

MATHEMATICS CONCEPTS MATHEMATICS ITEMS

The *Mathematics Concepts and Mathematics Items* book contains the released TIMSS mathematics assessment items. These are the released items from the 1999 and 2003 assessments (as distinct from the secure items, which are kept confidential so that they may be used in subsequent cycles to monitor trends).

Guide to Using the Mathematics Concepts and Mathematics Items Materials

The materials contained in this book can be used in a number of ways as a tool to assist teachers in making a formative assessment of student knowledge and skills. Some of these ways include the following:

Teacher-designed formative assessments. A teacher might, for example, decide to examine how well his or her class can solve routine problems. In such a case, the first step would be to review the questions in *Mathematics Concepts and Mathematics Items*, selecting the ones of interest. Ready-to-use versions of these items can be found in the *Mathematics Items* book. Teachers can print these items or present them to students on an overhead. Student responses can be scored by referring to the appropriate page in *Mathematics Concepts and Mathematics Items*. Teachers can also compare the overall percentage of students responding correctly to the international benchmark for that item.

Feedback on teaching. To the extent that the items coincide with concepts taught, the teacher might follow the same process to gain rapid feedback on the success of the teaching episode.

Understanding misunderstandings. Again, a teacher might decide to examine the incorrect or partially correct responses of the class for insight into any general misunderstandings, with a view to re-teaching a particular topic or skill.

Identifying individual difficulties. In the same way, the teacher might use the items to identify particular difficulties experienced by individual students, as the basis for some remedial teaching or focused practice.







This book contains the released items from both TIMSS 1999 and 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.

1999 Content Domains:

- · Fractions and number sense
- Algebra
- Measurement
- Geometry
- Data representation, analysis, and probability

2003 Content Domains:

- Algebra
- Data
- Geometry
- Measurement
- Number

1999 Cognitive Domains:

- Knowing
- Using routine procedures
- Investigating and problem solving
- · Mathematical reasoning
- Communicating

2003 Cognitive Domains:

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

Take a look at Calories in a portion of food from ratio, the name given to the first 1999 item in this book. As specified in boxes at the top of the page, the content domain for this item is fractions and number sense and the cognitive domain is investigating and solving problems. Looking at Value of -3x given value of x, the first item from TIMSS 2003 (page 85), 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. *Calories in a portion of food from ratio* provides an example of the letter code type—the correct answer is A.
- **Scoring guide**. This form is used to assist in scoring write-in responses. *Division of fractions* (J12) further along in the *Fractions and number sense* domain (page 13), provides an example of the scoring guide approach, indicating the general nature of correct and incorrect 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 TIMSS 2003 extended response items. An example of an actual U.S. eighth-grade student's response is provided for each scoring category. See item M032557 on page 89.

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	Cognitive Domain
Fractions and Number Sense	Investigating and Solving Problems

Calories in portion of food from ratio

If there are 300 calories in 100 g of a certain food, how many calories are there in a 30 g portion of this food?
A. 90
B. 100
C. 900
D. 1000
E. 9000

Item Number: B08

Overall Percent Correct

Singapore	90	A
Korea, Rep. of	86	<u> </u>
Hong Kong, SAR	84	_
Chinese Taipei	84	<u> </u>
Slovak Republic	78	<u> </u>
Malaysia	78	
Belgium (Flemish)	78	A
Czech Republic	76	<u> </u>
Russian Federation	76	<u> </u>
Thailand	75	<u> </u>
Slovenia	75	<u> </u>
Cyprus	74	<u> </u>
Macedonia, Rep. of	74	0
Italy	74	A
Moldova	73	0
Canada	73	A
Hungary	73	0
Romania	72	0
Australia	72	0
Netherlands	71	0
Latvia (LSS)	70	0
England	70	0
International Average	69	
Tunisia	69	0
New Zealand	69	0
Bulgaria	68	0
United States	68	0
Turkey	66	0
Israel	66	0
Iran, Islamic Rep.	66	0
Finland	65	\blacksquare
Japan	63	\blacksquare
Chile	62	\blacksquare
Jordan	56	* * * * * * * * * * * * * * * * * * *
Indonesia	56	\blacksquare
Lithuania	54	\blacksquare
Morocco	53	\blacksquare
Philippines	42	\blacksquare
South Africa	37	•

Country average vs. International average:

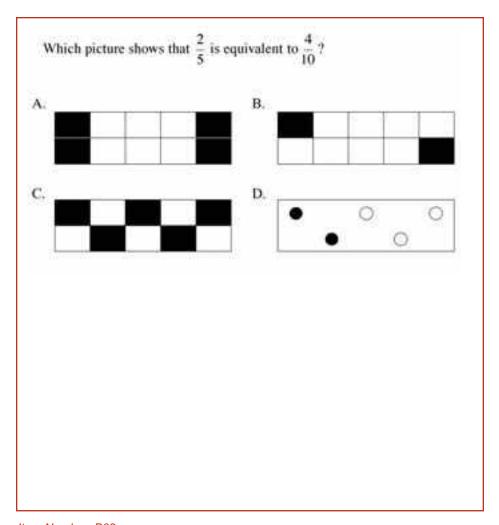
Higher Not different Cower

Correct Response:

Α

Content Domain	Cognitive Domain
Fractions and Number Sense	Using Complex Procedures

Figure showing equivalent fractions



Item Number: B09

Overall Percent Correct

Singapore	83	
Hong Kong, SAR	82	
Korea, Rep. of	81	
Japan	81	
Chinese Taipei	80	
Malaysia	76	
Belgium (Flemish)	74	
Canada	72	
Netherlands	69	
Slovenia	67	A A A A A
Australia	65	
Finland	63	
United States	63	
Cyprus	62	0
Russian Federation	62	0
Thailand	61	0
England	60	0
Italy	60	0
Israel	59	0
Philippines	58	0
		U
International Average	58	0
		0
International Average	58	0
International Average New Zealand	58 58	0
International Average New Zealand Iran, Islamic Rep.	58 58 56	0
International Average New Zealand Iran, Islamic Rep. Moldova	58 58 56 54	0
International Average New Zealand Iran, Islamic Rep. Moldova Hungary	58 58 56 54 53	0
International Average New Zealand Iran, Islamic Rep. Moldova Hungary Bulgaria	58 58 56 54 53 52	0
International Average New Zealand Iran, Islamic Rep. Moldova Hungary Bulgaria Slovak Republic	58 58 56 54 53 52 52	0
International Average New Zealand Iran, Islamic Rep. Moldova Hungary Bulgaria Slovak Republic Lithuania	58 58 56 54 53 52 52 51	0
International Average New Zealand Iran, Islamic Rep. Moldova Hungary Bulgaria Slovak Republic Lithuania Jordan	58 56 54 53 52 52 51 49	0
International Average New Zealand Iran, Islamic Rep. Moldova Hungary Bulgaria Slovak Republic Lithuania Jordan Latvia (LSS)	58 58 56 54 53 52 52 51 49 48	0
International Average New Zealand Iran, Islamic Rep. Moldova Hungary Bulgaria Slovak Republic Lithuania Jordan Latvia (LSS) Czech Republic	58 56 54 53 52 52 51 49 48 46	0
International Average New Zealand Iran, Islamic Rep. Moldova Hungary Bulgaria Slovak Republic Lithuania Jordan Latvia (LSS) Czech Republic Turkey	58 58 56 54 53 52 52 51 49 48 46 46	0
International Average New Zealand Iran, Islamic Rep. Moldova Hungary Bulgaria Slovak Republic Lithuania Jordan Latvia (LSS) Czech Republic Turkey Chile	58 58 56 54 53 52 52 51 49 48 46 46 46	0
International Average New Zealand Iran, Islamic Rep. Moldova Hungary Bulgaria Slovak Republic Lithuania Jordan Latvia (LSS) Czech Republic Turkey Chile Indonesia	58 58 56 54 53 52 52 51 49 48 46 46 46 46	0
International Average New Zealand Iran, Islamic Rep. Moldova Hungary Bulgaria Slovak Republic Lithuania Jordan Latvia (LSS) Czech Republic Turkey Chile Indonesia Macedonia, Rep. of	58 58 56 54 53 52 52 51 49 48 46 46 46 46 45	0
International Average New Zealand Iran, Islamic Rep. Moldova Hungary Bulgaria Slovak Republic Lithuania Jordan Latvia (LSS) Czech Republic Turkey Chile Indonesia Macedonia, Rep. of Romania	58 58 56 54 53 52 52 51 49 48 46 46 46 46 45	0
International Average New Zealand Iran, Islamic Rep. Moldova Hungary Bulgaria Slovak Republic Lithuania Jordan Latvia (LSS) Czech Republic Turkey Chile Indonesia Macedonia, Rep. of Romania Tunisia	58 58 56 54 53 52 52 51 49 48 46 46 46 46 44 33	0

