b>A</b>
Cyprus	60	
International average	54	
Romania	54	0
Bulgaria	54	0
Bulgaria Serbia and Montenegro	54 52	0 0
Bulgaria Serbia and Montenegro Egypt	54 52 52	0 0 0
Bulgaria Serbia and Montenegro Egypt Latvia	54 52 52 52	0 0 0
Bulgaria Serbia and Montenegro Egypt Latvia Lithuania	54 52 52 52 52 50	0 0 0 0
Bulgaria Serbia and Montenegro Egypt Latvia Lithuania Palestinian Nat'l Auth.	54 52 52 52 52 50 50	0 0 0 0
Bulgaria Serbia and Montenegro Egypt Latvia Lithuania Palestinian Nat'l Auth. Botswana	54 52 52 52 52 50 50 49	0 0 0 0
Bulgaria Serbia and Montenegro Egypt Latvia Lithuania Palestinian Nat'l Auth. Botswana Italy	54 52 52 52 52 50 50 49	0 0 0 0
Bulgaria Serbia and Montenegro Egypt Latvia Lithuania Palestinian Nat'l Auth. Botswana Italy Jordan	54 52 52 52 50 50 49 48 48	0 0 0 0
Bulgaria Serbia and Montenegro Egypt Latvia Lithuania Palestinian Nat'l Auth. Botswana Italy Jordan Tunisia	54 52 52 52 50 50 49 48 48 47	0 0 0 0
Bulgaria Serbia and Montenegro Egypt Latvia Lithuania Palestinian Nat'l Auth. Botswana Italy Jordan Tunisia Iran, Islamic Republic of	54 52 52 52 50 50 49 48 48 47	0 0 0 0
Bulgaria Serbia and Montenegro Egypt Latvia Lithuania Palestinian Nat'l Auth. Botswana Italy Jordan Tunisia Iran, Islamic Republic of Malaysia	54 52 52 52 50 50 49 48 48 47 47 47	0 0 0 0
Bulgaria Serbia and Montenegro Egypt Latvia Lithuania Palestinian Nat'l Auth. Botswana Italy Jordan Tunisia Iran, Islamic Republic of Malaysia Bahrain	54 52 52 52 50 50 49 48 48 47 47 43 41	0 0 0 0
Bulgaria Serbia and Montenegro Egypt Latvia Lithuania Palestinian Nat'l Auth. Botswana Italy Jordan Tunisia Iran, Islamic Republic of Malaysia Bahrain Moldova, Republic of	54 52 52 52 50 50 49 48 48 47 47 43 41 40	0 0 0 0
Bulgaria Serbia and Montenegro Egypt Latvia Lithuania Palestinian Nat'l Auth. Botswana Italy Jordan Tunisia Iran, Islamic Republic of Malaysia Bahrain Moldova, Republic of Saudi Arabia	54 52 52 52 50 50 49 48 47 47 43 41 40 39	0 0 0
Bulgaria Serbia and Montenegro Egypt Latvia Lithuania Palestinian Nat'l Auth. Botswana Italy Jordan Tunisia Iran, Islamic Republic of Malaysia Bahrain Moldova, Republic of Saudi Arabia Chile	54 52 52 52 50 50 49 48 47 47 43 41 40 39 36	0 0 0 0
Bulgaria Serbia and Montenegro Egypt Latvia Lithuania Palestinian Nat'l Auth. Botswana Italy Jordan Tunisia Iran, Islamic Republic of Malaysia Bahrain Moldova, Republic of Saudi Arabia Chile Macedonia, Republic of	54 52 52 52 50 50 49 48 48 47 47 43 41 40 39 36 35	0 0 0 0
Bulgaria Serbia and Montenegro Egypt Latvia Lithuania Palestinian Nat'l Auth. Botswana Italy Jordan Tunisia Iran, Islamic Republic of Malaysia Bahrain Moldova, Republic of Saudi Arabia Chile Macedonia, Republic of South Africa	54 52 52 52 50 50 49 48 48 47 47 43 41 40 39 36 35 30	0 0 0 0
Bulgaria Serbia and Montenegro Egypt Latvia Lithuania Palestinian Nat'l Auth. Botswana Italy Jordan Tunisia Iran, Islamic Republic of Malaysia Bahrain Moldova, Republic of Saudi Arabia Chile Macedonia, Republic of South Africa Lebanon	54 52 52 52 50 50 49 48 48 47 47 43 41 40 39 36 35 30 28	0 0 0 0
Bulgaria Serbia and Montenegro Egypt Latvia Lithuania Palestinian Nat'l Auth. Botswana Italy Jordan Tunisia Iran, Islamic Republic of Malaysia Bahrain Moldova, Republic of Saudi Arabia Chile Macedonia, Republic of South Africa Lebanon Indonesia	54 52 52 52 50 50 49 48 48 47 47 43 41 40 39 36 35 30 28 26	0 0 0 0
Bulgaria Serbia and Montenegro Egypt Latvia Lithuania Palestinian Nat'l Auth. Botswana Italy Jordan Tunisia Iran, Islamic Republic of Malaysia Bahrain Moldova, Republic of Saudi Arabia Chile Macedonia, Republic of South Africa Lebanon Indonesia Philippines	54 52 52 52 50 50 49 48 48 47 47 43 41 40 39 36 35 30 28 26 25	0 0 0 0
Bulgaria Serbia and Montenegro Egypt Latvia Lithuania Palestinian Nat'l Auth. Botswana Italy Jordan Tunisia Iran, Islamic Republic of Malaysia Bahrain Moldova, Republic of Saudi Arabia Chile Macedonia, Republic of South Africa Lebanon Indonesia	54 52 52 52 50 50 49 48 48 47 47 43 41 40 39 36 35 30 28 26	0 0 0 0

#### Country average vs. International average:

Higher	
Not different	0
Lower	_

# Fraction less than 4/9 (continued)

Item Number: M022012

# **Student Responses**

## **Correct Response:**

Write a fraction that is less than  $\frac{4}{9}$ .

## **Incorrect Response:**

Write a fraction that is less than  $\frac{4}{9}$ .

Content Domain	Main Topic	Cognitive Domain
NUMBER	Fractions and Decimals	Using Concepts

### Decimal rounded to nearest hundredth

Which of the following is 78.2437 rounded to the nearest hundredth?

- A 100
- 80  $\bigcirc$ B
- (C) 78.2
- D 78.24
- (E) 78.244

Item Number: M022144

**Correct Response:** 

D

## **Overall Percent Correct**

Korea, Republic of	88	
Serbia and Montenegro	74	
Russian Federation	73	
Lithuania	72	
Hungary	72	
Slovak Republic	71	<u> </u>
Belgium (Flemish)	66	<u> </u>
United States	66	<u> </u>
Estonia	62	<u> </u>
Moldova, Republic of	55	<u> </u>
Sweden	55	
Singapore	54	
Italy	54	<u> </u>
•	54	
Japan Latvia	54	
		<b>A</b>
Netherlands	54	
Chinese Taipei	49	0
Slovenia	49	0
International average	47	
Australia	47	0
Cyprus	46	O
Lebanon	45	O
Malaysia	45	0
Palestinian Nat'l Auth.	44	0
Israel	43	0
New Zealand	41	$\blacksquare$
Egypt	41	$\blacksquare$
Scotland	41	$\blacksquare$
Jordan	40	$\blacksquare$
England	40	* * * * * * * * * * * * * * * * * * *
Indonesia	39	$\blacksquare$
Philippines	38	$\blacksquare$
Bulgaria	38	•
Iran, Islamic Republic of	37	•
Morocco	37	•
Saudi Arabia	36	<b>V</b>
Romania	35	<b>V</b>
Norway	33	<b>V</b>
Bahrain	32	·
Macedonia, Republic of	32	<b>V</b>
Chile	30	<b>V</b>
Armenia	29	<b>—</b>
Ghana	29 29	<b>*</b>
Hong Kong, SAR	29 29	<u>*</u>
3 3.		<b>* * * *</b>
Botswana	28	<u> </u>
South Africa	22	▼

Country average vs. International average:

Higher 0 Not different Lower  $\blacksquare$ 

Content Domain	Main Topic	Cognitive Domain
NUMBER	Fractions and Decimals	Using Concepts

## Decimals ordered greatest to least

In which list are the numbers ordered from greatest to least?

- (B) 0.3, 0.32, 0.332, 0.233
- $\bigcirc$  0.32, 0.233, 0.332, 0.3
- $\bigcirc$  0.332, 0.32, 0.3, 0.233

Item Number: M022198

**Correct Response:** 

D

## **Overall Percent Correct**

Singapore	79	<b>A</b>
Belgium (Flemish)	74	
Hong Kong, SAR	72	<b>A</b>
Netherlands	66	<b>A</b>
Chinese Taipei	63	<b>A</b>
Estonia	62	
Malaysia	62	<b>A</b>
Korea, Republic of	59	<b>A</b>
Sweden	59	<b>A</b>
Latvia	58	<b>A</b>
Japan	53	<b>A</b>
Australia	53	
Slovak Republic	52	<b>A</b>
Lithuania	49	<b>A</b>
Russian Federation	49	<b>A</b>
Scotland	48	0
United States	48	
Slovenia	48	0
Italy	47	0
Hungary	47	0
Bulgaria	47	0
Egypt	46	0
Romania	46	0
Moldova, Republic of	44	0
		_
England	44	0
International average	44	
International average Armenia	<b>44</b> 42	0
International average Armenia Lebanon	<b>44</b> 42 42	0
International average Armenia Lebanon New Zealand	44 42 42 42	0 0 0
International average Armenia Lebanon New Zealand Cyprus	44 42 42 42 42 39	0 0 0
International average Armenia Lebanon New Zealand Cyprus Israel	44 42 42 42 39 38	0 0 0 0
International average Armenia Lebanon New Zealand Cyprus Israel Morocco	44 42 42 42 39 38 38	0 0 0 0
International average Armenia Lebanon New Zealand Cyprus Israel	44 42 42 42 39 38 38 35	0 0 0 0
International average Armenia Lebanon New Zealand Cyprus Israel Morocco Chile Norway	44 42 42 42 39 38 38 35 35	0 0 0 0
International average Armenia Lebanon New Zealand Cyprus Israel Morocco Chile Norway Jordan	44 42 42 42 39 38 38 35 35 35	0 0 0 0
International average Armenia Lebanon New Zealand Cyprus Israel Morocco Chile Norway Jordan Serbia and Montenegro	44 42 42 42 39 38 38 35 35 35 34	0 0 0 0
International average Armenia Lebanon New Zealand Cyprus Israel Morocco Chile Norway Jordan Serbia and Montenegro Tunisia	44 42 42 42 39 38 38 35 35 35 35 34 33	0 0 0 0
International average Armenia Lebanon New Zealand Cyprus Israel Morocco Chile Norway Jordan Serbia and Montenegro Tunisia Macedonia, Republic of	44 42 42 42 39 38 38 35 35 35 34 33 32	0 0 0 0
International average Armenia Lebanon New Zealand Cyprus Israel Morocco Chile Norway Jordan Serbia and Montenegro Tunisia Macedonia, Republic of Indonesia	44 42 42 42 39 38 35 35 35 35 34 33 32 29	0 0 0
International average Armenia Lebanon New Zealand Cyprus Israel Morocco Chile Norway Jordan Serbia and Montenegro Tunisia Macedonia, Republic of Indonesia Palestinian Nat'l Auth.	44 42 42 42 39 38 35 35 35 35 34 33 32 29	0 0 0 0
International average Armenia Lebanon New Zealand Cyprus Israel Morocco Chile Norway Jordan Serbia and Montenegro Tunisia Macedonia, Republic of Indonesia Palestinian Nat'l Auth. Bahrain	44 42 42 42 39 38 38 35 35 35 34 33 32 29 29	0 0 0 0
International average Armenia Lebanon New Zealand Cyprus Israel Morocco Chile Norway Jordan Serbia and Montenegro Tunisia Macedonia, Republic of Indonesia Palestinian Nat'l Auth. Bahrain Philippines	44 42 42 42 39 38 38 35 35 35 34 33 32 29 29 27 25	0 0 0 0 0 0 0 0 0 0
International average Armenia Lebanon New Zealand Cyprus Israel Morocco Chile Norway Jordan Serbia and Montenegro Tunisia Macedonia, Republic of Indonesia Palestinian Nat'l Auth. Bahrain Philippines Saudi Arabia	44 42 42 39 38 38 35 35 35 34 33 32 29 29 27 25 23	0 0 0 0 0 0 0 0 0 0
International average Armenia Lebanon New Zealand Cyprus Israel Morocco Chile Norway Jordan Serbia and Montenegro Tunisia Macedonia, Republic of Indonesia Palestinian Nat'l Auth. Bahrain Philippines Saudi Arabia Ghana	44 42 42 42 39 38 35 35 35 35 32 29 29 27 25 23 20	0 0 0 0 0 0 0 0 0 0
International average Armenia Lebanon New Zealand Cyprus Israel Morocco Chile Norway Jordan Serbia and Montenegro Tunisia Macedonia, Republic of Indonesia Palestinian Nat'l Auth. Bahrain Philippines Saudi Arabia Ghana Iran, Islamic Republic of	44 42 42 42 39 38 35 35 35 35 32 29 27 25 23 20 18	0 0 0 0 0 0 0 0 0 0
International average Armenia Lebanon New Zealand Cyprus Israel Morocco Chile Norway Jordan Serbia and Montenegro Tunisia Macedonia, Republic of Indonesia Palestinian Nat'l Auth. Bahrain Philippines Saudi Arabia Ghana Iran, Islamic Republic of Botswana	44 42 42 42 39 38 35 35 35 35 32 29 27 25 23 20 18 18	0 0 0 0
International average Armenia Lebanon New Zealand Cyprus Israel Morocco Chile Norway Jordan Serbia and Montenegro Tunisia Macedonia, Republic of Indonesia Palestinian Nat'l Auth. Bahrain Philippines Saudi Arabia Ghana Iran, Islamic Republic of	44 42 42 42 39 38 35 35 35 35 32 29 27 25 23 20 18	0 0 0 0 0 0 0 0 0 0

Country average vs. International average:

> 0  $\blacksquare$

Content Domain	Main Topic	Cognitive Domain
NUMBER	Fractions and Decimals	Using Concepts