Country average vs. International average:

Higher △
Not different ○
Lower ▼

Correct Response:

Α

Content Domain	Cognitive Domain
Fractions and Number Sense	Knowing

Smallest decimal fraction

Which of these is the smallest number?
A. 0.625
B. 0.25
C. 0.375
D. 0.5
E. 0.125

Item Number: B10

Overall Percent Correct

Singapore	86	A
Hong Kong, SAR	83	
Korea, Rep. of	82	<u> </u>
Netherlands	74	<u> </u>
Japan	73	
Finland	70	_
Chinese Taipei	69	A
Belgium (Flemish)	67	
Lithuania	61	
Canada	61	
Slovak Republic	60	
Czech Republic	59	
Malaysia	59	
Slovenia	58	A A A
Australia	58	
Hungary	55	
Russian Federation	53	0
United States	51	0
Latvia (LSS)	49	0
Bulgaria	46	0
Dulgaria	40	0
International Averag		
3		0
International Averag England Thailand	e 46	0
International Averag England	e 46 45	0
International Averag England Thailand	e 46 45 45	0
International Averag England Thailand New Zealand	45 45 45 43 37 34	0
International Average England Thailand New Zealand Italy Tunisia Morocco	45 45 45 43 37 34 31	0
International Average England Thailand New Zealand Italy Tunisia	e 46 45 45 43 37 34 31	0
International Average England Thailand New Zealand Italy Tunisia Morocco	e 46 45 45 43 37 34 31 31 29	0
International Average England Thailand New Zealand Italy Tunisia Morocco Moldova Israel Romania	45 45 45 43 37 34 31 31 29 28	0
International Average England Thailand New Zealand Italy Tunisia Morocco Moldova Israel	e 46 45 45 43 37 34 31 31 29 28 27	0
International Average England Thailand New Zealand Italy Tunisia Morocco Moldova Israel Romania Cyprus Jordan	e 46 45 45 43 37 34 31 31 29 28 27 26	0
International Average England Thailand New Zealand Italy Tunisia Morocco Moldova Israel Romania Cyprus Jordan Macedonia, Rep. of	e 46 45 45 43 37 34 31 31 29 28 27 26 25	0
International Average England Thailand New Zealand Italy Tunisia Morocco Moldova Israel Romania Cyprus Jordan Macedonia, Rep. of Chile	e 46 45 45 43 37 34 31 31 29 28 27 26 25 14	0
International Average England Thailand New Zealand Italy Tunisia Morocco Moldova Israel Romania Cyprus Jordan Macedonia, Rep. of Chile Iran, Islamic Rep.	e 46 45 45 43 37 34 31 31 29 28 27 26 25 14	0
International Average England Thailand New Zealand Italy Tunisia Morocco Moldova Israel Romania Cyprus Jordan Macedonia, Rep. of Chile Iran, Islamic Rep. Philippines	e 46 45 45 43 37 34 31 31 29 28 27 26 25 14 10	0
International Average England Thailand New Zealand Italy Tunisia Morocco Moldova Israel Romania Cyprus Jordan Macedonia, Rep. of Chile Iran, Islamic Rep. Philippines Indonesia	e 46 45 45 43 37 34 31 31 29 28 27 26 25 14 10 10 9	0
International Average England Thailand New Zealand Italy Tunisia Morocco Moldova Israel Romania Cyprus Jordan Macedonia, Rep. of Chile Iran, Islamic Rep. Philippines	e 46 45 45 43 37 34 31 31 29 28 27 26 25 14 10	0

Country average vs. International average:

Higher
Not different
Lower

Correct Response:

E

Content Domain	Cognitive Domain
Fractions and Number Sense	Using Complex Procedures

Smallest simple fraction

Which of these fractions is smallest?

- A. $\frac{1}{6}$
- B. $\frac{2}{3}$
- C. $\frac{1}{3}$
- D. $\frac{1}{2}$

Item Number: D09

Correct Response:

Α

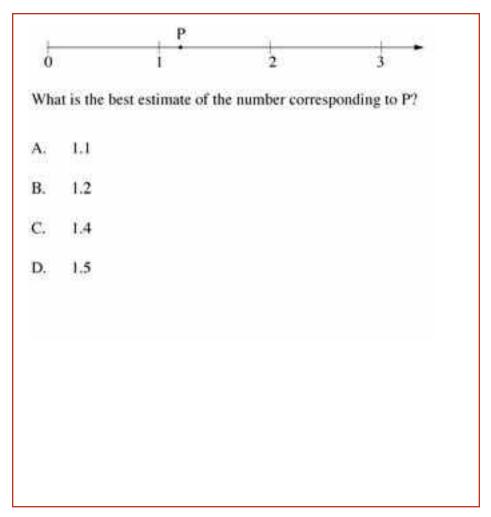
Overall Percent Correct

Hong Kong, SAR Singapore Japan Netherlands Finland Chinese Taipei Canada Korea, Rep. of Belgium (Flemish) Australia United States Slovenia New Zealand Israel Cyprus England Hungary Slovak Republic Czech Republic Malaysia	93 90 89 87 85 85 83 82 80 76 75 75 73 71 67 65 65	
International Average Tunisia	61	0
Tunisia Latvia (LSS) Russian Federation	61 61 59	0
Tunisia Latvia (LSS) Russian Federation Bulgaria	61 61 59 59	0
Tunisia Latvia (LSS) Russian Federation	61 61 59	0
Tunisia Latvia (LSS) Russian Federation Bulgaria Jordan	61 61 59 59 51	0
Tunisia Latvia (LSS) Russian Federation Bulgaria Jordan Lithuania	61 61 59 59 51	0
Tunisia Latvia (LSS) Russian Federation Bulgaria Jordan Lithuania Romania	61 61 59 59 51 50 47	0
Tunisia Latvia (LSS) Russian Federation Bulgaria Jordan Lithuania Romania	61 61 59 59 51 50 47 46	0
Tunisia Latvia (LSS) Russian Federation Bulgaria Jordan Lithuania Romania Italy Macedonia, Rep. of Iran, Islamic Rep. Thailand	61 61 59 59 51 50 47 46 44 43 42	0
Tunisia Latvia (LSS) Russian Federation Bulgaria Jordan Lithuania Romania Italy Macedonia, Rep. of Iran, Islamic Rep. Thailand Philippines	61 61 59 59 51 50 47 46 44 43 42 39	0
Tunisia Latvia (LSS) Russian Federation Bulgaria Jordan Lithuania Romania Italy Macedonia, Rep. of Iran, Islamic Rep. Thailand Philippines Turkey	61 61 59 59 51 50 47 46 44 43 42 39	0
Tunisia Latvia (LSS) Russian Federation Bulgaria Jordan Lithuania Romania Italy Macedonia, Rep. of Iran, Islamic Rep. Thailand Philippines Turkey Moldova	61 61 59 59 51 50 47 46 44 43 42 39 39	0
Tunisia Latvia (LSS) Russian Federation Bulgaria Jordan Lithuania Romania Italy Macedonia, Rep. of Iran, Islamic Rep. Thailand Philippines Turkey Moldova Indonesia	61 61 59 59 51 50 47 46 44 43 42 39 39 38	0
Tunisia Latvia (LSS) Russian Federation Bulgaria Jordan Lithuania Romania Italy Macedonia, Rep. of Iran, Islamic Rep. Thailand Philippines Turkey Moldova	61 61 59 59 51 50 47 46 44 43 42 39 39	0

Country average vs. International average:

Content Domain	Cognitive Domain
Fractions and Number Sense	Knowing

Estimate of point P on number line



Item Number: D12

Overall Percent Correct

Japan	93	A
Singapore	91	
Finland	90	
Netherlands	90	
England	88	
Hong Kong, SAR	86	
Belgium (Flemish)	84	
Canada	84	
Australia	83	
Chinese Taipei	81	
United States	81	
Korea, Rep. of	81	
Slovak Republic	80	
Hungary	80	
New Zealand	80	A
Malaysia	78	
Slovenia	78	
Latvia (LSS)	78	
Russian Federation	77	
Italy	68	O
International Average	68	
International Average Czech Republic	68 65	0
		0
Czech Republic	65	0
Czech Republic Israel Thailand Bulgaria	65 64	0 0
Czech Republic Israel Thailand	65 64 64	0 0
Czech Republic Israel Thailand Bulgaria	65 64 64 63 63 61	0 0
Czech Republic Israel Thailand Bulgaria Moldova Lithuania Turkey	65 64 64 63 63 61 59	0 0
Czech Republic Israel Thailand Bulgaria Moldova Lithuania	65 64 64 63 63 61 59	0 0
Czech Republic Israel Thailand Bulgaria Moldova Lithuania Turkey	65 64 64 63 63 61 59 54	0 0
Czech Republic Israel Thailand Bulgaria Moldova Lithuania Turkey Chile	65 64 64 63 63 61 59	0 0
Czech Republic Israel Thailand Bulgaria Moldova Lithuania Turkey Chile Romania Jordan Philippines	65 64 64 63 63 61 59 54	0 0
Czech Republic Israel Thailand Bulgaria Moldova Lithuania Turkey Chile Romania Jordan Philippines Macedonia, Rep. of	65 64 64 63 63 61 59 54 53	0 0
Czech Republic Israel Thailand Bulgaria Moldova Lithuania Turkey Chile Romania Jordan Philippines Macedonia, Rep. of Indonesia	65 64 64 63 63 61 59 54 53 51 49	0 0
Czech Republic Israel Thailand Bulgaria Moldova Lithuania Turkey Chile Romania Jordan Philippines Macedonia, Rep. of Indonesia Cyprus	65 64 64 63 63 61 59 54 53 53 51 49 46 44	0 0
Czech Republic Israel Thailand Bulgaria Moldova Lithuania Turkey Chile Romania Jordan Philippines Macedonia, Rep. of Indonesia Cyprus Morocco	65 64 64 63 63 61 59 54 53 53 51 49 46 44 43	0 0
Czech Republic Israel Thailand Bulgaria Moldova Lithuania Turkey Chile Romania Jordan Philippines Macedonia, Rep. of Indonesia Cyprus Morocco Tunisia	65 64 64 63 63 61 59 54 53 53 51 49 46 44 43 40	0 0
Czech Republic Israel Thailand Bulgaria Moldova Lithuania Turkey Chile Romania Jordan Philippines Macedonia, Rep. of Indonesia Cyprus Morocco Tunisia South Africa	65 64 64 63 63 61 59 54 53 51 49 46 44 43 40 38	0 0
Czech Republic Israel Thailand Bulgaria Moldova Lithuania Turkey Chile Romania Jordan Philippines Macedonia, Rep. of Indonesia Cyprus Morocco Tunisia	65 64 64 63 63 61 59 54 53 53 51 49 46 44 43 40	0

Country average vs. International average:

Higher △
Not different ○
Lower ▼

Correct Response:

Content Domain	Cognitive Domain
Fractions and Number Sense	Investigating and Solving Problems

Average speed from distance and time

A runner ran 3000 m in exactly 8 minutes. What was his average speed in meters per second?
A. 3.75
B. 6.25
C. 16.0
D. 37.5
E. 62.5

Item Number: F07

Overall Percent Correct

Singapore Chinese Taipei Hong Kong, SAR Japan Malaysia Russian Federation Belgium (Flemish) Korea, Rep. of Slovak Republic Bulgaria	67 61 60 50 47 45 44 43 42 41	A A A A A A A O
Slovenia Netherlands	41 40	0
Hungary Lithuania	40 34	0
International Averag		
Romania Canada Czech Republic Turkey Finland Australia Latvia (LSS) Moldova United States Thailand Indonesia Israel Tunisia Macedonia, Rep. of New Zealand Italy Cyprus England Jordan Iran, Islamic Rep. Chile Morocco	33 32 32 30 30 29 29 29 28 28 27 26 26 25 25 23 22 19 19	
South Africa Philippines	16 15	*

Country average vs. International average:

Higher A
Not different O
Lower

Note of the second of the

Correct Response:

Content Domain	Cognitive Domain
Fractions and Number Sense	Using Complex Procedures

Number between two decimal fractions

Which of these numbers is between 0.07 and 0.08?
A. 0.00075
B. 0.0075
C. 0.075
D. 0.75

Item Number: F09

Overall Percent Correct

Singapore	87	
Netherlands	85	
Korea, Rep. of	84	
Belgium (Flemish)	84	
Japan	83	
Chinese Taipei	82	
Hong Kong, SAR	81	
Finland	80	A
Canada	78	
Australia	76	
Slovenia	75	
Slovak Republic	74	
England	71	
Lithuania	71	
Czech Republic	70	
Malaysia	70	
United States	70	
Hungary	69	
Russian Federation	69	0
New Zealand	68	O
Bulgaria	67	0
Latvia (LSS)	66	0
International Average	63	
Italy	59	0
Israel	57	\blacksquare
Macedonia, Rep. of	56	•
Moldova	56	_
Thailand	54	_
Cyprus	53	_
Romania	52	_
Tunisia	48	_
Chile	42	_
Indonesia	40	_
Morocco	39	* * * * * * * * * * * * * * * * * * *
Jordan	37	_
Turkey	35	•
	2.4	_
Philippines South Africa	34 33	T

Country average vs. International average:

Iran, Islamic Rep.