### The number closest to 10

Jse the patterns in the previous table to answer the following questions.	
A. Pat made a shape with a <b>total</b> of 64 tiles. How many were black and how many were red?	
Answer: black tiles red tiles	
3. Pat made a shape that used 49 <b>black</b> tiles.  How many <b>red</b> tiles did Pat use in that shape?	
Answer: red tiles	
C. Next, Pat made a shape using 44 of the <b>red</b> tiles. How many black tiles would Pat need to complete the black part of the shape?	
Answer: black tiles	

Item Number: M032670

**Correct Response:** 

В

# **Overall Percent Correct**

Sweden 96 A Estonia 96 A Singapore 95 A Lithuania 95 A Belgium (Flemish) 94 A Korea, Republic of 94 A Malaysia 93 A Japan 92 A Serbia and Montenegro 91 A Norway 91 A Russian Federation 91 A Latvia 90 A Slovak Republic 90 A Hong Kong, SAR 89 A Scotland 89 A Chinese Taipei 89 A Cyprus 88 A Hungary 88 A Australia 88 A United States 87 A Slovenia 87 A New Zealand 86 A Bulgaria 85 A England 82 A Moldova, Republic of 82 A Romania 79 O Macedonia, Republic of 78 O International average 76 Tunisia 76 O Morocco 75 O Indonesia 74 O Iran, Islamic Republic of 69 V Chile 67 V Lebanon 67 V Armenia 66 V Jordan 55 V Palestinian Nat'l Auth. 50 Bahrain 49 V Egypt 48 Philippines 42 Botswana 40 Saudi Arabia 35 South Africa 30 Ghana 24 V	Netherlands	97	
Estonia 96			
Lithuania 95			
Lithuania 95 Belgium (Flemish) 94 Korea, Republic of 94 Malaysia 93 Japan 92 Serbia and Montenegro 91 Norway 91 Russian Federation 91 Latvia 90 Slovak Republic 90 Italy 90 Hong Kong, SAR 89 Scotland 89 Chinese Taipei 89 Cyprus 88 Hungary 88 AUStralia 88 United States 87 Slovenia 87 New Zealand 82 Moldova, Republic of 82 Israel 81 Romania 79 Macedonia, Republic of 78 International average 76 Tunisia 76 Morocco 75 Indonesia 74 Iran, Islamic Republic of 99 Cyrus 75 Indonesia 74 Iran, Islamic Republic of 99 Chile 67 Lebanon 67 Armenia 66 Jordan 55 Palestinian Nat'l Auth. 50 Rahrain 49 Egypt 48 Philippines 42 Botswana 40 Saudi Arabia 35 South Africa 30			
Belgium (Flemish) 94 A Korea, Republic of 94 A Malaysia 93 A Japan 92 A Serbia and Montenegro 91 A Russian Federation 91 A Latvia 90 A Slovak Republic 90 A Hong Kong, SAR 89 A Scotland 89 A Chinese Taipei 89 A Cyprus 88 A Hungary 88 A Hungary 88 A AUnited States 87 A Slovenia 87 A New Zealand 86 A Bulgaria 85 A England 82 A Moldova, Republic of 82 A Israel 81 A Romania 79 O Macedonia, Republic of 78 O International average 76 Tunisia 76 O Morocco 75 O Indonesia 74 O Iran, Islamic Republic of 69 V Chile 67 V Lebanon 67 V Armenia 66 V Jordan 55 V Palestinian Nat'l Auth. 50 V Bahrain 49 V Egypt 48 V Philippines 42 V Botswana 35 South Africa 30 V	_ ~ '		
Korea, Republic of Malaysia Japan Japan Serbia and Montenegro Norway Russian Federation Latvia Slovak Republic Italy Hong Kong, SAR Scotland Sourts Taipei Cyprus Hungary Australia United States Slovenia Bulgaria England Moldova, Republic of Israel Romania Romania Romania Romania Romania Romocco Indonesia Iran, Islamic Republic of Chile Lebanon Armenia Jordan Saudi Arabia South Africa Serbia and Montenegro 91 A A A A A A A A A A A A A A A A A A			_
Malaysia 93 A Japan 92 A Serbia and Montenegro 91 A Norway 91 A Russian Federation 91 A Latvia 90 A Slovak Republic 90 A Hong Kong, SAR 89 A Scotland 89 A Chinese Taipei 89 A Cyprus 88 A Hungary 88 A Australia 88 A United States 87 A Slovenia 87 A New Zealand 86 A Bulgaria 85 A England 82 A Moldova, Republic of 82 A Israel 81 A Romania 79 O Macedonia, Republic of 78 O International average 76 Tunisia 76 O Morocco 75 O Indonesia 74 O Iran, Islamic Republic of 69 V Chile 67 V Lebanon 67 V Lebanon 67 V Armenia 66 V Jordan 55 V Palestinian Nat'l Auth. 50 V Bahrain 49 V Egypt 48 V Philippines 42 V Botswana 35 V South Africa 30 V	j , ,		
Japan 92   Serbia and Montenegro 91   Norway 91   Russian Federation 91   Latvia 90   Slovak Republic 90   Italy 90   Hong Kong, SAR 89   Scotland 89   Chinese Taipei 89   Cyprus 88   Hungary 88   Australia 88   United States 87   Slovenia 87   New Zealand 86   Bulgaria 85   England 82   Moldova, Republic of 82   Israel 81   Romania 79   Macedonia, Republic of 78   International average 76   Tunisia 76   Morocco 75   Indonesia 74   Iran, Islamic Republic of 69   Chile 67   Lebanon 67   Armenia 66   Jordan 55   Palestinian Nat'l Auth 50   Bahrain 49   Egypt 48   Philippines 42   Botswana 40   Saudi Arabia 35   South Africa 30	' '		
Serbia and Montenegro 91   Norway 91   Russian Federation 91   Latvia 90   Slovak Republic 90   Italy 90   Hong Kong, SAR 89   Scotland 89   Chinese Taipei 89   Cyprus 88   Hungary 88   AUstralia 88   United States 87   Slovenia 87   New Zealand 86   Bulgaria 85   England 82   Moldova, Republic of 82   Israel 81   Romania 79   Macedonia, Republic of 78   International average 76  Tunisia 76   Morocco 75   Indonesia 74   Iran, Islamic Republic of 75   Chile 67   Lebanon 67   Armenia 66   Jordan 55   Palestinian Nat'l Auth. 50   Bahrain 49   Egypt 48   Philippines 42   Botswana 40   Saudi Arabia 35   South Africa 30    **  **International average 70   **International average 71   **International average 72   **International average 73   **International average 74   **International average 75   **International average 76   **International average 7	,		
Norway         91         ▲           Russian Federation         91         ▲           Latvia         90         ▲           Slovak Republic         90         ▲           Italy         90         ▲           Hong Kong, SAR         89         ▲           Scotland         89         ▲           Chinese Taipei         89         ▲           Chinese Taipei         89         ▲           Cyprus         88         ▲           Hungary         88         ▲           Australia         88         ▲           United States         87         ▲           Slovenia         87         ▲           New Zealand         86         ▲           Bulgaria         85         ▲           England         82         ▲           Moldova, Republic of         82         ▲           Israel         81         ▲           Romania         79         ○           Macedonia, Republic of         78         ○           International average         76         ○           Indonesia         74         ○           Iran, Islamic Republ	'		
Russian Federation 91	_		
Latvia 90 A Slovak Republic 90 A Italy 90 A Hong Kong, SAR 89 A Scotland 89 A Chinese Taipei 89 A Cyprus 88 A Hungary 88 A Australia 88 A United States 87 A Slovenia 87 A New Zealand 86 A Bulgaria 85 A England 82 A Moldova, Republic of 82 A Israel 81 A Romania 79 O Macedonia, Republic of 78 O International average 76 Tunisia 76 O Indonesia 74 O Iran, Islamic Republic of 69 V Chile 67 V Lebanon 67 V Armenia 66 V Jordan 55 V Palestinian Nat'l Auth. 50 V Bahrain 49 V Egypt 48 V Philippines 42 V Botswana 35 V South Africa 30 V	1		
Slovak Republic         90         ▲           Italy         90         ▲           Hong Kong, SAR         89         ▲           Scotland         89         ▲           Chinese Taipei         89         ▲           Cyprus         88         ▲           Hungary         88         ▲           Australia         88         ▲           United States         87         ▲           Slovenia         87         ▲           New Zealand         86         ▲           Bulgaria         85         ▲           Bulgaria         82         ▲           Israel         81         ▲           Romania         79         ○           Macedonia, Republic of         78         ○           International average         76         ○           Indonesia         74         ○           Indonesia         74         ○           Iran, Islamic Republic of         69         ▼           Chile         67         ▼           Lebanon         67         ▼           Armenia         66         ▼           Jordan         55 <td></td> <td></td> <td></td>			
Italy       90       ▲         Hong Kong, SAR       89       ▲         Scotland       89       ▲         Chinese Taipei       89       ▲         Cyprus       88       ▲         Hungary       88       ▲         Australia       88       ▲         United States       87       ▲         Slovenia       87       ▲         New Zealand       86       ▲         Bulgaria       85       ▲         England       82       ▲         Moldova, Republic of       82       ▲         Israel       81       ▲         Romania       79       ○         Macedonia, Republic of       78       ○         International average       76       ○         Indonesia       74       ○         Indonesia       74       ○         Iran, Islamic Republic of       69       ▼         Chile       67       ▼         Lebanon       67       ▼         Armenia       66       ▼         Jordan       55       ▼         Palestinian Nat'l Auth.       50       ▼ <t< td=""><td></td><td></td><td></td></t<>			
Hong Kong, SAR         89         ▲           Scotland         89         ▲           Chinese Taipei         89         ▲           Cyprus         88         ▲           Hungary         88         ▲           Australia         88         ▲           United States         87         ▲           Slovenia         87         ▲           New Zealand         86         ▲           Bulgaria         85         ▲           England         82         ▲           Moldova, Republic of         82         ▲           Israel         81         ▲           Romania         79         ○           Macedonia, Republic of         78         ○           International average         76         ○           Tunisia         76         ○           Morocco         75         ○           Indonesia         74         ○           Iran, Islamic Republic of         69         ▼           Chile         67         ▼           Lebanon         67         ▼           Armenia         66         ▼           Jordan         55	· '		
Scotland         89         ▲           Chinese Taipei         89         ▲           Cyprus         88         ▲           Hungary         88         ▲           Australia         88         ▲           United States         87         ▲           Slovenia         87         ▲           New Zealand         86         ▲           Bulgaria         85         ▲           England         82         ▲           Moldova, Republic of         82         ▲           Israel         81         ▲           Romania         79         ○           Macedonia, Republic of         78         ○           International average         76         ○           Tunisia         76         ○           Morocco         75         ○           Indonesia         74         ○           Iran, Islamic Republic of         69         ▼           Chile         67         ▼           Lebanon         67         ▼           Armenia         66         ▼           Jordan         55         ▼           Palestinian Nat'l Auth.	· ·		
Chinese Taipei         89         ▲           Cyprus         88         ▲           Hungary         88         ▲           Australia         88         ▲           United States         87         ▲           Slovenia         87         ▲           New Zealand         86         ▲           Bulgaria         85         ▲           England         82         ▲           Moldova, Republic of         82         ▲           Israel         81         ▲           Romania         79         ○           Macedonia, Republic of         78         ○           International average         76         ○           Tunisia         76         ○           Morocco         75         ○           Indonesia         74         ○           Iran, Islamic Republic of         69         ▼           Chile         67         ▼           Lebanon         67         ▼           Armenia         66         ▼           Jordan         55         ▼           Palestinian Nat'l Auth.         50         ▼           Bahrain			
Cyprus         88         ▲           Hungary         88         ▲           Australia         88         ▲           United States         87         ▲           Slovenia         87         ▲           New Zealand         86         ▲           Bulgaria         85         ▲           England         82         ▲           Moldova, Republic of         82         ▲           Israel         81         ▲           Romania         79         ○           Macedonia, Republic of         78         ○           International average         76         ○           Tunisia         76         ○           Morocco         75         ○           Indonesia         74         ○           Iran, Islamic Republic of         69         ▼           Chile         67         ▼           Lebanon         67         ▼           Armenia         66         ▼           Jordan         55         ▼           Palestinian Nat'l Auth.         50         ▼           Bahrain         49         ▼           Egypt         48<			
Hungary       88       ▲         Australia       88       ▲         United States       87       ▲         Slovenia       87       ▲         New Zealand       86       ▲         Bulgaria       85       ▲         England       82       ▲         Moldova, Republic of       82       ▲         Israel       81       ▲         Romania       79       ○         Macedonia, Republic of       78       ○         International average       76       ○         Tunisia       76       ○         Morocco       75       ○         Indonesia       74       ○         Iran, Islamic Republic of       69       ▼         Chile       67       ▼         Lebanon       67       ▼         Armenia       66       ▼         Jordan       55       ▼         Palestinian Nat'l Auth.       50       ▼         Bahrain       49       ▼         Egypt       48       ▼         Philippines       42       ▼         Botswana       40       ▼ <t< td=""><td>Chinese Taipei</td><td>89</td><td></td></t<>	Chinese Taipei	89	
Australia 88	Cyprus	88	
United States       87       ▲         Slovenia       87       ▲         New Zealand       86       ▲         Bulgaria       85       ▲         England       82       ▲         Moldova, Republic of       82       ▲         Israel       81       ▲         Romania       79       ○         Macedonia, Republic of       78       ○         International average       76       ○         Indonesia       74       ○         Indonesia       74       ○         Iran, Islamic Republic of       69       ▼         Chile       67       ▼         Lebanon       67       ▼         Armenia       66       ▼         Jordan       55       ▼         Palestinian Nat'l Auth.       50       ▼         Bahrain       49       ▼         Egypt       48       ▼         Philippines       42       ▼         Botswana       40       ▼         South Africa       30       ▼	Hungary	88	
Slovenia       87       ▲         New Zealand       86       ▲         Bulgaria       85       ▲         England       82       ▲         Moldova, Republic of       82       ▲         Israel       81       ▲         Romania       79       ○         Macedonia, Republic of       78       ○         International average       76       ○         Tunisia       76       ○         Morocco       75       ○         Indonesia       74       ○         Iran, Islamic Republic of       69       ▼         Chile       67       ▼         Lebanon       67       ▼         Armenia       66       ▼         Jordan       55       ▼         Palestinian Nat'l Auth.       50       ▼         Bahrain       49       ▼         Egypt       48       ▼         Philippines       42       ▼         Botswana       40       ▼         South Africa       30       ▼	Australia	88	
New Zealand  Bulgaria  England  Moldova, Republic of Israel  Romania  Romania  Romania  Romania  To  International average  Tunisia  Morocco  Indonesia  Iran, Islamic Republic of  Chile  Chile  Chile  Farmenia  Jordan  Palestinian Nat'l Auth.  Bahrain  Egypt  Philippines  Botswana  Saudi Arabia  South Africa  82  A  A  A  A  C  A  Bah  A  A  Bah  A  A  Bah  A  Bah  A  Botswana  Saudi Arabia  South Africa  A  A  Bah  A  Bah  A  Bah  A  Bah  A  Bah  Bah	United States	87	
Bulgaria 85 ▲ England 82 ▲ Moldova, Republic of 82 ▲ Israel 81 ▲ Romania 79 ○ Macedonia, Republic of 78 ○ International average 76  Tunisia 76 ○ Morocco 75 ○ Indonesia 74 ○ Iran, Islamic Republic of 69 ▼ Chile 67 ▼ Lebanon 67 ▼ Armenia 66 ▼ Jordan 55 ▼ Palestinian Nat'l Auth. 50 ▼ Bahrain 49 ▼ Egypt 48 ▼ Philippines 42 ▼ Botswana 40 ▼ Saudi Arabia 35 ▼	Slovenia	87	$\blacktriangle$
England 82 ▲ Moldova, Republic of 82 ▲ Israel 81 ▲ Romania 79 ○ Macedonia, Republic of 78 ○ International average 76  Tunisia 76 ○ Morocco 75 ○ Indonesia 74 ○ Iran, Islamic Republic of 69 ▼ Chile 67 ▼ Lebanon 67 ▼ Armenia 66 ▼ Jordan 55 ▼ Palestinian Nat'l Auth. 50 ▼ Bahrain 49 ▼ Egypt 48 ▼ Philippines 42 ▼ Botswana 40 ▼ Saudi Arabia 35 ▼ South Africa 30 ▼	New Zealand	86	$\blacktriangle$
Moldova, Republic of 82	Bulgaria	85	<b>A</b>
Israel 81 A Romania 79 O Macedonia, Republic of 78 O International average 76  Tunisia 76 O Morocco 75 O Indonesia 74 O Iran, Islamic Republic of 69 V Chile 67 V Lebanon 67 V Armenia 66 V Jordan 55 V Palestinian Nat'l Auth. 50 V Bahrain 49 V Egypt 48 V Philippines 42 V Botswana 40 V Saudi Arabia 35 V South Africa 30 V	England	82	$\blacktriangle$
Romania 79 O Macedonia, Republic of 78 O International average 76  Tunisia 76 O Morocco 75 O Indonesia 74 O Iran, Islamic Republic of 69 V Chile 67 V Lebanon 67 V Armenia 66 V Jordan 55 V Palestinian Nat'l Auth. 50 V Bahrain 49 V Egypt 48 V Philippines 42 V Botswana 40 V Saudi Arabia 35 V South Africa 30 V	Moldova, Republic of	82	$\blacktriangle$
Macedonia, Republic of International average78○Tunisia76○Morocco75○Indonesia74○Iran, Islamic Republic of Chile67▼Lebanon67▼Armenia66▼Jordan55▼Palestinian Nat'l Auth.50▼Bahrain49▼Egypt48▼Philippines42▼Botswana40▼Saudi Arabia35▼South Africa30▼	Israel	81	$\blacktriangle$
International average Tunisia Tunisia To Morocco To Indonesia To Iran, Islamic Republic of Chile To Lebanon To Armenia To Jordan To Palestinian Nat'l Auth To Bahrain To Egypt To Botswana To Saudi Arabia To	Romania	79	0
Tunisia 76 O Morocco 75 O Indonesia 74 O Iran, Islamic Republic of 69 ▼ Chile 67 ▼ Lebanon 67 ▼ Armenia 66 ▼ Jordan 55 ▼ Palestinian Nat'l Auth. 50 ▼ Bahrain 49 ▼ Egypt 48 ▼ Philippines 42 ▼ Botswana 40 ▼ Saudi Arabia 35 ▼	Macedonia, Republic of	78	0
Morocco 75 O Indonesia 74 O Iran, Islamic Republic of 69 ▼ Chile 67 ▼ Lebanon 67 ▼ Armenia 66 ▼ Jordan 55 ▼ Palestinian Nat'l Auth. 50 ▼ Bahrain 49 ▼ Egypt 48 ▼ Philippines 42 ▼ Botswana 40 ▼ Saudi Arabia 35 ▼ South Africa 30 ▼	International average	76	
Indonesia 74 O Iran, Islamic Republic of 69 ▼ Chile 67 ▼ Lebanon 67 ▼ Armenia 66 ▼ Jordan 55 ▼ Palestinian Nat'l Auth. 50 ▼ Bahrain 49 ▼ Egypt 48 ▼ Philippines 42 ▼ Botswana 40 ▼ Saudi Arabia 35 ▼	Tunisia	76	0
Iran, Islamic Republic of 69 ▼ Chile 67 ▼ Lebanon 67 ▼ Armenia 66 ▼ Jordan 55 ▼ Palestinian Nat'l Auth. 50 ▼ Bahrain 49 ▼ Egypt 48 ▼ Philippines 42 ▼ Botswana 40 ▼ Saudi Arabia 35 ▼ South Africa 30 ▼	Morocco	75	0
Chile 67 ▼ Lebanon 67 ▼ Armenia 66 ▼ Jordan 55 ▼ Palestinian Nat'l Auth. 50 ▼ Bahrain 49 ▼ Egypt 48 ▼ Philippines 42 ▼ Botswana 40 ▼ Saudi Arabia 35 ▼ South Africa 30 ▼	Indonesia	74	0
Lebanon 67 ▼ Armenia 66 ▼ Jordan 55 ▼ Palestinian Nat'l Auth. 50 ▼ Bahrain 49 ▼ Egypt 48 ▼ Philippines 42 ▼ Botswana 40 ▼ Saudi Arabia 35 ▼ South Africa 30 ▼	Iran, Islamic Republic of	69	▼
Armenia 66 V  Jordan 55 V  Palestinian Nat'l Auth. 50 V  Bahrain 49 V  Egypt 48 V  Philippines 42 V  Botswana 40 V  Saudi Arabia 35 V  South Africa 30 V	Chile	67	▼
Jordan 55 ▼ Palestinian Nat'l Auth. 50 ▼ Bahrain 49 ▼ Egypt 48 ▼ Philippines 42 ▼ Botswana 40 ▼ Saudi Arabia 35 ▼ South Africa 30 ▼	Lebanon	67	▼
Palestinian Nat'l Auth. 50 ▼ Bahrain 49 ▼ Egypt 48 ▼ Philippines 42 ▼ Botswana 40 ▼ Saudi Arabia 35 ▼ South Africa 30 ▼	Armenia	66	▼
Bahrain 49 ▼ Egypt 48 ▼ Philippines 42 ▼ Botswana 40 ▼ Saudi Arabia 35 ▼ South Africa 30 ▼	Jordan	55	▼
Bahrain 49 ▼ Egypt 48 ▼ Philippines 42 ▼ Botswana 40 ▼ Saudi Arabia 35 ▼ South Africa 30 ▼	Palestinian Nat'l Auth.	50	▼
Egypt 48 ♥ Philippines 42 ♥ Botswana 40 ♥ Saudi Arabia 35 ♥ South Africa 30 ♥			▼
Philippines 42 ▼ Botswana 40 ▼ Saudi Arabia 35 ▼ South Africa 30 ▼	Egypt	48	▼
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3044174111ca 30 ,			▼
3044174111ca 30 ,			
- · · · · · · · · · · · · · · · · · · ·	South Africa	30	<b>V</b>
			<b>▼</b>

Country average vs. International average:

0

 $\blacksquare$ 

Content Domain	Main Topic	Cognitive Domain
NUMBER	Integers	Knowing Facts and Procedures

### The value of 1 minus 5 times -2

What is the value of  $1 - 5 \times (-2)$ ?

- A 11
- (B) 8
- © −8
- $\bigcirc$  -9

Item Number: M032612

**Correct Response:** 

Α

# **Overall Percent Correct**

Japan	74	<b>A</b>
Singapore	70	
Hong Kong, SAR	67	<b>A</b>
Chinese Taipei	66	<b>A</b>
Netherlands	61	<b>A</b>
Belgium (Flemish)	55	<b>A</b>
Korea, Republic of	54	<b>A</b>
Slovak Republic	52	<b>A</b>
Estonia	52	<b>A</b>
Israel	52	<b>A</b>
Romania	49	<b>A</b>
New Zealand	48	<b>A</b>
Russian Federation	46	<b>A</b>
Bulgaria	46	
Australia	45	<b>A</b>
Armenia	44	<b>A</b>
Latvia	42	<b>A</b>
Hungary	42	<b>A</b>
Lebanon	42	<b>A</b>
Malaysia	39	0
Botswana	39	0
Lithuania	38	0
United States	38	0
Italy	37	0
,		
Egypt	37	0
Egypt Slovenia	36	0 0
Egypt Slovenia International average	36 <b>35</b>	0
Egypt Slovenia International average Serbia and Montenegro	36 <b>35</b> 33	0
Egypt Slovenia International average Serbia and Montenegro Moldova, Republic of	36 35 33 33	0 0
Egypt Slovenia International average Serbia and Montenegro Moldova, Republic of Macedonia, Republic of	36 35 33 33 32	0 0 0
Egypt Slovenia International average Serbia and Montenegro Moldova, Republic of Macedonia, Republic of England	36 35 33 33 32 25	0 0 0 0
Egypt Slovenia International average Serbia and Montenegro Moldova, Republic of Macedonia, Republic of England Tunisia	36 35 33 33 32 25 24	0 0 0 0
Egypt Slovenia International average Serbia and Montenegro Moldova, Republic of Macedonia, Republic of England Tunisia Cyprus	36 35 33 33 32 25 24 23	0 0 0 0
Egypt Slovenia International average Serbia and Montenegro Moldova, Republic of Macedonia, Republic of England Tunisia Cyprus Philippines	36 35 33 32 25 24 23 21	0 0 0 0
Egypt Slovenia International average Serbia and Montenegro Moldova, Republic of Macedonia, Republic of England Tunisia Cyprus Philippines Jordan	36 35 33 32 25 24 23 21 19	0 0 0 0
Egypt Slovenia International average Serbia and Montenegro Moldova, Republic of Macedonia, Republic of England Tunisia Cyprus Philippines Jordan Palestinian Nat'l Auth.	36 35 33 32 25 24 23 21 19	0 0 0 0
Egypt Slovenia International average Serbia and Montenegro Moldova, Republic of Macedonia, Republic of England Tunisia Cyprus Philippines Jordan Palestinian Nat'l Auth. Scotland	36 35 33 32 25 24 23 21 19 19	0 0 0 0
Egypt Slovenia International average Serbia and Montenegro Moldova, Republic of Macedonia, Republic of England Tunisia Cyprus Philippines Jordan Palestinian Nat'l Auth. Scotland South Africa	36 35 33 32 25 24 23 21 19 19 18	0 0 0 .0   
Egypt Slovenia International average Serbia and Montenegro Moldova, Republic of Macedonia, Republic of England Tunisia Cyprus Philippines Jordan Palestinian Nat'l Auth. Scotland South Africa Bahrain	36 35 33 32 25 24 23 21 19 19 18 17	0 0 0 0
Egypt Slovenia International average Serbia and Montenegro Moldova, Republic of Macedonia, Republic of England Tunisia Cyprus Philippines Jordan Palestinian Nat'l Auth. Scotland South Africa Bahrain Indonesia	36 35 33 32 25 24 23 21 19 19 18 17 15 12	0 0 0 .0   
Egypt Slovenia International average Serbia and Montenegro Moldova, Republic of Macedonia, Republic of England Tunisia Cyprus Philippines Jordan Palestinian Nat'l Auth. Scotland South Africa Bahrain Indonesia Saudi Arabia	36 35 33 32 25 24 23 21 19 19 18 17 15 12 12	0 0 0 .0   
Egypt Slovenia International average Serbia and Montenegro Moldova, Republic of Macedonia, Republic of England Tunisia Cyprus Philippines Jordan Palestinian Nat'l Auth. Scotland South Africa Bahrain Indonesia Saudi Arabia Sweden	36 35 33 32 25 24 23 21 19 19 18 17 15 12 12 10	0 0 0 .0   
Egypt Slovenia International average Serbia and Montenegro Moldova, Republic of Macedonia, Republic of England Tunisia Cyprus Philippines Jordan Palestinian Nat'l Auth. Scotland South Africa Bahrain Indonesia Saudi Arabia Sweden Chile	36 35 33 32 25 24 23 21 19 19 18 17 15 12 10 10	0 0 0 .0   
Egypt Slovenia International average Serbia and Montenegro Moldova, Republic of Macedonia, Republic of England Tunisia Cyprus Philippines Jordan Palestinian Nat'l Auth. Scotland South Africa Bahrain Indonesia Saudi Arabia Sweden Chile Iran, Islamic Republic of	36 35 33 32 25 24 23 21 19 18 17 15 12 10 10 10	0 0 0 .0   
Egypt Slovenia International average Serbia and Montenegro Moldova, Republic of Macedonia, Republic of England Tunisia Cyprus Philippines Jordan Palestinian Nat'l Auth. Scotland South Africa Bahrain Indonesia Saudi Arabia Sweden Chile Iran, Islamic Republic of Morocco	36 35 33 32 25 24 23 21 19 18 17 15 12 10 10 10 6	0 0 0 .0   
Egypt Slovenia International average Serbia and Montenegro Moldova, Republic of Macedonia, Republic of England Tunisia Cyprus Philippines Jordan Palestinian Nat'l Auth. Scotland South Africa Bahrain Indonesia Saudi Arabia Sweden Chile Iran, Islamic Republic of	36 35 33 32 25 24 23 21 19 18 17 15 12 10 10 10	0 0 0 .0   
Egypt Slovenia International average Serbia and Montenegro Moldova, Republic of Macedonia, Republic of England Tunisia Cyprus Philippines Jordan Palestinian Nat'l Auth. Scotland South Africa Bahrain Indonesia Saudi Arabia Sweden Chile Iran, Islamic Republic of Morocco	36 35 33 32 25 24 23 21 19 18 17 15 12 10 10 10 6	0 0 0 .0   

Country average vs. International average:

0

 $\blacksquare$ 

Content Domain	Main Topic	Cognitive Domain
NUMBER	Integers	Using Concepts

## If *n* is a negative integer

If n is a negative integer, which of these is the largest number?