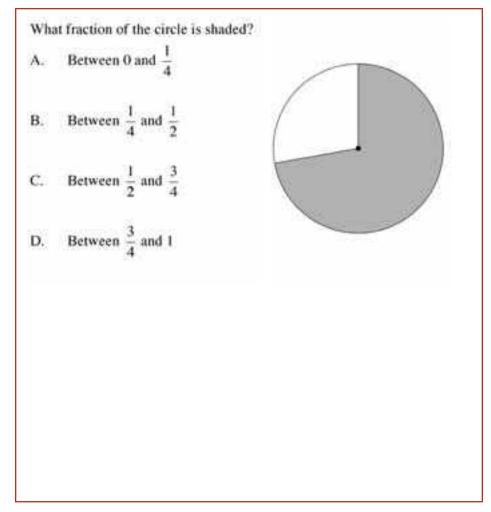
Higher Not different **▲** ○ Lower

Correct Response:

C

Content Domain	Cognitive Domain
Fractions and Number Sense	Knowing

Fraction of circle shaded



Item Number: F12

Overall Percent Correct

Netherlands	75	
Belgium (Flemish)	73	
England	72	
Hong Kong, SAR	72	
Singapore	71	
Canada	68	
Australia	68	
New Zealand	64	▲ ▲
United States	62	
Chinese Taipei	61	
Japan	61	
Slovenia	59	
Finland	57	
Hungary	56	
Israel	54	0
Bulgaria	53	0
Czech Republic	51	0
Malaysia	50	0
Cyprus	50	0
International Average	50	
iliterilational Average	วบ	
	50	0
Korea, Rep. of Russian Federation		0
Korea, Rep. of Russian Federation	50	0
Korea, Rep. of Russian Federation Slovak Republic	50 50	0
Korea, Rep. of Russian Federation Slovak Republic Italy	50 50 49	0 0 0
Korea, Rep. of Russian Federation Slovak Republic	50 50 49 48	0 0 0
Korea, Rep. of Russian Federation Slovak Republic Italy Latvia (LSS) Tunisia	50 50 49 48 44	0 0 0
Korea, Rep. of Russian Federation Slovak Republic Italy Latvia (LSS)	50 50 49 48 44 43	0 0 0
Korea, Rep. of Russian Federation Slovak Republic Italy Latvia (LSS) Tunisia Jordan	50 50 49 48 44 43	0 0 0
Korea, Rep. of Russian Federation Slovak Republic Italy Latvia (LSS) Tunisia Jordan Romania	50 50 49 48 44 43 40	0 0 0
Korea, Rep. of Russian Federation Slovak Republic Italy Latvia (LSS) Tunisia Jordan Romania Thailand	50 50 49 48 44 43 40 40 39	0 0 0
Korea, Rep. of Russian Federation Slovak Republic Italy Latvia (LSS) Tunisia Jordan Romania Thailand Indonesia	50 50 49 48 44 43 40 40 39 39	0 0 0
Korea, Rep. of Russian Federation Slovak Republic Italy Latvia (LSS) Tunisia Jordan Romania Thailand Indonesia Moldova Morocco	50 50 49 48 44 43 40 40 39 39 34	0 0 0
Korea, Rep. of Russian Federation Slovak Republic Italy Latvia (LSS) Tunisia Jordan Romania Thailand Indonesia Moldova	50 50 49 48 44 43 40 40 39 39 34 33	0 0 0
Korea, Rep. of Russian Federation Slovak Republic Italy Latvia (LSS) Tunisia Jordan Romania Thailand Indonesia Moldova Morocco Iran, Islamic Rep. Chile	50 50 49 48 44 43 40 40 39 39 34 33 32	0 0 0
Korea, Rep. of Russian Federation Slovak Republic Italy Latvia (LSS) Tunisia Jordan Romania Thailand Indonesia Moldova Morocco Iran, Islamic Rep.	50 50 49 48 44 43 40 40 39 39 34 33 32	0 0 0
Korea, Rep. of Russian Federation Slovak Republic Italy Latvia (LSS) Tunisia Jordan Romania Thailand Indonesia Moldova Morocco Iran, Islamic Rep. Chile Philippines Lithuania	50 50 49 48 44 43 40 40 39 39 34 33 32 32 31	0 0 0
Korea, Rep. of Russian Federation Slovak Republic Italy Latvia (LSS) Tunisia Jordan Romania Thailand Indonesia Moldova Morocco Iran, Islamic Rep. Chile Philippines Lithuania Turkey	50 50 49 48 44 43 40 40 39 39 34 33 32 32 31 31	0 0 0
Korea, Rep. of Russian Federation Slovak Republic Italy Latvia (LSS) Tunisia Jordan Romania Thailand Indonesia Moldova Morocco Iran, Islamic Rep. Chile Philippines Lithuania	50 50 49 48 44 43 40 40 39 39 34 33 32 32 31 31 28	0 0 0

Country average vs. International average:

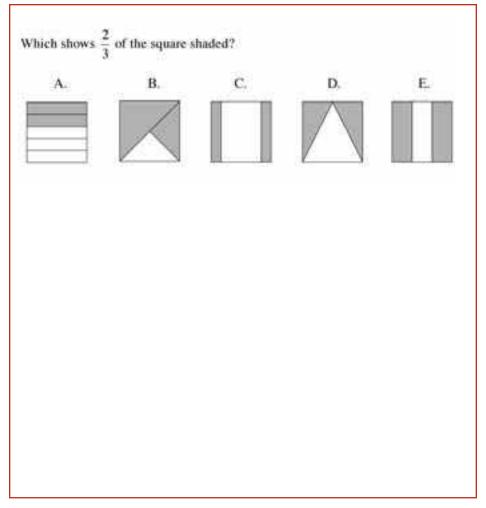
Higher △
Not different ○
Lower ▼

Correct Response:

C

Content Domain	Cognitive Domain
Fractions and Number Sense	Knowing

Figure showing fraction of shaded square



Item Number: H08

Overall Percent Correct

Singapore	96	<u> </u>
Belgium (Flemish)	94	A
Hong Kong, SAR	94	<u> </u>
Netherlands	92	
Canada	91	
Japan	89	
Chinese Taipei	88	
Finland	87	A
Korea, Rep. of	87	
Cyprus	87	
United States	86	
Malaysia	86	
Australia	85	
England	82	A
New Zealand	80	
Hungary	78	
Slovenia	78	
Iran, Islamic Rep.	76	
Israel	73	0
Slovak Republic	72	0
Thailand	71	0
'	71	0
Thailand	71	0
Thailand International Averag	71 e 68	
Thailand International Average Latvia (LSS)	71 e 68 66	0
Thailand International Average Latvia (LSS) Czech Republic	71 e 68 66 65	0 0
Thailand International Average Latvia (LSS) Czech Republic Italy	71 e 68 66 65 63	0 0
Thailand International Average Latvia (LSS) Czech Republic Italy Russian Federation	71 e 68 66 65 63 61	0 0
Thailand International Average Latvia (LSS) Czech Republic Italy Russian Federation Bulgaria	71 e 68 66 65 63 61 59	0 0
Thailand International Average Latvia (LSS) Czech Republic Italy Russian Federation Bulgaria Chile	71 e 68 66 65 63 61 59 57	0 0
Thailand International Average Latvia (LSS) Czech Republic Italy Russian Federation Bulgaria Chile Jordan Turkey	71 e 68 66 65 63 61 59 57	0 0
Thailand International Average Latvia (LSS) Czech Republic Italy Russian Federation Bulgaria Chile Jordan	71 1e 68 66 65 63 61 59 57 54 53	0 0
Thailand International Average Latvia (LSS) Czech Republic Italy Russian Federation Bulgaria Chile Jordan Turkey Macedonia, Rep. of	71 e 68 66 65 63 61 59 57 54 53 49	0 0
Thailand International Average Latvia (LSS) Czech Republic Italy Russian Federation Bulgaria Chile Jordan Turkey Macedonia, Rep. of Tunisia	71 e 68 66 65 63 61 59 57 54 53 49 48	0 0
Thailand International Average Latvia (LSS) Czech Republic Italy Russian Federation Bulgaria Chile Jordan Turkey Macedonia, Rep. of Tunisia Philippines	71 e 68 66 65 63 61 59 57 54 53 49 48 46	0 0
Thailand International Average Latvia (LSS) Czech Republic Italy Russian Federation Bulgaria Chile Jordan Turkey Macedonia, Rep. of Tunisia Philippines Lithuania	71 e 68 66 65 63 61 59 57 54 53 49 48 46 45	0 0
Thailand International Average Latvia (LSS) Czech Republic Italy Russian Federation Bulgaria Chile Jordan Turkey Macedonia, Rep. of Tunisia Philippines Lithuania Moldova	71 e 68 66 65 63 61 59 57 54 53 49 48 46 45 43	0 0
Thailand International Average Latvia (LSS) Czech Republic Italy Russian Federation Bulgaria Chile Jordan Turkey Macedonia, Rep. of Tunisia Philippines Lithuania Moldova Romania	71 1e 68 66 65 63 61 59 57 54 53 49 48 46 45 43 41 31	0 0
Thailand International Average Latvia (LSS) Czech Republic Italy Russian Federation Bulgaria Chile Jordan Turkey Macedonia, Rep. of Tunisia Philippines Lithuania Moldova Romania Indonesia	71	0

Country average vs. International average:

Higher △
Not different ○
Lower ▼

Correct Response:

E

Content Domain	Cognitive Domain
Fractions and Number Sense	Using Complex Procedures

Sum closest to 691 + 208

W 201 + 200 1 1 + + + + 1
The sum 691 + 208 is closest to the sum
A. 600 + 200
B. 700 + 200
C. 700 + 300
D. 900 + 200

Item Number: H09

Correct Response:

В

Overall Percent Correct

Singapore	97	
Belgium (Flemish)	96	
Japan	95	
Netherlands	95	
Hong Kong, SAR	93	
Canada	93	
United States	93	
Hungary	93	
Korea, Rep. of	93	
Slovenia	92	
England	92	
Czech Republic	91	
Australia	91	
Finland	91	
Slovak Republic	90	
Chinese Taipei	89	
New Zealand	88	
Malaysia	88	
Latvia (LSS)	87	
Bulgaria	86	
Cyprus	85	
Lithuania	84	0
Russian Federation	83	0
Israel	83	0
International Average	e 80	
Macedonia, Rep. of	79	0
I a a		

Macedonia, Rep. of	79	0
Italy	77	0
Thailand	77	0
Turkey	74	•
Romania	73	•
Tunisia	67	•
Jordan	66	•
Moldova	66	\blacksquare
Chile	65	•
Iran, Islamic Rep.	58	•
Indonesia	54	\blacksquare
Philippines	53	•
Morocco	43	\blacksquare
South Africa	37	\blacksquare

Country average vs. International average:

Content Domain	Cognitive Domain
Fractions and Number Sense	Using Routine Procedures

Division of fractions

D 1	6		3	
Divide:	 55	÷	$\frac{-}{25}$	=

Answer:	
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Item Number: J12

SCORING

Correct Response

- 10/11
- Other fractions or decimals equivalent to 10/11 (e.g., 30/33, 150/165, .909, .91, etc.)

Incorrect Response

- Any fraction with 2 as a numerator [Divides 6 by 3]
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task)

Overall Percent Correct

Singapore	84	A
Chinese Taipei	83	
Hong Kong, SAR	81	<u> </u>
Korea, Rep. of	80	<u> </u>
Japan	79	_
Slovenia	74	_
Russian Federation	72	A
Bulgaria	72	_
Slovak Republic	71	_
Latvia (LSS)	68	_
Hungary	66	A A A
Romania	65	_
Lithuania	64	
Italy	63	
Belgium (Flemish)	58	
Moldova	57	
Czech Republic	56	0
Malaysia	54	▲ ▲ ▲ ○
International Averag	e 45	
Turkey	41	0
Turkey		0
Thailand	40	0
,		O ▼
Thailand	40	○ ▼ ▼
Thailand United States	40 37	○ ▼ ▼
Thailand United States Iran, Islamic Rep. Canada Jordan	40 37 34	○▼▼▼
Thailand United States Iran, Islamic Rep. Canada	40 37 34 32	○ ▼ ▼ ▼
Thailand United States Iran, Islamic Rep. Canada Jordan Tunisia Chile	40 37 34 32 32 29 26	○▼▼▼▼
Thailand United States Iran, Islamic Rep. Canada Jordan Tunisia	40 37 34 32 32 29 26 24	<!--</td-->
Thailand United States Iran, Islamic Rep. Canada Jordan Tunisia Chile Indonesia Macedonia, Rep. of	40 37 34 32 32 29 26 24 24	0 V V V
Thailand United States Iran, Islamic Rep. Canada Jordan Tunisia Chile Indonesia Macedonia, Rep. of Australia	40 37 34 32 32 29 26 24 24 23	0 V V V V
Thailand United States Iran, Islamic Rep. Canada Jordan Tunisia Chile Indonesia Macedonia, Rep. of Australia Israel	40 37 34 32 32 29 26 24 24 23 22	0VVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVVV<l< td=""></l<>
Thailand United States Iran, Islamic Rep. Canada Jordan Tunisia Chile Indonesia Macedonia, Rep. of Australia Israel Cyprus	40 37 34 32 32 29 26 24 24 23 22 21	<!--</td-->
Thailand United States Iran, Islamic Rep. Canada Jordan Tunisia Chile Indonesia Macedonia, Rep. of Australia Israel Cyprus Finland	40 37 34 32 32 29 26 24 24 23 22 21	· · · · · · · · · · · · · · · · · · ·
Thailand United States Iran, Islamic Rep. Canada Jordan Tunisia Chile Indonesia Macedonia, Rep. of Australia Israel Cyprus Finland Netherlands	40 37 34 32 32 29 26 24 24 23 22 21 17	· · · · · · · · · · · · · · · · · · ·
Thailand United States Iran, Islamic Rep. Canada Jordan Tunisia Chile Indonesia Macedonia, Rep. of Australia Israel Cyprus Finland Netherlands Philippines	40 37 34 32 32 29 26 24 24 23 22 21 17 12	· · · · · · · · · · · · · · · · · · ·
Thailand United States Iran, Islamic Rep. Canada Jordan Tunisia Chile Indonesia Macedonia, Rep. of Australia Israel Cyprus Finland Netherlands Philippines New Zealand	40 37 34 32 32 29 26 24 24 23 22 21 17 12 11	· · · · · · · · · · · · · · · · · · ·
Thailand United States Iran, Islamic Rep. Canada Jordan Tunisia Chile Indonesia Macedonia, Rep. of Australia Israel Cyprus Finland Netherlands Philippines New Zealand South Africa	40 37 34 32 32 29 26 24 24 23 22 21 17 12 11 10 5	· · · · · · · · · · · · · · · · · · ·
Thailand United States Iran, Islamic Rep. Canada Jordan Tunisia Chile Indonesia Macedonia, Rep. of Australia Israel Cyprus Finland Netherlands Philippines New Zealand	40 37 34 32 32 29 26 24 24 23 22 21 17 12 11	