- $\bigcirc$  3 + n
- (B)  $3 \times n$
- (c) 3 n
- $\bigcirc$  3 ÷ n

Item Number: M032643

**Correct Response:** 

# **Overall Percent Correct**

Korea, Republic of Chinese Taipei Russian Federation Japan Hong Kong, SAR Singapore Hungary Estonia Latvia Belgium (Flemish) United States Israel Armenia Slovak Republic Serbia and Montenegro Netherlands Bulgaria Romania Lebanon Lithuania Malaysia International average	78 74 69 68 67 58 53 51 49 48 48 47 46 46 44 42 41 40 40	
Moldova, Republic of	39	0
Slovenia	38	0
Egypt Australia	37 36	0 0
Cyprus	34	▼
Italy	32	Ť
Iran, Islamic Republic of	32	* * * * * * * * * * * * * * * * * * *
Philippines	32	▼
Macedonia, Republic of	32	▼
New Zealand	31	▼
Jordan	29	▼
Palestinian Nat'l Auth.	29	▼
Sweden	28	▼
Scotland	28	
Indonesia	27 26	
England South Africa	26 26	¥
Norway	25	¥
Morocco	25	Ť
Saudi Arabia	25	▼ .
Bahrain	22	_
T i . i .	~~	<b>V</b>
Tunisia	22	¥
Botswana		▼ ▼

Country average vs. International average:

0

 $\blacksquare$ 

Content Domain	Main Topic	Cognitive Domain
NUMBER	Ratio, Proportions, and Percent	Knowing Facts and Procedures

#### Percent decrease in travel time

When a new highway is built, the average time it takes a bus to travel from one town to another is reduced from 25 minutes to 20 minutes. What is the percent decrease in time taken to travel between the two towns?

- $\bigcirc$ 4%
- 5% (B)
- 20%
- (D) 25%

Item Number: M022139

**Correct Response:** 

### **Overall Percent Correct**

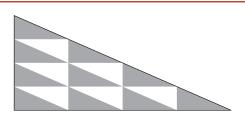
Singapore	70	
Netherlands	62	
Hong Kong, SAR	61	
Malaysia	48	
Sweden	47	
Australia	46	
Korea, Republic of	45	
Scotland	42	<b>A</b>
England	42	
Hungary	40	<b>A</b>
Chinese Taipei	40	
New Zealand	40	
Japan	39	
Slovak Republic	38	
Israel	38	
Slovenia	38	<b>A</b>
Belgium (Flemish)	38	
Estonia	37	
Latvia	37	
United States	35	<b>A</b>
Lithuania	34	0
Cyprus	34	0
Norway	34	0
Russian Federation	32	0
Serbia and Montenegro	32	0
International average	31	
International average Moldova, Republic of	<b>31</b> 29	0
International average Moldova, Republic of Bulgaria	31 29 28	0
International average Moldova, Republic of Bulgaria Romania	31 29 28 27	0
International average Moldova, Republic of Bulgaria Romania Jordan	31 29 28 27 22	0
International average Moldova, Republic of Bulgaria Romania Jordan South Africa	29 28 27 22 21	0
International average Moldova, Republic of Bulgaria Romania Jordan South Africa Chile	29 28 27 22 21 21	0
International average Moldova, Republic of Bulgaria Romania Jordan South Africa Chile Armenia	29 28 27 22 21 21 20	0
International average Moldova, Republic of Bulgaria Romania Jordan South Africa Chile Armenia Italy	31 29 28 27 22 21 21 20 20	0
International average Moldova, Republic of Bulgaria Romania Jordan South Africa Chile Armenia Italy Macedonia, Republic of	29 28 27 22 21 21 20 20	0
International average Moldova, Republic of Bulgaria Romania Jordan South Africa Chile Armenia Italy Macedonia, Republic of Bahrain	31 29 28 27 22 21 21 20 20 19	0
International average Moldova, Republic of Bulgaria Romania Jordan South Africa Chile Armenia Italy Macedonia, Republic of Bahrain Indonesia	29 28 27 22 21 21 20 20 19	0
International average Moldova, Republic of Bulgaria Romania Jordan South Africa Chile Armenia Italy Macedonia, Republic of Bahrain Indonesia Palestinian Nat'l Auth.	29 28 27 22 21 21 20 20 19 19	0
International average Moldova, Republic of Bulgaria Romania Jordan South Africa Chile Armenia Italy Macedonia, Republic of Bahrain Indonesia Palestinian Nat'l Auth. Iran, Islamic Republic of	29 28 27 22 21 21 20 20 19 19 19	0
International average Moldova, Republic of Bulgaria Romania Jordan South Africa Chile Armenia Italy Macedonia, Republic of Bahrain Indonesia Palestinian Nat'l Auth. Iran, Islamic Republic of Botswana	29 28 27 22 21 21 20 20 19 19 19 18 18	0
International average Moldova, Republic of Bulgaria Romania Jordan South Africa Chile Armenia Italy Macedonia, Republic of Bahrain Indonesia Palestinian Nat'l Auth. Iran, Islamic Republic of Botswana Lebanon	29 28 27 22 21 21 20 20 19 19 18 18 18 18	0
International average Moldova, Republic of Bulgaria Romania Jordan South Africa Chile Armenia Italy Macedonia, Republic of Bahrain Indonesia Palestinian Nat'l Auth. Iran, Islamic Republic of Botswana Lebanon Egypt	29 28 27 22 21 21 20 20 19 19 19 18 18 18 17	0
International average Moldova, Republic of Bulgaria Romania Jordan South Africa Chile Armenia Italy Macedonia, Republic of Bahrain Indonesia Palestinian Nat'l Auth. Iran, Islamic Republic of Botswana Lebanon Egypt Philippines	29 28 27 22 21 21 20 20 19 19 19 18 18 18 17 17	0
International average Moldova, Republic of Bulgaria Romania Jordan South Africa Chile Armenia Italy Macedonia, Republic of Bahrain Indonesia Palestinian Nat'l Auth. Iran, Islamic Republic of Botswana Lebanon Egypt Philippines Saudi Arabia	29 28 27 22 21 21 20 20 19 19 19 18 18 18 17 17	0
International average Moldova, Republic of Bulgaria Romania Jordan South Africa Chile Armenia Italy Macedonia, Republic of Bahrain Indonesia Palestinian Nat'l Auth. Iran, Islamic Republic of Botswana Lebanon Egypt Philippines Saudi Arabia Morocco	29 28 27 22 21 21 20 20 19 19 19 18 18 18 17 17 17	0
International average Moldova, Republic of Bulgaria Romania Jordan South Africa Chile Armenia Italy Macedonia, Republic of Bahrain Indonesia Palestinian Nat'l Auth. Iran, Islamic Republic of Botswana Lebanon Egypt Philippines Saudi Arabia Morocco Ghana	29 28 27 22 21 20 20 19 19 18 18 18 17 17 17 17 15	0
International average Moldova, Republic of Bulgaria Romania Jordan South Africa Chile Armenia Italy Macedonia, Republic of Bahrain Indonesia Palestinian Nat'l Auth. Iran, Islamic Republic of Botswana Lebanon Egypt Philippines Saudi Arabia Morocco	29 28 27 22 21 21 20 20 19 19 19 18 18 18 17 17 17	0

Country average vs. International average:

Higher Not different 0  $\blacksquare$ Lower

Content Domain	Main Topic	Cognitive Domain
NUMBER	Ratio, Proportions, and Percent	Knowing Facts and Procedures

### The ratio of the shaded area to the unshaded



In the figure above, each of the smaller triangles has the same area. What is the ratio of the shaded area to the unshaded area?

5:3

B 8:5

 $\bigcirc$  5:8

(D) 3:5

Item Number: M032447

**Correct Response:** 

Α

### **Overall Percent Correct**

Singapore	87	<b>A</b>
Chinese Taipei	81	
Korea, Republic of	80	
Hong Kong, SAR	74	
Malaysia	72	
Japan	71	
Slovak Republic	56	
Australia	55	
Scotland	54	
Latvia	52	
England	52	
Hungary	52	
Netherlands	51	
United States	50	
Lithuania	50	
Slovenia	48	
Serbia and Montenegro	48	
Russian Federation	47	
Indonesia	45	0
Bulgaria	44	0
Belgium (Flemish)	43	0
Estonia	42	Ο
International average	41	
New Zealand	39	0
Israel	38	0
Cyprus	37	0
Romania	37	0
Philippines	37	0
Moldova, Republic of	37	0
Italy	35	$\blacksquare$
Macedonia, Republic of	35	<b>* *</b>
		_
Sweden	31	•

Egypt 26 Saudi Arabia 26 Norway 23 Jordan 21 Chile 20 Bahrain 19 17 Botswana South Africa 16 Morocco 16 Lebanon 16 14 Tunisia

27

26

Palestinian Nat'l Auth.

Iran, Islamic Republic of

Country average vs. International average:

> 0  $\blacksquare$

Content Domain	Main Topic	Cognitive Domain
NUMBER	Ratio, Proportions, and Percent	Reasoning

## A computer club had 40 members

A computer club had 40 members, and 60% of the members were girls.  Later, 10 boys joined the club. What percent of the members now are girls?  Show the calculations that led to your answer.
Answer:

#### Item Number: M032233

#### **SCORING**

#### **Correct Response**

• 48% with calculations shown.

### **Partial Response**

- 24 girls
- Correct method but computational error.
- 48% with no calculations shown.

#### **Incorrect Response**

- Other incorrect (including crossed out/erased, stray marks, illegible or off task).

## **Overall Percent Correct**

Singapore Korea, Republic of Chinese Taipei Hong Kong, SAR Hungary Malaysia Belgium (Flemish) Sweden Slovak Republic Estonia Netherlands Lithuania Japan England Scotland United States Australia Slovenia Israel Israel Australia Slovenia Israel Israel Israel Israel Australia Slovenia Israel Isr			
Korea, Republic of Chinese Taipei Hong Kong, SAR Hungary Malaysia Belgium (Flemish) Sweden Slovak Republic Estonia Netherlands Lithuania Japan England Scotland United States Australia Slovenia Israel Israel Australia Slovenia Israel	Singapore	64	
Chinese Taipei 41 A Hong Kong, SAR 29 A Hungary 28 A Malaysia 23 A Belgium (Flemish) 21 A Sweden 21 Slovak Republic 19 A Estonia 19 A Netherlands 18 A Lithuania 18 A Japan 16 A England 16 O Scotland 14 O United States 14 O Australia 13 O Slovenia 13 O Slovenia 13 O Srael 13 O New Zealand 12 O International average 12 Latvia 9 O Armenia 8 O Armenia 8 O Armenia 7 Russian Federation 15 Usligaria 6 Cyprus 4 V Norway 7 O Serbia and Montenegro 9 O Armenia 8 O Romania 7 Russian Federation 18 D Subject 19 O Serbia and Montenegro 9 O Armenia 8 O Cyprus 4 V Norway 19 O Serbia and Montenegro 19 O Armenia 19 O Serbia and Montenegro 10 O Serbia an		44	
Hungary         28         A           Malaysia         23         A           Belgium (Flemish)         21         A           Sweden         21         A           Slovak Republic         19         A           Estonia         19         A           Netherlands         18         A           Lithuania         18         A           Japan         16         O           England         16         O           Scotland         14         O           United States         14         O           Australia         13         O           Slovenia         13         O           Israel         13         O           New Zealand         12         O           International average         12         Letvia           Serbia and Montenegro         9         O           Armenia         8         O           Romania         7         Y           Russian Federation         6         Y           Italy         6         Y           Norway         3         Y           Chile         3         Y<	Chinese Taipei	41	
Hungary         28         A           Malaysia         23         A           Belgium (Flemish)         21         A           Sweden         21         A           Slovak Republic         19         A           Estonia         19         A           Netherlands         18         A           Lithuania         18         A           Japan         16         O           England         16         O           Scotland         14         O           United States         14         O           Australia         13         O           Slovenia         13         O           Israel         13         O           New Zealand         12         O           International average         12         Letvia           Serbia and Montenegro         9         O           Armenia         8         O           Romania         7         Y           Russian Federation         6         Y           Italy         6         Y           Norway         3         Y           Chile         3         Y<	Hong Kong, SAR	29	
Malaysia         23         A           Belgium (Flemish)         21         A           Sweden         21         A           Slovak Republic         19         A           Estonia         19         A           Netherlands         18         A           Lithuania         18         A           Japan         16         A           England         16         O           Scotland         14         O           United States         14         O           Australia         13         O           Slovenia         13         O           Israel         13         O           New Zealand         12         O           International average         12         Image: Common and and and and and and and and and an		28	
Belgium (Flemish)         21         A           Sweden         21         A           Slovak Republic         19         A           Estonia         19         A           Netherlands         18         A           Lithuania         18         A           Japan         16         A           England         16         O           Scotland         14         O           United States         14         O           Australia         13         O           Slovenia         13         O           Israel         13         O           New Zealand         12         O           International average         12         Image: Common of the commo	Malaysia	23	
Sweden         21         A           Slovak Republic         19         A           Estonia         19         A           Netherlands         18         A           Lithuania         18         A           Japan         16         A           England         16         O           Scotland         14         O           United States         14         O           Australia         13         O           Slovenia         13         O           Israel         13         O           New Zealand         12         O           International average         12         U           Latvia         9         O           Serbia and Montenegro         9         O           Armenia         8         O           Romania         7         Y           Russian Federation         6         Y           Italy         6         Y           Bulgaria         6         Y           Cyprus         4         Y           Norway         3         Y           Chile         3         Y      <			
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#### Country average vs. International average:

Higher	
Not different	0
Lower	_

## A computer club had 40 members (continued)

Item Number: M032233

# **Student Responses**

#### **Correct Response:**

A computer club had 40 members, and 60% of the members were girls. Later, 10 boys joined the club. What percent of the members now are girls? Show the calculations that lead to your answer.

50 members 24 girls

## **Partial Response:**

A computer club had 40 members, and 60% of the members were girls. Later, 10 boys joined the club. What percent of the members now are girls? Show the calculations that lead to your answer.

# **Incorrect Response:**

A computer club had 40 members, and 60% of the members were girls. Later, 10 boys joined the club. What percent of the members now are girls? Show the calculations that lead to your answer.

Content Domain	Main Topic	Cognitive Domain
NUMBER	Ratio, Proportions, and Percent	Solving Routine Problems

## Laps run by Carol and Alice from ratio

Alice can run 4 laps around a track in the same time that Carol can run 3 laps. When Carol has run 12 laps, how many laps has Alice run?

- $\bigcirc$ 9
- B 11
- (c) 13
- (D) 16

Item Number: M012004

**Correct Response:** 

D

## **Overall Percent Correct**

Singapore 75 A Belgium (Flemish) 69 A Japan 68 A Chinese Taipei 66 A Netherlands 66 A Sweden 62 A Hong Kong, SAR 61 A Slovak Republic 59 A Latvia 55 A Lithuania 55 A Israel 53 A Australia 52 O Norway 52 A Estonia 51 A Korea, Republic of 51 A United States 48 O Ghana 47 O International average 47 Serbia and Montenegro 5 South Africa 47 O Cyprus 46 O Lebanon 46 O New Zealand 46 O Slovenia 46 O England 45 O Scotland 45 O Hungary 43 W Malaysia 43 O Palestinian Nat'l Auth. 43 V Armenia 42 V Philippines 42 V Inuisia Jordan 41 V Egypt 40 W Moldova, Republic of 40 P Botswana 39 Romania 37 Bulgaria 36 W Macedonia, Republic of 36 N Italy 35 Saudi Arabia 11donesia 34 Morocco 33 Chile 32 V Bahrain 29 V			
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Macedonia, Republic of 36 Value 14ly 35 Value 14ly 35 Value 15ly 15ly 15ly 15ly 15ly 15ly 15ly 15ly	Bulgaria	36	$\blacksquare$
Italy35▼Saudi Arabia35▼Indonesia34▼Morocco33▼Chile32▼	-		$\blacksquare$
			•
	,		•
			<b>V</b>
			<b>V</b>
			<b>V</b>
	Bahrain	29	•

Country average vs. International average:

> 0  $\blacksquare$

Content Domain	Main Topic	Cognitive Domain
NUMBER	Ratio, Proportions, and Percent	Solving Routine Problems

## A shop increased its prices by 20%

A shop increased its prices by 20%. What is the new price of an item which previously sold for 800 zeds?

- $640\;\rm zeds$ (A)
- (B) 900 zeds
- $960 \; \rm zeds$
- $\bigcirc$  1,000 zeds

Item Number: M032228

**Correct Response:** 

### **Overall Percent Correct**

Singapore	87	<b>A</b>
Hong Kong, SAR	86	
Netherlands	79	<b>A</b>
Chinese Taipei	74	•
Korea, Republic of	74	<b>A</b>
	73	•
Slovak Republic		<u> </u>
Hungary	72	<b>A</b>
Belgium (Flemish)	72	<b>A</b>
Sweden	70	<b>A</b>
Estonia	65	<b>A</b>
Japan	63	<b>A</b>
Scotland	62	
Malaysia	62	<b>A</b>
Russian Federation	61	_ _
Lithuania	58	<u> </u>
		<b>A</b>
Israel	58	
United States	57	<b>A</b>
Australia	55	<b>A</b>
Slovenia	55	<b>A</b>
Romania	54	0
Latvia	54	0
England	52	0
Serbia and Montenegro	51	0
International average	49	
International average	<b>49</b>	0
New Zealand	49	0
New Zealand Italy	49 49	0
New Zealand Italy Norway	49 49 48	0 0
New Zealand Italy Norway Bulgaria	49 49 48 47	0 0 0
New Zealand Italy Norway Bulgaria Armenia	49 49 48 47 45	O O O ▼
New Zealand Italy Norway Bulgaria Armenia Cyprus	49 49 48 47 45 45	O O O ▼
New Zealand Italy Norway Bulgaria Armenia	49 49 48 47 45	O O O ▼
New Zealand Italy Norway Bulgaria Armenia Cyprus	49 49 48 47 45 45	O O O ▼
New Zealand Italy Norway Bulgaria Armenia Cyprus Moldova, Republic of	49 49 48 47 45 45	O O O ▼
New Zealand Italy Norway Bulgaria Armenia Cyprus Moldova, Republic of Chile Tunisia	49 49 48 47 45 45 44 41	O O O ▼
New Zealand Italy Norway Bulgaria Armenia Cyprus Moldova, Republic of Chile	49 49 48 47 45 45 44 41	O O O ▼
New Zealand Italy Norway Bulgaria Armenia Cyprus Moldova, Republic of Chile Tunisia Macedonia, Republic of Indonesia	49 49 48 47 45 45 44 41 40 39 34	O O O ▼
New Zealand Italy Norway Bulgaria Armenia Cyprus Moldova, Republic of Chile Tunisia Macedonia, Republic of Indonesia Botswana	49 49 48 47 45 45 44 41 40 39 34 32	O O O ▼
New Zealand Italy Norway Bulgaria Armenia Cyprus Moldova, Republic of Chile Tunisia Macedonia, Republic of Indonesia Botswana Philippines	49 49 48 47 45 45 44 41 40 39 34 32 31	O O O ▼
New Zealand Italy Norway Bulgaria Armenia Cyprus Moldova, Republic of Chile Tunisia Macedonia, Republic of Indonesia Botswana Philippines Lebanon	49 49 48 47 45 45 44 41 40 39 34 32 31	O O O ▼
New Zealand Italy Norway Bulgaria Armenia Cyprus Moldova, Republic of Chile Tunisia Macedonia, Republic of Indonesia Botswana Philippines Lebanon Morocco	49 49 48 47 45 44 41 40 39 34 32 31 31 30	0 0 0
New Zealand Italy Norway Bulgaria Armenia Cyprus Moldova, Republic of Chile Tunisia Macedonia, Republic of Indonesia Botswana Philippines Lebanon Morocco Egypt	49 49 48 47 45 44 41 40 39 34 32 31 31 30 29	O O O ▼
New Zealand Italy Norway Bulgaria Armenia Cyprus Moldova, Republic of Chile Tunisia Macedonia, Republic of Indonesia Botswana Philippines Lebanon Morocco Egypt Bahrain	49 49 48 47 45 44 41 40 39 34 32 31 31 30 29 27	O O O ▼
New Zealand Italy Norway Bulgaria Armenia Cyprus Moldova, Republic of Chile Tunisia Macedonia, Republic of Indonesia Botswana Philippines Lebanon Morocco Egypt	49 49 48 47 45 44 41 40 39 34 32 31 31 30 29	O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O
New Zealand Italy Norway Bulgaria Armenia Cyprus Moldova, Republic of Chile Tunisia Macedonia, Republic of Indonesia Botswana Philippines Lebanon Morocco Egypt Bahrain	49 49 48 47 45 44 41 40 39 34 32 31 31 30 29 27	O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O
New Zealand Italy Norway Bulgaria Armenia Cyprus Moldova, Republic of Chile Tunisia Macedonia, Republic of Indonesia Botswana Philippines Lebanon Morocco Egypt Bahrain Palestinian Nat'l Auth.	49 49 48 47 45 44 41 40 39 34 32 31 31 30 29 27 26	O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O
New Zealand Italy Norway Bulgaria Armenia Cyprus Moldova, Republic of Chile Tunisia Macedonia, Republic of Indonesia Botswana Philippines Lebanon Morocco Egypt Bahrain Palestinian Nat'l Auth. Jordan	49 49 48 47 45 44 41 40 39 34 32 31 31 30 29 27 26 25	O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O
New Zealand Italy Norway Bulgaria Armenia Cyprus Moldova, Republic of Chile Tunisia Macedonia, Republic of Indonesia Botswana Philippines Lebanon Morocco Egypt Bahrain Palestinian Nat'l Auth. Jordan Iran, Islamic Republic of Saudi Arabia	49 49 48 47 45 44 41 40 39 34 32 31 31 30 29 27 26 25 24 22	O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O
New Zealand Italy Norway Bulgaria Armenia Cyprus Moldova, Republic of Chile Tunisia Macedonia, Republic of Indonesia Botswana Philippines Lebanon Morocco Egypt Bahrain Palestinian Nat'l Auth. Jordan Iran, Islamic Republic of	49 49 48 47 45 44 41 40 39 34 32 31 31 30 29 27 26 25 24	O O O ▼

Country average vs. International average:

Higher Not different 0 Lower  $\blacksquare$ 

Content Domain	Main Topic	Cognitive Domain
NUMBER	Ratio, Proportions, and Percent	Solving Routine Problems

## A machine uses 2.4 liters of gasoline

A machine uses 2.4 liters of gasoline for every 30 hours of operation. How many liters of gasoline will the machine use in 100 hours?

- A 7.2
- B 8.0
- © 8.4
- D 9.6

Item Number: M032533

**Correct Response:** 

В

### **Overall Percent Correct**

Singapore	89	
Netherlands	78	
Hong Kong, SAR	77	
Korea, Republic of	75	
Belgium (Flemish)	74	
Chinese Taipei	71	
Malaysia	68	
Japan	66	
Estonia	65	
Lithuania	64	
Slovak Republic	63	
Hungary	63	
Sweden	60	
Lebanon	55	
United States	55	<b>A</b>
Russian Federation	54	
Israel	53	
England	50	0
Scotland	50	0
Latvia	50	0
Slovenia	50	0
Australia	49	0
Romania	48	0
International average	47	
international average	4/	
		0
Serbia and Montenegro Italy	45 44	0
Serbia and Montenegro	45	
Serbia and Montenegro Italy	45 44	0
Serbia and Montenegro Italy Norway	45 44 44	0 0
Serbia and Montenegro Italy Norway Moldova, Republic of Cyprus	45 44 44 44	0 0 0
Serbia and Montenegro Italy Norway Moldova, Republic of	45 44 44 44 44	0 0 0 0 0
Serbia and Montenegro Italy Norway Moldova, Republic of Cyprus Bulgaria	45 44 44 44 44 43	0 0 0 0 0
Serbia and Montenegro Italy Norway Moldova, Republic of Cyprus Bulgaria New Zealand	45 44 44 44 44 43 42	0 0 0 0 0
Serbia and Montenegro Italy Norway Moldova, Republic of Cyprus Bulgaria New Zealand Armenia Jordan	45 44 44 44 43 42 41	0 0 0 0 0
Serbia and Montenegro Italy Norway Moldova, Republic of Cyprus Bulgaria New Zealand Armenia Jordan Macedonia, Republic of	45 44 44 44 43 42 41 40	0 0 0 0 0
Serbia and Montenegro Italy Norway Moldova, Republic of Cyprus Bulgaria New Zealand Armenia Jordan Macedonia, Republic of Egypt	45 44 44 44 43 42 41 40 38	0 0 0 0 0
Serbia and Montenegro Italy Norway Moldova, Republic of Cyprus Bulgaria New Zealand Armenia Jordan Macedonia, Republic of	45 44 44 44 43 42 41 40 38 34	0 0 0 0 0
Serbia and Montenegro Italy Norway Moldova, Republic of Cyprus Bulgaria New Zealand Armenia Jordan Macedonia, Republic of Egypt Iran, Islamic Republic of	45 44 44 44 43 42 41 40 38 34 31	0 0 0 0 0
Serbia and Montenegro Italy Norway Moldova, Republic of Cyprus Bulgaria New Zealand Armenia Jordan Macedonia, Republic of Egypt Iran, Islamic Republic of Indonesia	45 44 44 44 43 42 41 40 38 34 31	0 0 0 0 0
Serbia and Montenegro Italy Norway Moldova, Republic of Cyprus Bulgaria New Zealand Armenia Jordan Macedonia, Republic of Egypt Iran, Islamic Republic of Indonesia Palestinian Nat'l Auth.	45 44 44 44 43 42 41 40 38 34 31 31 31	0 0 0 0 0
Serbia and Montenegro Italy Norway Moldova, Republic of Cyprus Bulgaria New Zealand Armenia Jordan Macedonia, Republic of Egypt Iran, Islamic Republic of Indonesia Palestinian Nat'l Auth. Tunisia Chile	45 44 44 44 43 42 41 40 38 34 31 31 31 30 29	0 0 0 0 0
Serbia and Montenegro Italy Norway Moldova, Republic of Cyprus Bulgaria New Zealand Armenia Jordan Macedonia, Republic of Egypt Iran, Islamic Republic of Indonesia Palestinian Nat'l Auth. Tunisia	45 44 44 44 43 42 41 40 38 34 31 31 31 30 29 27	0 0 0 0 0
Serbia and Montenegro Italy Norway Moldova, Republic of Cyprus Bulgaria New Zealand Armenia Jordan Macedonia, Republic of Egypt Iran, Islamic Republic of Indonesia Palestinian Nat'l Auth. Tunisia Chile Philippines Morocco	45 44 44 44 43 42 41 40 38 34 31 31 31 30 29 27 27	0 0 0 0 0 0 0 0 0 0 0 0 0
Serbia and Montenegro Italy Norway Moldova, Republic of Cyprus Bulgaria New Zealand Armenia Jordan Macedonia, Republic of Egypt Iran, Islamic Republic of Indonesia Palestinian Nat'l Auth. Tunisia Chile Philippines	45 44 44 44 43 42 41 40 38 34 31 31 31 30 29 27 27 27	0 0 0 0 0 0 0 0 0 0 0 0 0
Serbia and Montenegro Italy Norway Moldova, Republic of Cyprus Bulgaria New Zealand Armenia Jordan Macedonia, Republic of Egypt Iran, Islamic Republic of Indonesia Palestinian Nat'l Auth. Tunisia Chile Philippines Morocco Botswana Bahrain	45 44 44 44 43 42 41 40 38 34 31 31 30 29 27 27 23 23	0 0 0 0 0 0 0 0 0 0 0 0 0
Serbia and Montenegro Italy Norway Moldova, Republic of Cyprus Bulgaria New Zealand Armenia Jordan Macedonia, Republic of Egypt Iran, Islamic Republic of Indonesia Palestinian Nat'l Auth. Tunisia Chile Philippines Morocco Botswana Bahrain Saudi Arabia	45 44 44 44 43 42 41 40 38 34 31 31 30 29 27 27 23 23 22	0 0 0 0 0 0 0 0 0 0 0 0 0
Serbia and Montenegro Italy Norway Moldova, Republic of Cyprus Bulgaria New Zealand Armenia Jordan Macedonia, Republic of Egypt Iran, Islamic Republic of Indonesia Palestinian Nat'l Auth. Tunisia Chile Philippines Morocco Botswana Bahrain	45 44 44 44 43 42 41 40 38 34 31 31 30 29 27 27 23 23	0 0 0 0 0

Country average vs. International average:

0

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Content Domain	Main Topic	Cognitive Domain
NUMBER	Ratio, Proportions, and Percent	Solving Routine Problems

## Three brothers receive 45,000 zeds

Three brothers, Bob, Dan, and Mark, receive a gift of 45,000 zeds from their father. The money is shared between the brothers in proportion to the number of children each one has. Bob has 2 children, Dan has 3 children, and Mark has 4 children.