Country average vs. International average:

Content Domain	Cognitive Domain
Fractions and Number Sense	Using Routine Procedures

Division of decimals

Divide 0.003)15.45	
A. 0.515	
B. 5.15	
C. 51.5	
D. 515	
E. 5150	

Item Number: J14

Overall Percent Correct

Japan Slovak Republic Russian Federation Hong Kong, SAR Lithuania Chinese Taipei Hungary Korea, Rep. of Latvia (LSS) Slovenia Moldova Bulgaria Czech Republic Belgium (Flemish) Singapore Netherlands Romania	70 69 68 66 65 64 63 61 54 54 53 53 52 45 44	
International Averag		
United States	39	0
Canada	39	0
Malaysia	39	0
Macedonia, Rep. of	38	0
Italy	36	0
Jordan	30	\blacksquare
Finland	29	\blacksquare
Cyprus	26	\blacksquare
Indonesia	24	\blacksquare
Israel	24	\blacksquare
Thailand	23	\blacksquare
New Zealand	21	\blacksquare
Tunisia	21	\blacksquare
Philippines	20	\blacksquare
Australia	20	\blacksquare
South Africa	19	\blacksquare
Chile	18	O V
England	16	\blacksquare
Turkey	15	\blacksquare
Iran, Islamic Rep.	14	\blacksquare
Morocco	14	▼

Country average vs. International average:

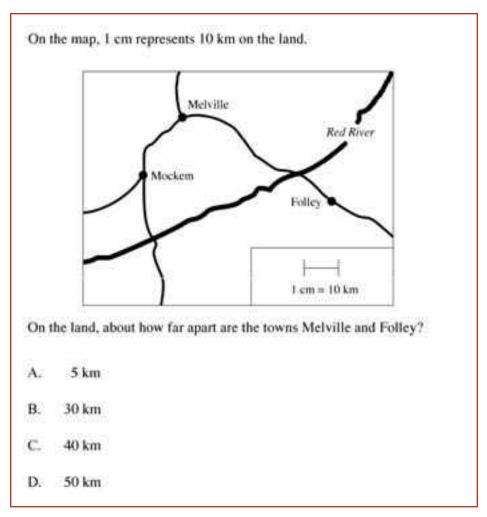
Higher △
Not different ○
Lower ▼

Correct Response:

E

Content Domain	Cognitive Domain
Fractions and Number Sense	Using Complex Procedures

Distance between towns from map



Item Number: J18

Overall Percent Correct

Japan	85	
Belgium (Flemish)	83	
Singapore	82	
Malaysia	77	
Lithuania	75	
Chinese Taipei	70	
Slovenia	70	
Netherlands	70	
Latvia (LSS)	68	
Russian Federation	68	
Czech Republic	67	0
Canada	65	
Hungary	65	0
Moldova	64	0
Bulgaria	64	0
Australia	64	0
Italy	63	0
England	62	0
Finland	61	0
Cyprus	61	0
Slovak Republic	61	0
Korea, Rep. of	60	0
New Zealand	58	0
International Averag	e 57	
Thailand	56	0
Tunisia	54	0
Romania	51	0
Jordan	46	•
Indonesia	44	\blacksquare
Israel	44	\blacksquare
Macedonia, Rep. of	43	\blacksquare
United States	40	\blacksquare
Iran, Islamic Rep.	37	* * * * * * * * * * * * * * * * * * *
Turkey	35	\blacksquare
Chile	30	\blacksquare
South Africa	26	\blacksquare
Morocco	25	\blacksquare
Philippines	24	\blacksquare
I		

Country average vs. International average:

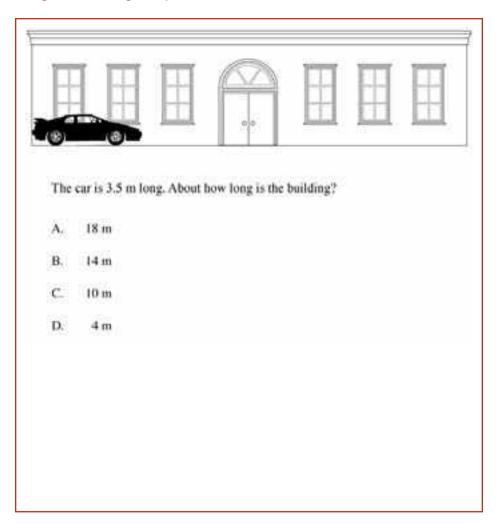
Higher △
Not different ○
Lower ▼

Correct Response:

D

Content Domain	Cognitive Domain
Fractions and Number Sense	Using Complex Procedures

Length of building compared to car



Item Number: L09

Overall Percent Correct

Singapore	91	A
Malaysia	90	A
Czech Republic	89	A
Slovak Republic	88	A
Hungary	88	A
Russian Federation	88	A
Finland	87	A
Chinese Taipei	87	A
Korea, Rep. of	87	A
Lithuania	87	A
Latvia (LSS)	86	A
Belgium (Flemish)	85	A
Japan	84	A
Hong Kong, SAR	83	A
Australia	83	A
Bulgaria	83	A
Netherlands	82	A
Slovenia	82	0
Canada	79	0
New Zealand	78	0
England	76	0
Romania	76	0
Moldova	75	0
International Average		
Thailand	73	0
Italy	73	0
United States	72	0
Cyprus	71	0
Tunisia	70	0
Macedonia, Rep. of	69	0
Turkey	68	▼
Israel	68	▼
Iran, Islamic Rep.	61	▼
Chile	60	▼
Indonesia	59	▼
Jordan	56	▼
Morocco	43	▼
Philippines	40	* * * * * * * *
C L	20	_
South Africa	26	•

Country average vs. International average:

Higher △
Not different ○
Lower ▼

Correct Response:

Content Domain	Cognitive Domain
Fractions and Number Sense	Knowing

Two hundred six and nine-tenths

Which number is two hundred six and nine-tenths?
A. 206.09
B. 206.9
C. 206.910
D. 2006.9