How many zeds does Mark get?

- $\bigcirc$ 5,000
- 10,000
- (C) 15,000
- 20,000

Item Number: M032727

**Correct Response:** 

D

### **Overall Percent Correct**

Singapore	85	<b>A</b>
Hong Kong, SAR	73	
Korea, Republic of	71	
Chinese Taipei	68	<b>A</b>
Sweden	67	
Hungary	67	
Estonia	67	<b>A</b>
Netherlands	66	<b>A</b>
Slovak Republic	65	<b>A</b>
Belgium (Flemish)	63	<b>A</b>
Japan	60	<b>A</b>
Malaysia	57	<b>A</b>
England	55	<b>A</b>
Australia	55	
Romania	53	<b>A</b>
Israel	52	_
Russian Federation	52	<b>A</b>
New Zealand	50	0
Lithuania	49	0
Italy	48	0
Scotland	48	0
Serbia and Montenegro	48	0
United States	45	0
Norway	45	0
Slovenia	45	0
International average	45	
International average Cyprus	<b>45</b> 42	0
International average Cyprus Chile	<b>45</b> 42 41	0
International average Cyprus Chile Moldova, Republic of	<b>45</b> 42 41 40	0 0
International average Cyprus Chile Moldova, Republic of Latvia	45 42 41 40 37	0 0 0
International average Cyprus Chile Moldova, Republic of Latvia Bulgaria	45 42 41 40 37 37	0 0 0
International average Cyprus Chile Moldova, Republic of Latvia Bulgaria Macedonia, Republic of	45 42 41 40 37 37 36	0 0 0
International average Cyprus Chile Moldova, Republic of Latvia Bulgaria Macedonia, Republic of Iran, Islamic Republic of	45 42 41 40 37 37 36 35	0 0 0
International average Cyprus Chile Moldova, Republic of Latvia Bulgaria Macedonia, Republic of Iran, Islamic Republic of South Africa	45 42 41 40 37 37 36 35	0 0 0
International average Cyprus Chile Moldova, Republic of Latvia Bulgaria Macedonia, Republic of Iran, Islamic Republic of South Africa Ghana	45 42 41 40 37 37 36 35 32 32	0 0 0
International average Cyprus Chile Moldova, Republic of Latvia Bulgaria Macedonia, Republic of Iran, Islamic Republic of South Africa Ghana Philippines	45 42 41 40 37 37 36 35 32 32 29	0 0
International average Cyprus Chile Moldova, Republic of Latvia Bulgaria Macedonia, Republic of Iran, Islamic Republic of South Africa Ghana Philippines Jordan	45 42 41 40 37 36 35 32 32 29 29	0 0 0
International average Cyprus Chile Moldova, Republic of Latvia Bulgaria Macedonia, Republic of Iran, Islamic Republic of South Africa Ghana Philippines Jordan Armenia	45 42 41 40 37 36 35 32 32 29 29 28	0 0 0
International average Cyprus Chile Moldova, Republic of Latvia Bulgaria Macedonia, Republic of Iran, Islamic Republic of South Africa Ghana Philippines Jordan Armenia Palestinian Nat'l Auth.	45 42 41 40 37 36 35 32 29 29 28 28	0 0 0
International average Cyprus Chile Moldova, Republic of Latvia Bulgaria Macedonia, Republic of Iran, Islamic Republic of South Africa Ghana Philippines Jordan Armenia Palestinian Nat'l Auth. Indonesia	45 42 41 40 37 36 35 32 32 29 29 28 28 27	0 0 0
International average Cyprus Chile Moldova, Republic of Latvia Bulgaria Macedonia, Republic of Iran, Islamic Republic of South Africa Ghana Philippines Jordan Armenia Palestinian Nat'l Auth. Indonesia Lebanon	45 42 41 40 37 36 35 32 32 29 29 28 28 27 26	0 0 0
International average Cyprus Chile Moldova, Republic of Latvia Bulgaria Macedonia, Republic of Iran, Islamic Republic of South Africa Ghana Philippines Jordan Armenia Palestinian Nat'l Auth. Indonesia Lebanon Tunisia	45 42 41 40 37 36 35 32 29 29 28 28 27 26 24	0 0 0
International average Cyprus Chile Moldova, Republic of Latvia Bulgaria Macedonia, Republic of Iran, Islamic Republic of South Africa Ghana Philippines Jordan Armenia Palestinian Nat'l Auth. Indonesia Lebanon Tunisia Morocco	45 42 41 40 37 36 35 32 29 29 28 28 27 26 24 22	0 0 0
International average Cyprus Chile Moldova, Republic of Latvia Bulgaria Macedonia, Republic of Iran, Islamic Republic of South Africa Ghana Philippines Jordan Armenia Palestinian Nat'l Auth. Indonesia Lebanon Tunisia Morocco Botswana	45 42 41 40 37 36 35 32 29 29 28 28 27 26 24 22 21	0 0 0
International average Cyprus Chile Moldova, Republic of Latvia Bulgaria Macedonia, Republic of Iran, Islamic Republic of South Africa Ghana Philippines Jordan Armenia Palestinian Nat'l Auth. Indonesia Lebanon Tunisia Morocco Botswana Bahrain	45 42 41 40 37 36 35 32 29 29 28 28 27 26 24 22 21 21	0 0 0
International average Cyprus Chile Moldova, Republic of Latvia Bulgaria Macedonia, Republic of Iran, Islamic Republic of South Africa Ghana Philippines Jordan Armenia Palestinian Nat'l Auth. Indonesia Lebanon Tunisia Morocco Botswana Bahrain Egypt	45 42 41 40 37 36 35 32 29 29 28 27 26 24 22 21 21 20	0 0 0
International average Cyprus Chile Moldova, Republic of Latvia Bulgaria Macedonia, Republic of Iran, Islamic Republic of South Africa Ghana Philippines Jordan Armenia Palestinian Nat'l Auth. Indonesia Lebanon Tunisia Morocco Botswana Bahrain	45 42 41 40 37 36 35 32 29 29 28 28 27 26 24 22 21 21	0 0 0

Country average vs. International average:

Higher Not different 0  $\blacksquare$ Lower

Content Domain	Main Topic	Cognitive Domain
NUMBER	Ratio, Proportions, and Percent	Using Concepts

## 3/25 of the people in the audience were children

At a play,  $\frac{3}{25}$  of the people in the audience were children.

What percent of the audience was this?

- A 12%
- (B) 3%
- 0.3%
- 0.12%

Item Number: M032570

**Correct Response:** 

### **Overall Percent Correct**

Country average vs. International average:

Higher Not different 0  $\blacksquare$ Lower

Moldova, Republic of

Iran, Islamic Republic of

Palestinian Nat'l Auth.

Ghana

Jordan

Bahrain Lebanon

Tunisia Morocco

South Africa

Saudi Arabia

Chile

42

41

39

39

39

39 36

34

33 30

29

25

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Content Domain	Main Topic	Cognitive Domain
NUMBER	Whole Numbers	Knowing Facts and Procedures

# The closest to 11 squared plus 9 squared

Which of these is closest to  $11^2 + 9^2$ ?

- $\bigcirc$  20 + 20
- B 20 + 80
- $\bigcirc$  120 + 20
- $\bigcirc$  120 + 80

Item Number: M032609

**Correct Response:** 

D

## **Overall Percent Correct**

Hong Kong, SAR	88	<b>A</b>
Latvia	88	<b>A</b>
Hungary	85	<b>A</b>
Russian Federation	84	<b>A</b>
United States	82	<b>A</b>
Slovak Republic	82	<b>A</b>
Estonia	81	<b>A</b>
Slovenia	81	<b>A</b>
Lebanon	80	<b>A</b>
Belgium (Flemish)	80	
Korea, Republic of	80	<b>A</b>
Malaysia	80	
Chinese Taipei	80	
Romania	80	
Singapore	80	<b>A</b>
Serbia and Montenegro	79	<b>A</b>
Italy	79	<b>A</b>
Lithuania	77	
Cyprus	74	<b>A</b>
Australia	73	<b>A</b>
Netherlands	69	<b>A</b>
Macedonia, Republic of	68	<b>A</b>
Bulgaria	67	_
Indonesia	65	0
England	64	()
England Armenia	64 64	0
9	٠.	0
Armenia	64	0
Armenia Israel	64 63	0
Armenia Israel International average	64 63 <b>61</b>	0 0
Armenia Israel International average Scotland	64 63 <b>61</b> 59	0 0
Armenia Israel International average Scotland New Zealand	64 63 <b>61</b> 59 56	0 0 0
Armenia Israel International average Scotland New Zealand Tunisia	64 63 <b>61</b> 59 56 53	0 0 0
Armenia Israel International average Scotland New Zealand Tunisia Japan	64 63 <b>61</b> 59 56 53 50	0 0 0
Armenia Israel International average Scotland New Zealand Tunisia Japan Jordan	64 63 <b>61</b> 59 56 53 50 49	0 0 0
Armenia Israel International average Scotland New Zealand Tunisia Japan Jordan Palestinian Nat'l Auth.	64 63 <b>61</b> 59 56 53 50 49	0 0 0
Armenia Israel International average Scotland New Zealand Tunisia Japan Jordan Palestinian Nat'l Auth. Morocco	64 63 <b>61</b> 59 56 53 50 49 48 47	0 0 0
Armenia Israel International average Scotland New Zealand Tunisia Japan Jordan Palestinian Nat'l Auth. Morocco Philippines	64 63 61 59 56 53 50 49 48 47 45	0 0 0
Armenia Israel International average Scotland New Zealand Tunisia Japan Jordan Palestinian Nat'l Auth. Morocco Philippines Egypt	64 63 61 59 56 53 50 49 48 47 45 44	0 0
Armenia Israel International average Scotland New Zealand Tunisia Japan Jordan Palestinian Nat'l Auth. Morocco Philippines Egypt Iran, Islamic Republic of	64 63 61 59 56 53 50 49 48 47 45 44	0 0 0
Armenia Israel International average Scotland New Zealand Tunisia Japan Jordan Palestinian Nat'l Auth. Morocco Philippines Egypt Iran, Islamic Republic of Chile	64 63 61 59 56 53 50 49 48 47 45 44 44 41	0 0 0
Armenia Israel International average Scotland New Zealand Tunisia Japan Jordan Palestinian Nat'l Auth. Morocco Philippines Egypt Iran, Islamic Republic of Chile Bahrain	64 63 61 59 56 53 50 49 48 47 45 44 44 41 37	0 0 0
Armenia Israel International average Scotland New Zealand Tunisia Japan Jordan Palestinian Nat'l Auth. Morocco Philippines Egypt Iran, Islamic Republic of Chile Bahrain Sweden	64 63 61 59 56 53 50 49 48 47 45 44 44 41 37 36	0 0 0
Armenia Israel International average Scotland New Zealand Tunisia Japan Jordan Palestinian Nat'l Auth. Morocco Philippines Egypt Iran, Islamic Republic of Chile Bahrain Sweden Ghana	64 63 61 59 56 53 50 49 48 47 45 44 41 37 36 28	0 0 0
Armenia Israel International average Scotland New Zealand Tunisia Japan Jordan Palestinian Nat'l Auth. Morocco Philippines Egypt Iran, Islamic Republic of Chile Bahrain Sweden Ghana Botswana	64 63 61 59 56 53 50 49 48 47 45 44 41 37 36 28 26	0 0 0
Armenia Israel International average Scotland New Zealand Tunisia Japan Jordan Palestinian Nat'l Auth. Morocco Philippines Egypt Iran, Islamic Republic of Chile Bahrain Sweden Ghana Botswana Saudi Arabia	64 63 61 59 56 53 50 49 48 47 45 44 41 37 36 28 26 22	0 0 0
Armenia Israel International average Scotland New Zealand Tunisia Japan Jordan Palestinian Nat'l Auth. Morocco Philippines Egypt Iran, Islamic Republic of Chile Bahrain Sweden Ghana Botswana Saudi Arabia South Africa	64 63 61 59 56 53 50 49 48 47 45 44 41 37 36 28 26 22 20	0 0 0
Armenia Israel International average Scotland New Zealand Tunisia Japan Jordan Palestinian Nat'l Auth. Morocco Philippines Egypt Iran, Islamic Republic of Chile Bahrain Sweden Ghana Botswana Saudi Arabia South Africa Moldova, Republic of	64 63 61 59 56 53 50 49 48 47 45 44 41 37 36 28 26 22 20 18	0 0 0

Country average vs. International average:

0

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Content Domain	Main Topic	Cognitive Domain
NUMBER	Whole Numbers	Knowing Facts and Procedures

## Which equals 370 times 998 plus 370 times 2

Which of these is equal to  $370 \times 998 + 370 \times 2$ ?

- $\bigcirc$  370 × 1,000
- (B)  $372 \times 998$
- $\bigcirc$  740 × 998
- $\bigcirc$  370  $\times$  998  $\times$  2

Item Number: M032690

**Correct Response:** 

## **Overall Percent Correct**

Singapore	70	
Hong Kong, SAR	69	
Chinese Taipei	68	
Hungary	61	
Netherlands	59	
Estonia	57	
Lebanon	53	
Israel	52	
Egypt	52	
Belgium (Flemish)	50	
Russian Federation	49	
Australia	49	
United States	48	
Lithuania	47	
Malaysia	47	•
New Zealand	46	<u> </u>
Korea, Republic of	43	0
Romania	43	0
Botswana	41	0
Scotland	40	0
International average	39	
Armenia	38	0
Latvia	38	0
Lacria	50	0
Slovak Republic	38	0
Slovak Republic	38	0
Slovak Republic Japan	38 37	0
Slovak Republic Japan Bulgaria	38 37 37	0 0
Slovak Republic Japan Bulgaria Moldova, Republic of	38 37 37 37	0 0 0
Slovak Republic Japan Bulgaria Moldova, Republic of Slovenia	38 37 37 37 36	0 0 0 0
Slovak Republic Japan Bulgaria Moldova, Republic of Slovenia Italy	38 37 37 37 36 35	0 0 0 0 0 0
Slovak Republic Japan Bulgaria Moldova, Republic of Slovenia Italy Macedonia, Republic of	38 37 37 37 36 35 34	0 0 0 0 0 0 0
Slovak Republic Japan Bulgaria Moldova, Republic of Slovenia Italy Macedonia, Republic of England	38 37 37 37 36 35 34	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Slovak Republic Japan Bulgaria Moldova, Republic of Slovenia Italy Macedonia, Republic of England Palestinian Nat'l Auth. Tunisia	38 37 37 37 36 35 34 34 33	0 0 0 0 0
Slovak Republic Japan Bulgaria Moldova, Republic of Slovenia Italy Macedonia, Republic of England Palestinian Nat'l Auth.	38 37 37 37 36 35 34 34 33	0 0 0 0 0
Slovak Republic Japan Bulgaria Moldova, Republic of Slovenia Italy Macedonia, Republic of England Palestinian Nat'l Auth. Tunisia Philippines	38 37 37 36 35 34 34 33 31 30	0 0 0 0 0
Slovak Republic Japan Bulgaria Moldova, Republic of Slovenia Italy Macedonia, Republic of England Palestinian Nat'l Auth. Tunisia Philippines Bahrain Cyprus	38 37 37 36 35 34 34 33 31 30 28	0 0 0 0 0
Slovak Republic Japan Bulgaria Moldova, Republic of Slovenia Italy Macedonia, Republic of England Palestinian Nat'l Auth. Tunisia Philippines Bahrain	38 37 37 36 35 34 34 33 31 30 28 24	0 0 0 0 0
Slovak Republic Japan Bulgaria Moldova, Republic of Slovenia Italy Macedonia, Republic of England Palestinian Nat'l Auth. Tunisia Philippines Bahrain Cyprus Sweden	38 37 37 36 35 34 34 33 31 30 28 24 23	0 0 0 0 0
Slovak Republic Japan Bulgaria Moldova, Republic of Slovenia Italy Macedonia, Republic of England Palestinian Nat'l Auth. Tunisia Philippines Bahrain Cyprus Sweden Serbia and Montenegro Norway	38 37 37 37 36 35 34 34 33 31 30 28 24 23 23	0 0 0 0 0
Slovak Republic Japan Bulgaria Moldova, Republic of Slovenia Italy Macedonia, Republic of England Palestinian Nat'l Auth. Tunisia Philippines Bahrain Cyprus Sweden Serbia and Montenegro	38 37 37 36 35 34 34 33 31 30 28 24 23 23 22	0 0 0 0 0
Slovak Republic Japan Bulgaria Moldova, Republic of Slovenia Italy Macedonia, Republic of England Palestinian Nat'l Auth. Tunisia Philippines Bahrain Cyprus Sweden Serbia and Montenegro Norway Saudi Arabia	38 37 37 36 35 34 34 33 31 30 28 24 23 22 22	0 0 0 0 0
Slovak Republic Japan Bulgaria Moldova, Republic of Slovenia Italy Macedonia, Republic of England Palestinian Nat'l Auth. Tunisia Philippines Bahrain Cyprus Sweden Serbia and Montenegro Norway Saudi Arabia Morocco	38 37 37 36 35 34 34 33 31 30 28 24 23 22 22 21	0 0 0 0 0
Slovak Republic Japan Bulgaria Moldova, Republic of Slovenia Italy Macedonia, Republic of England Palestinian Nat'l Auth. Tunisia Philippines Bahrain Cyprus Sweden Serbia and Montenegro Norway Saudi Arabia Morocco South Africa	38 37 37 37 36 35 34 34 33 31 30 28 24 23 22 22 21 21	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

Country average vs. International average:

14

0  $\blacksquare$ 

Higher Not different Lower

Iran, Islamic Republic of

Α

Content Domain	Main Topic	Cognitive Domain
NUMBER	Whole Numbers	Solving Routine Problems

## Arrangements of 4-digit whole numbers

The four digits above are to be arranged from largest to smallest to form a four-digit number. The same four digits are then to be arranged from smallest to largest to form another four-digit number. What is the difference between the two resulting four-digit numbers?

- 3,726
- 4,726
- © 8,082
- (D) 8,182
- (E) 8,192

Item Number: M012028

**Correct Response:** 

### **Overall Percent Correct**

Korea, Republic of	92	<b>A</b>
Singapore	88	<b>A</b>
Chinese Taipei	87	<b>A</b>
Hong Kong, SAR	86	
Japan	85	<b>A</b>
Malaysia	79	
Latvia	77	
Slovenia	75	<b>A</b>
Belgium (Flemish)	75	<b>A</b>
Sweden	72	
Bulgaria	71	<b>A</b>
Italy	71	<b>A</b>
Russian Federation	70	<b>A</b>
Romania	70	<b>A</b>
United States	70	<b>A</b>
Serbia and Montenegro	70	<b>A</b>
Slovak Republic	69	<b>A</b>
Estonia	68	<b>A</b>
Australia	68	<b>A</b>
Moldova, Republic of	67	<b>A</b>
Scotland	66	<b>A</b>
Israel	66	<b>A</b>
Hungary	65	<b>A</b>
• •	65	<b>A</b>
Lithuania	03	_
	64	<u> </u>
Lithuania Macedonia, Republic of Netherlands		
Macedonia, Republic of	64	<b>A</b>
Macedonia, Republic of Netherlands	64 61	0
Macedonia, Republic of Netherlands England	64 61 60	0
Macedonia, Republic of Netherlands England International average	64 61 60 <b>59</b>	0 0
Macedonia, Republic of Netherlands England International average Armenia	64 61 60 <b>59</b> 57 56 56	• O O O
Macedonia, Republic of Netherlands England International average Armenia New Zealand	64 61 60 <b>59</b> 57 56	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>○</li><li>✓</li></ul>
Macedonia, Republic of Netherlands England International average Armenia New Zealand Iran, Islamic Republic of	64 61 60 <b>59</b> 57 56 56	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>○</li><li>✓</li></ul>
Macedonia, Republic of Netherlands England International average Armenia New Zealand Iran, Islamic Republic of Cyprus	64 61 60 <b>59</b> 57 56 56 55	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>○</li><li>✓</li></ul>
Macedonia, Republic of Netherlands England International average Armenia New Zealand Iran, Islamic Republic of Cyprus Egypt	64 61 60 <b>59</b> 57 56 56 55 53	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>○</li><li>✓</li></ul>
Macedonia, Republic of Netherlands England International average Armenia New Zealand Iran, Islamic Republic of Cyprus Egypt Tunisia	64 61 60 <b>59</b> 57 56 56 55 53 52 50	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>○</li><li>✓</li></ul>
Macedonia, Republic of Netherlands England International average Armenia New Zealand Iran, Islamic Republic of Cyprus Egypt Tunisia Jordan	64 61 60 <b>59</b> 57 56 56 55 53 52 50	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>○</li><li>✓</li></ul>
Macedonia, Republic of Netherlands England International average Armenia New Zealand Iran, Islamic Republic of Cyprus Egypt Tunisia Jordan Chile Norway Palestinian Nat'l Auth.	64 61 60 <b>59</b> 57 56 56 55 53 52 50	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>○</li><li>✓</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li></ul>
Macedonia, Republic of Netherlands England International average Armenia New Zealand Iran, Islamic Republic of Cyprus Egypt Tunisia Jordan Chile Norway	64 61 60 <b>59</b> 57 56 56 55 53 52 50 45	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>○</li><li>✓</li></ul>
Macedonia, Republic of Netherlands England International average Armenia New Zealand Iran, Islamic Republic of Cyprus Egypt Tunisia Jordan Chile Norway Palestinian Nat'l Auth.	64 61 60 <b>59</b> 57 56 56 55 53 52 50 45 41	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>○</li><li>✓</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li></ul>
Macedonia, Republic of Netherlands England International average Armenia New Zealand Iran, Islamic Republic of Cyprus Egypt Tunisia Jordan Chile Norway Palestinian Nat'l Auth. Lebanon	64 61 60 <b>59</b> 57 56 56 55 53 52 50 45 41 41	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>○</li><li>✓</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li></ul>
Macedonia, Republic of Netherlands England International average Armenia New Zealand Iran, Islamic Republic of Cyprus Egypt Tunisia Jordan Chile Norway Palestinian Nat'l Auth. Lebanon Bahrain	64 61 60 <b>59</b> 57 56 56 55 53 52 50 50 45 41 41 41	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>○</li><li>✓</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li></ul>
Macedonia, Republic of Netherlands England International average Armenia New Zealand Iran, Islamic Republic of Cyprus Egypt Tunisia Jordan Chile Norway Palestinian Nat'l Auth. Lebanon Bahrain Indonesia	64 61 60 <b>59</b> 57 56 55 53 52 50 50 45 41 41 41 40	
Macedonia, Republic of Netherlands England International average Armenia New Zealand Iran, Islamic Republic of Cyprus Egypt Tunisia Jordan Chile Norway Palestinian Nat'l Auth. Lebanon Bahrain Indonesia Philippines	64 61 60 <b>59</b> 57 56 55 53 52 50 45 41 41 41 40 35	
Macedonia, Republic of Netherlands England International average Armenia New Zealand Iran, Islamic Republic of Cyprus Egypt Tunisia Jordan Chile Norway Palestinian Nat'l Auth. Lebanon Bahrain Indonesia Philippines Botswana	64 61 60 <b>59</b> 57 56 55 53 52 50 45 41 41 41 40 35 32	
Macedonia, Republic of Netherlands England International average Armenia New Zealand Iran, Islamic Republic of Cyprus Egypt Tunisia Jordan Chile Norway Palestinian Nat'l Auth. Lebanon Bahrain Indonesia Philippines Botswana Morocco Ghana South Africa	64 61 60 <b>59</b> 57 56 56 55 53 52 50 45 41 41 40 35 32 30 22 21	
Macedonia, Republic of Netherlands England International average Armenia New Zealand Iran, Islamic Republic of Cyprus Egypt Tunisia Jordan Chile Norway Palestinian Nat'l Auth. Lebanon Bahrain Indonesia Philippines Botswana Morocco Ghana	64 61 60 <b>59</b> 57 56 56 55 53 52 50 45 41 41 40 35 32 30 22	<ul><li>▲</li><li>○</li><li>○</li><li>○</li><li>○</li><li>✓</li><li>▼</li><li>▼</li><li>▼</li><li>▼</li></ul>

Country average vs. International average:

Higher Not different 0  $\blacksquare$ Lower

Content Domain	Main Topic	Cognitive Domain
NUMBER	Whole Numbers	Solving Routine Problems

## Approximate number of magazines sold

About 7,000 copies of a magazine are sold each week. Approximately how many magazines are sold each year?

8,400  $\bigcirc$ 

35,000

(C) 84,000

(D) 350,000

(E) 3,500,000

Item Number: M022194

**Correct Response:** 

D

### **Overall Percent Correct**

Korea, Republic of	74	
Singapore	74	
Chinese Taipei	71	
Netherlands	69	
Belgium (Flemish)	69	
Hong Kong, SAR	68	
Australia	67	
Hungary	66	
Japan	66	
Sweden	63	
New Zealand	62	
Estonia	62	
England	61	
Slovenia	60	
Slovak Republic	59	
United States	58	<b>A</b>
Malaysia	58	<u> </u>
Russian Federation	58	
Scotland	58	<u> </u>
Norway	58	<b>A</b>
Lithuania	57	_
Latvia	57	<u> </u>
Bulgaria	56	<u> </u>
Israel	54	<u> </u>
Italy	53	<b>A</b>
Italy Serbia and Montenegro	53 50	0
Serbia and Montenegro		0
•	50	
Serbia and Montenegro International average	50 <b>49</b>	0
Serbia and Montenegro International average Romania	50 <b>49</b> 47	0 0
Serbia and Montenegro International average Romania Cyprus	50 <b>49</b> 47 47	0 0 0
Serbia and Montenegro International average Romania Cyprus Moldova, Republic of	50 49 47 47 44	0 0 0 0
Serbia and Montenegro International average Romania Cyprus Moldova, Republic of Macedonia, Republic of	50 49 47 47 44 42	0 0 0 0
Serbia and Montenegro International average Romania Cyprus Moldova, Republic of Macedonia, Republic of Armenia	50 49 47 47 44 42 39	0 0 0 0
Serbia and Montenegro International average Romania Cyprus Moldova, Republic of Macedonia, Republic of Armenia Indonesia	50 49 47 47 44 42 39 38	0 0 0 0
Serbia and Montenegro International average Romania Cyprus Moldova, Republic of Macedonia, Republic of Armenia Indonesia Tunisia	50 49 47 47 44 42 39 38 37	0 0 0 0
Serbia and Montenegro International average Romania Cyprus Moldova, Republic of Macedonia, Republic of Armenia Indonesia Tunisia Philippines	50 49 47 47 44 42 39 38 37 36	0 0 0 0
Serbia and Montenegro International average Romania Cyprus Moldova, Republic of Macedonia, Republic of Armenia Indonesia Tunisia Philippines Lebanon	50 49 47 47 44 42 39 38 37 36 36	0 0 0 0
Serbia and Montenegro International average Romania Cyprus Moldova, Republic of Macedonia, Republic of Armenia Indonesia Tunisia Philippines Lebanon Chile	50 49 47 47 44 42 39 38 37 36 36 36	0 0 0 0
Serbia and Montenegro International average Romania Cyprus Moldova, Republic of Macedonia, Republic of Armenia Indonesia Tunisia Philippines Lebanon Chile Morocco	50 49 47 47 44 42 39 38 37 36 36 36 33	0 0 0
Serbia and Montenegro International average Romania Cyprus Moldova, Republic of Macedonia, Republic of Armenia Indonesia Tunisia Philippines Lebanon Chile Morocco Bahrain	50 49 47 47 44 42 39 38 37 36 36 36 33 31	0 0 0 0
Serbia and Montenegro International average Romania Cyprus Moldova, Republic of Macedonia, Republic of Armenia Indonesia Tunisia Philippines Lebanon Chile Morocco Bahrain Iran, Islamic Republic of Jordan	50 49 47 47 44 42 39 38 37 36 36 36 33 31 29	0 0 0 0
Serbia and Montenegro International average Romania Cyprus Moldova, Republic of Macedonia, Republic of Armenia Indonesia Tunisia Philippines Lebanon Chile Morocco Bahrain Iran, Islamic Republic of	50 49 47 47 44 42 39 38 37 36 36 33 31 29 28	0 0 0 0
Serbia and Montenegro International average Romania Cyprus Moldova, Republic of Macedonia, Republic of Armenia Indonesia Tunisia Philippines Lebanon Chile Morocco Bahrain Iran, Islamic Republic of Jordan Egypt	50 49 47 47 44 42 39 38 37 36 36 33 31 29 28 23	0 0 0 0
Serbia and Montenegro International average Romania Cyprus Moldova, Republic of Macedonia, Republic of Armenia Indonesia Tunisia Philippines Lebanon Chile Morocco Bahrain Iran, Islamic Republic of Jordan Egypt Saudi Arabia	50 49 47 47 44 42 39 38 37 36 36 33 31 29 28 23 23	0 0 0 0
Serbia and Montenegro International average Romania Cyprus Moldova, Republic of Macedonia, Republic of Armenia Indonesia Tunisia Philippines Lebanon Chile Morocco Bahrain Iran, Islamic Republic of Jordan Egypt Saudi Arabia Palestinian Nat'l Auth.	50 49 47 47 44 42 39 38 37 36 36 36 33 31 29 28 23 23 21	0 0 0 0
Serbia and Montenegro International average Romania Cyprus Moldova, Republic of Macedonia, Republic of Armenia Indonesia Tunisia Philippines Lebanon Chile Morocco Bahrain Iran, Islamic Republic of Jordan Egypt Saudi Arabia Palestinian Nat'l Auth. South Africa	50 49 47 47 44 42 39 38 37 36 36 36 33 31 29 28 23 21 20	0 0 0 0
Serbia and Montenegro International average Romania Cyprus Moldova, Republic of Macedonia, Republic of Armenia Indonesia Tunisia Philippines Lebanon Chile Morocco Bahrain Iran, Islamic Republic of Jordan Egypt Saudi Arabia Palestinian Nat'l Auth. South Africa Botswana	50 49 47 47 44 42 39 38 37 36 36 36 33 31 29 28 23 21 20 19	0 0 0 0

Country average vs. International average:

0

 $\blacksquare$ 

Content Domain	Main Topic	Cognitive Domain
NUMBER	Whole Numbers	Solving Routine Problems

## The teachers plan to send 6 newsletters per year

The teachers at Parkway School plan to send 6 newsletters per year to each of the 620 families with children at the school. The newsletters each need 2 sheets of paper. The paper is sold in packs of 500 sheets.
What is the least number of packs of paper needed to print the school newsletter for the year?
Answer:

#### Item Number: M032652

#### **SCORING**

#### **Correct Response**

• 15

### **Incorrect Response**

- 14 or 14.88
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task).

# **Overall Percent Correct**

Armenia	60	
Netherlands	57	<b>A</b>
Singapore	57	
Hong Kong, SAR	53	
Belgium (Flemish)	46	
Japan	44	
Chinese Taipei	44	
Korea, Republic of	43	
United States	36	<b>A</b>
Hungary	35	<b>▲</b>
Slovak Republic	33	_
Scotland	32	<u> </u>
Estonia	32	<u> </u>
Sweden	30	<u> </u>
New Zealand	29	<u> </u>
Russian Federation	29	
Lithuania	29	_
Australia	29 28	<b>A</b>
England	27	0
Slovenia	24	0
Latvia	22	0
International average	21	
Italy	21	O
Bulgaria	20	0
9		
Israel	20	Ο
Israel Norway	20 20	O O
lsrael Norway Cyprus	20 20 18	O O
Israel Norway Cyprus Romania	20 20	O O
Israel Norway Cyprus Romania Serbia and Montenegro	20 20 18	O O
Israel Norway Cyprus Romania Serbia and Montenegro Macedonia, Republic of	20 20 18 14	O O
Israel Norway Cyprus Romania Serbia and Montenegro	20 20 18 14 13	O O
Israel Norway Cyprus Romania Serbia and Montenegro Macedonia, Republic of	20 20 18 14 13	O O
Israel Norway Cyprus Romania Serbia and Montenegro Macedonia, Republic of Moldova, Republic of	20 20 18 14 13 11	O O
Israel Norway Cyprus Romania Serbia and Montenegro Macedonia, Republic of Moldova, Republic of Malaysia	20 20 18 14 13 11 10 8	O O
Israel Norway Cyprus Romania Serbia and Montenegro Macedonia, Republic of Moldova, Republic of Malaysia Chile	20 20 18 14 13 11 10 8	O O
Israel Norway Cyprus Romania Serbia and Montenegro Macedonia, Republic of Moldova, Republic of Malaysia Chile Tunisia	20 20 18 14 13 11 10 8 8	O O
Israel Norway Cyprus Romania Serbia and Montenegro Macedonia, Republic of Moldova, Republic of Malaysia Chile Tunisia Jordan	20 20 18 14 13 11 10 8 8 8	O O
Israel Norway Cyprus Romania Serbia and Montenegro Macedonia, Republic of Moldova, Republic of Malaysia Chile Tunisia Jordan Lebanon	20 20 18 14 13 11 10 8 8 8 4 4	Ο
Israel Norway Cyprus Romania Serbia and Montenegro Macedonia, Republic of Moldova, Republic of Malaysia Chile Tunisia Jordan Lebanon Philippines	20 20 18 14 13 11 10 8 8 8 4 4 4 3	O O
Israel Norway Cyprus Romania Serbia and Montenegro Macedonia, Republic of Moldova, Republic of Malaysia Chile Tunisia Jordan Lebanon Philippines Indonesia	20 20 18 14 13 11 10 8 8 4 4 3 3 3	O O
Israel Norway Cyprus Romania Serbia and Montenegro Macedonia, Republic of Moldova, Republic of Malaysia Chile Tunisia Jordan Lebanon Philippines Indonesia South Africa	20 20 18 14 13 11 10 8 8 4 4 3 3	O O
Israel Norway Cyprus Romania Serbia and Montenegro Macedonia, Republic of Moldova, Republic of Malaysia Chile Tunisia Jordan Lebanon Philippines Indonesia South Africa Iran, Islamic Republic of Bahrain	20 20 18 14 13 11 10 8 8 8 4 4 3 3 3 3	O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O
Israel Norway Cyprus Romania Serbia and Montenegro Macedonia, Republic of Moldova, Republic of Malaysia Chile Tunisia Jordan Lebanon Philippines Indonesia South Africa Iran, Islamic Republic of	20 20 18 14 13 11 10 8 8 8 4 4 3 3 3 3 3	O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O
Israel Norway Cyprus Romania Serbia and Montenegro Macedonia, Republic of Moldova, Republic of Malaysia Chile Tunisia Jordan Lebanon Philippines Indonesia South Africa Iran, Islamic Republic of Bahrain	20 20 18 14 13 11 10 8 8 8 4 4 3 3 3 3	O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O
Israel Norway Cyprus Romania Serbia and Montenegro Macedonia, Republic of Moldova, Republic of Malaysia Chile Tunisia Jordan Lebanon Philippines Indonesia South Africa Iran, Islamic Republic of Bahrain Egypt Palestinian Nat'l Auth. Morocco	20 20 18 14 13 11 10 8 8 4 4 3 3 3 3 3 2	O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O
Israel Norway Cyprus Romania Serbia and Montenegro Macedonia, Republic of Moldova, Republic of Malaysia Chile Tunisia Jordan Lebanon Philippines Indonesia South Africa Iran, Islamic Republic of Bahrain Egypt Palestinian Nat'l Auth. Morocco Botswana	20 20 18 14 13 11 10 8 8 4 4 3 3 3 3 3 3 2 1 0	O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O
Israel Norway Cyprus Romania Serbia and Montenegro Macedonia, Republic of Moldova, Republic of Malaysia Chile Tunisia Jordan Lebanon Philippines Indonesia South Africa Iran, Islamic Republic of Bahrain Egypt Palestinian Nat'l Auth. Morocco	20 20 18 14 13 11 10 8 8 4 4 3 3 3 3 3 2	O O
Israel Norway Cyprus Romania Serbia and Montenegro Macedonia, Republic of Moldova, Republic of Malaysia Chile Tunisia Jordan Lebanon Philippines Indonesia South Africa Iran, Islamic Republic of Bahrain Egypt Palestinian Nat'l Auth. Morocco Botswana Ghana	20 20 18 14 13 11 10 8 8 4 4 3 3 3 3 3 3 2 1 0	O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O

#### Country average vs. International average:

Higher Not different 0 Lower  $\blacksquare$ 

## The teachers plan to send 6 newsletters per year (continued)

Item Number: M032652

## **Student Responses**

#### **Correct Response:**

The teachers at Parkway School plan to send 6 newsletters per year to each of the 620 families with children at the school. The newsletters each need 2 sheets of paper. The paper is sold in packs of 500 sheets.

What is the least number of packs of paper needed to print the school newsletter for the year?

## **Incorrect Response:**

The teachers at Parkway School plan to send 6 newsletters per year to each of the 620 families with children at the school. The newsletters each need 2 sheets of paper. The paper is sold in packs of 500 sheets.

What is the least number of packs of paper needed to print the school newsletter for the year?

Answer: 3 palle of 300

Content Domain	Main Topic	Cognitive Domain
NUMBER	Whole Numbers	Solving Routine Problems

## Garden with 14 rows of 20 plants each

A garden has 14 rows. Each row has 20 plants. The gardener then plants 6 more rows with 20 plants in each row.
How many plants are now there altogether?
Answer:

#### Item Number: M032671

#### **SCORING**

#### **Correct Response**

• 400 or equivalent.

#### **Incorrect Response**

• Incorrect (including crossed out/erased, stray marks, illegible, or off task).

# **Overall Percent Correct**

Singapore	91	
Netherlands	88	
Hong Kong, SAR	87	
Belgium (Flemish)	86	
Korea, Republic of	85	
Estonia	85	
Chinese Taipei	83	
Sweden	82	
Malaysia	81	
United States	78	
Latvia	78	
Russian Federation	78	
New Zealand	77	
Australia	76	
England	75	
Hungary	72	
Israel	72	
Lithuania	72	
Scotland	71	
Italy	71	
Slovenia	67	
Moldova, Republic of	66	
Cyprus	66	
Romania	65	
Bulgaria	63	O
Slovak Republic	63	O
Slovak Republic Japan	63 61	0
· '		_
Japan .	61 61 61	0
Japan Chile	61 61	0
Japan Chile Serbia and Montenegro International average Norway	61 61 61 61	0 0 0
Japan Chile Serbia and Montenegro International average Norway Macedonia, Republic of	61 61 61	0 0 0
Japan Chile Serbia and Montenegro International average Norway Macedonia, Republic of Indonesia	61 61 61 61	0 0 0
Japan Chile Serbia and Montenegro International average Norway Macedonia, Republic of Indonesia Tunisia	61 61 61 61 60 56 49	0 0 0
Japan Chile Serbia and Montenegro International average Norway Macedonia, Republic of Indonesia Tunisia Armenia	61 61 61 60 56 49 48 47	0 0 0
Japan Chile Serbia and Montenegro International average Norway Macedonia, Republic of Indonesia Tunisia Armenia Iran, Islamic Republic of	61 61 61 60 56 49 48 47 44	0 0 0
Japan Chile Serbia and Montenegro International average Norway Macedonia, Republic of Indonesia Tunisia Armenia Iran, Islamic Republic of Lebanon	61 61 61 60 56 49 48 47 44 43	0 0 0
Japan Chile Serbia and Montenegro International average Norway Macedonia, Republic of Indonesia Tunisia Armenia Iran, Islamic Republic of Lebanon Jordan	61 61 61 60 56 49 48 47 44 43 43	0 0 0 •
Japan Chile Serbia and Montenegro International average Norway Macedonia, Republic of Indonesia Tunisia Armenia Iran, Islamic Republic of Lebanon Jordan Bahrain	61 61 61 60 56 49 48 47 44 43 43	0 0 0
Japan Chile Serbia and Montenegro International average Norway Macedonia, Republic of Indonesia Tunisia Armenia Iran, Islamic Republic of Lebanon Jordan Bahrain Morocco	61 61 61 60 56 49 48 47 44 43 43 41 39	0 0 0 •
Japan Chile Serbia and Montenegro International average Norway Macedonia, Republic of Indonesia Tunisia Armenia Iran, Islamic Republic of Lebanon Jordan Bahrain Morocco Egypt	61 61 61 60 56 49 48 47 44 43 43 41 39 36	0 0 0 •
Japan Chile Serbia and Montenegro International average Norway Macedonia, Republic of Indonesia Tunisia Armenia Iran, Islamic Republic of Lebanon Jordan Bahrain Morocco Egypt Philippines	61 61 61 60 56 49 48 47 44 43 43 41 39 36 35	0 0 0 •
Japan Chile Serbia and Montenegro International average Norway Macedonia, Republic of Indonesia Tunisia Armenia Iran, Islamic Republic of Lebanon Jordan Bahrain Morocco Egypt Philippines Palestinian Nat'l Auth.	61 61 61 60 56 49 48 47 44 43 43 41 39 36 35 33	0 0 0 •
Japan Chile Serbia and Montenegro International average Norway Macedonia, Republic of Indonesia Tunisia Armenia Iran, Islamic Republic of Lebanon Jordan Bahrain Morocco Egypt Philippines Palestinian Nat'l Auth. Botswana	61 61 61 60 56 49 48 47 44 43 43 41 39 36 35 33 28	0 0 0 •
Japan Chile Serbia and Montenegro International average Norway Macedonia, Republic of Indonesia Tunisia Armenia Iran, Islamic Republic of Lebanon Jordan Bahrain Morocco Egypt Philippines Palestinian Nat'l Auth. Botswana Saudi Arabia	61 61 61 60 56 49 48 47 44 43 41 39 36 35 33 28 23	0 0 0 •
Japan Chile Serbia and Montenegro International average Norway Macedonia, Republic of Indonesia Tunisia Armenia Iran, Islamic Republic of Lebanon Jordan Bahrain Morocco Egypt Philippines Palestinian Nat'l Auth. Botswana Saudi Arabia South Africa	61 61 61 60 56 49 48 47 44 43 41 39 36 35 33 28 23 18	0 0 0 •
Japan Chile Serbia and Montenegro International average Norway Macedonia, Republic of Indonesia Tunisia Armenia Iran, Islamic Republic of Lebanon Jordan Bahrain Morocco Egypt Philippines Palestinian Nat'l Auth. Botswana Saudi Arabia	61 61 61 60 56 49 48 47 44 43 41 39 36 35 33 28 23	0 0 0 •

Country average vs. International average:

0

 $\blacksquare$ 

## Garden with 14 rows of 20 plants each (continued)

Item Number: M032671

# **Student Responses**

### **Correct Response:**

A garden has 14 rows. Each row has 20 plants. The gardener then plants 6 more rows with 20 plants in each row.

How many plants are now there altogether?

Answer:

# **Incorrect Response:**

A garden has 14 rows. Each row has 20 plants. The gardener then plants 6 more rows with 20 plants in each row.

How many plants are now there altogether?

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