Item Number: L10

Overall Percent Correct

	Hungary	97	A
	Russian Federation	93	<u> </u>
	Slovak Republic	90	<u> </u>
	Belgium (Flemish)	87	
	Iran, Islamic Rep.	83	
	Moldova	81	<u> </u>
	United States	80	<u> </u>
	Netherlands	79	<u> </u>
	Korea, Rep. of	78	
	Canada	77	
	Czech Republic	75	_ ▲
	Jordan	75	<u> </u>
	Lithuania	73	0
	Turkey	72	
	Singapore	72	0
	Chinese Taipei	72	
	Bulgaria '	71	0
	Romania	71	0
	Finland	70	0
	Hong Kong, SAR	68	0
	Australia	67	0
	Italy	66	0
	International Average	e 65	
	Israel	62	0
	Japan	62	0
	Slovenia	61	0
	Chile	60	0
	Malaysia	56	\blacksquare
	Latvia (LSS)	55	0
	Cyprus	54	\blacksquare
	England	53	\blacksquare
	New Zealand	53	\blacksquare
	Tunisia	43	\blacksquare
	Macedonia, Rep. of	42	\blacksquare
	Philippines	42	\blacksquare
	Morocco	41	\blacksquare
	Thailand	40	0 V V V V
	South Africa	31	\blacksquare
1	Indonesia	23	_

Country average vs. International average:

Higher △
Not different ○
Lower ▼

Correct Response:

Content Domain	Cognitive Domain
Fractions and Number Sense	Using Routine Procedures

Subtraction with three fractions

What is the value of $\frac{4}{5}$ - $\frac{1}{3}$ - $\frac{1}{15}$?

- A. $\frac{1}{5}$
- B. $\frac{2}{5}$
- C. $\frac{7}{15}$
- D. $\frac{3}{4}$
- E. $\frac{4}{5}$

Item Number: L18

Overall Percent Correct

Singapore	87	
Chinese Taipei	81	
Korea, Rep. of	81	
Belgium (Flemish)	78	
Hong Kong, SAR	77	
Japan	75	
Malaysia	71	
Russian Federation	64	
Slovenia	63	
Slovak Republic	62	0
Hungary	60	0
Lithuania	58	0
Canada	57	0
Czech Republic	55	0
Netherlands	55	0
United States	55	Ο
International Averag	e 52	

		_
International Average	52	
Indonesia	51	O
Finland	51	O
Thailand	51	O
Latvia (LSS)	50	O
Romania	50	O
Bulgaria	48	O
Australia	48	O
Cyprus	47	O
Israel	44	\blacksquare
Turkey	44	\blacksquare
Moldova	43	O
Italy	43	▼
New Zealand	41	
Jordan	40	\blacksquare
Macedonia, Rep. of	37	\blacksquare
Iran, Islamic Rep.	36	•
Tunisia	36	\blacksquare
Philippines	35	
England	34	\blacksquare
Chile	32	\blacksquare
South Africa	23	\blacksquare
Morocco	16	\blacksquare

Country average vs. International average:

Higher
Not different
Lower

Correct Response:

Content Domain	Cognitive Domain
Fractions and Number Sense	Using Routine Procedures

Number of cars from rounded value

A company produced 17,175 cars in 1996. For a report, this number was rounded to the nearest hundred. Which was the number of cars given in the report?

A. 17,000

B. 17,100

C. 17,200

D. 17,270

Item Number: N11

Overall Percent Correct

96	A
96	
94	
94	
94	
93	
93	
92	
92	
90	
89	
89	
87	
86	
86	
86	
82	
82	
81	
80	0
79	
76	0
e 74	
72	0
72	0
72	0
68	0
65	○▼▼
64	\blacksquare
	96 94 94 94 93 93 92 92 90 89 87 86 86 82 82 81 80 79 76 e 74 72 72 68 65

Country average vs. International average:

59

55

51

49 38

30

30

Turkey

Chile Jordan

Philippines

South Africa Tunisia

Iran, Islamic Rep.

Moldova

Morocco

Higher △
Not different ○
Lower ▼

Correct Response:

C

Content Domain	Cognitive Domain
Fractions and Number Sense	Knowing

List of equivalent fractions

In which list of fractions are all of the fractions equivalent?

A.
$$\frac{1}{2}$$
 , $\frac{2}{4}$, $\frac{4}{6}$

B.
$$\frac{2}{3}$$
 , $\frac{4}{6}$, $\frac{8}{12}$

C.
$$\frac{2}{5}$$
 , $\frac{4}{10}$, $\frac{8}{50}$

D.
$$\frac{3}{4}$$
 , $\frac{4}{6}$, $\frac{6}{8}$

Item Number: N14

Correct Response:

В

Overall Percent Correct

Korea, Rep. of	86	
Chinese Taipei	85	
Hong Kong, SAR	84	
Singapore	84	
Belgium (Flemish)	83	
Japan	82	
Netherlands	74	
Canada	72	
Russian Federation	71	
Hungary	70	0
Bulgaria	68	0
Malaysia	68	0
Slovak Republic	67	O
Latvia (LSS)	66	O
Lithuania	66	O
Slovenia	65	O
Cyprus	64	O
United States	63	O
Australia	63	O
Finland	61	O
International Average	61	
Czech Republic	60	0

International Average	61	
Czech Republic	60	0
Israel	59	O
Italy	57	O
Thailand	57	O
Jordan	55	0
Romania	55	0
New Zealand	51	\blacksquare
England	51	\blacksquare
Moldova	50	\blacksquare
Iran, Islamic Rep.	49	\blacksquare
Tunisia	49	\blacksquare
Indonesia	48	\blacksquare
Turkey	45	\blacksquare
Macedonia, Rep. of	44	\blacksquare
Philippines	42	\blacksquare
Chile	41	\blacksquare
South Africa	34	\blacksquare
Morocco	32	\blacksquare

Country average vs. International average:

Higher 0 Not different Lower

Content Domain	Cognitive Domain
Fractions and Number Sense	Investigating and Solving Problems

Number of marbles in bag

Penny had a bag of marbles. She gave one-third of them to Rebecca, and then one-fourth of the remaining marbles to John. Penny then had 24 marbles left in the bag. How many marbles were in the bag to start with?

A. 36

B. 48

C. 60

D. 96

Item Number: N16

Overall Percent Correct

Singapore Japan Korea, Rep. of Chinese Taipei Hong Kong, SAR Netherlands Finland Belgium (Flemish) New Zealand Australia Malaysia England Slovak Republic Thailand Canada Hungary Czech Republic	81 64 64 60 60 53 53 52 49 48 47 46 45 45 45	
International Average	44	
Philippines	43	0
Bulgaria	43	0
Russian Federation	42	0
Israel	42	0
Moldova	41	0
Latvia (LSS)	41	0
United States	41	0
Slovenia	39	0
Romania	38	0
Turkey	38	0
Italy	38	0
Indonesia	37	0
Cyprus	36	0
Macedonia, Rep. of	35	\blacksquare
Morocco	34	\blacksquare
Jordan	33	\blacksquare
Tunisia	33	* * * * * * * * * * * * * * * * * * *
Lithuania	32	\blacksquare
South Africa	31	\blacksquare
Iran, Islamic Rep.	31	\blacksquare
Chile	30	•

Country average vs. International average:

Higher 0 Not different Lower

Correct Response:

Content Domain	Cognitive Domain
Fractions and Number Sense	Investigating and Solving Problems

Amount of paint left

Item Number: N17

Overall Percent Correct

Singapore	65	
Chinese Taipei	63	
Hong Kong, SAR	56	
Malaysia	54	A
Korea, Rep. of	53	
Netherlands .	49	
Japan	47	
Czech Republic	43	0
Hungary	40	0
Bulgaria	39	0
Russian Federation	39	0
Lithuania	39	0
Belgium (Flemish)	39	0
Slovak Republic	39	0
Canada	36	0
Slovenia	36	0
International Averag	e 35	
United States	35	0
Finland	34	0
Cyprus	33	0
Australia	32	0
Latvia (LSS)	31	0
Turkey	29	0
Romania	29	0
Moldova	29	0
New Zealand	29	0
Macedonia, Rep. of	28	0
Italy	27	0
England	27	0
Tunisia	26	\blacksquare
Israel	25	\blacksquare
Iran, Islamic Rep.	25	\blacksquare
Morocco	23	\blacksquare
Indonesia	22	O V
Chile	22	\blacksquare
Jordan	21	\blacksquare
Philippines	20	\blacksquare
South Africa	18	\blacksquare

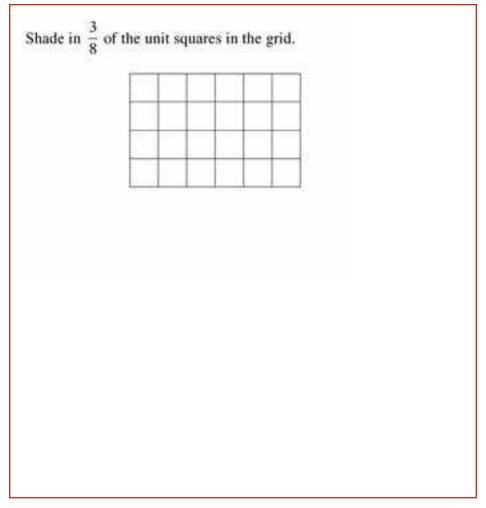
Country average vs. International average:

Higher
Not different
Lower

Correct Response:

Content Domain	Cognitive Domain
Fractions and Number Sense	Knowing

Shade in 3/8 of squares in grid



Item Number: N19

SCORING

Correct Response

- 9 squares are shaded (regardless of which squares)
- Other correct (e.g., 6 full squares and 6 half squares shaded or other equivalent of nine squares)

Incorrect Response

- 3 squares shaded
- 8 squares shaded
- 11 or 13 squares shaded
- 3 squares shaded and 8 more squares shaded (areas are shaded separately)
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task)

Overall Percent Correct

Singapore	89	
Hong Kong, SAR	87	
Belgium (Flemish)	87	
Korea, Rep. of	81	
Chinese Taipei	80	
Japan	78	
Malaysia	73	
Canada	68	
Finland	65	
Hungary	63	
Netherlands	61	O
Australia	60	
Slovenia	55	O
Bulgaria	54	0
Cyprus	54	0
England	52	0
Slovak Republic	52	0
Russian Federation	52	0
United States	49	0
International Averag	e 49	
Thailand	49	0
Thailand New Zealand	49 46	0
New Zealand	46	0
New Zealand Italy	46 46	0
New Zealand Italy Latvia (LSS)	46 46 46	0 0
New Zealand Italy Latvia (LSS) Moldova	46 46 46 44	0 0 0 0 0
New Zealand Italy Latvia (LSS) Moldova Czech Republic	46 46 46 44 42	0 0 0 0 0 0 0 0
New Zealand Italy Latvia (LSS) Moldova Czech Republic Israel	46 46 46 44 42 40	0 0 0 0 0 0 0 0
New Zealand Italy Latvia (LSS) Moldova Czech Republic Israel Romania	46 46 46 44 42 40 39	0 0 0 0 0 0 0 0
New Zealand Italy Latvia (LSS) Moldova Czech Republic Israel Romania Macedonia, Rep. of	46 46 46 44 42 40 39 32	0 0 0 0 0 0 0 0
New Zealand Italy Latvia (LSS) Moldova Czech Republic Israel Romania Macedonia, Rep. of Jordan	46 46 46 44 42 40 39 32 31	0 0 0 0 0 0 0 0
New Zealand Italy Latvia (LSS) Moldova Czech Republic Israel Romania Macedonia, Rep. of Jordan Iran, Islamic Rep.	46 46 46 44 42 40 39 32 31 31	0 0 0 0 0 0 0 0
New Zealand Italy Latvia (LSS) Moldova Czech Republic Israel Romania Macedonia, Rep. of Jordan Iran, Islamic Rep. Tunisia	46 46 44 42 40 39 32 31 31 28	0 0 0 0 0 0 0 0
New Zealand Italy Latvia (LSS) Moldova Czech Republic Israel Romania Macedonia, Rep. of Jordan Iran, Islamic Rep. Tunisia Turkey	46 46 44 42 40 39 32 31 31 28 26	0 0 0 0 0 0 0 0
New Zealand Italy Latvia (LSS) Moldova Czech Republic Israel Romania Macedonia, Rep. of Jordan Iran, Islamic Rep. Tunisia Turkey Lithuania	46 46 44 42 40 39 32 31 31 28 26	0 0 0 0 0 0 0 0
New Zealand Italy Latvia (LSS) Moldova Czech Republic Israel Romania Macedonia, Rep. of Jordan Iran, Islamic Rep. Tunisia Turkey Lithuania Indonesia	46 46 44 42 40 39 32 31 31 28 26 26 21	0 0 0 0 0 0 0 0
New Zealand Italy Latvia (LSS) Moldova Czech Republic Israel Romania Macedonia, Rep. of Jordan Iran, Islamic Rep. Tunisia Turkey Lithuania Indonesia Chile	46 46 44 42 40 39 32 31 31 28 26 26 21	0 0 0 0 0 0 0 0
New Zealand Italy Latvia (LSS) Moldova Czech Republic Israel Romania Macedonia, Rep. of Jordan Iran, Islamic Rep. Tunisia Turkey Lithuania Indonesia Chile Philippines	46 46 44 42 40 39 32 31 31 28 26 21 13	0 0 0 0 0

Country average vs. International average:

Content Domain	Cognitive Domain
Fractions and Number Sense	Using Complex Procedures

Estimate of total cars in parking lot

There are 68 rows of cars in a parking lot. Each row has 92 cars. Which of these would give the closest estimate of the total number of cars in the parking lot?

A. $60 \times 90 = 5400$

B. $60 \times 100 = 6000$

 $C. 70 \times 90 = 6300$

D. $70 \times 100 = 7000$

Item Number: P13

Overall Percent Correct

Singapore Hong Kong, SAR Belgium (Flemish) Japan Korea, Rep. of Chinese Taipei Netherlands Finland United States Slovak Republic Hungary Canada Czech Republic Malaysia Australia Slovenia England New Zealand Russian Federation	94 85 83 82 81 81 79 78 78 78 78 78 76 74 67	
International Average	e 65	
Israel Latvia (LSS) Cyprus Bulgaria Thailand Jordan Lithuania Romania Macedonia, Rep. of Italy Moldova Turkey Chile Tunisia Iran, Islamic Rep. Indonesia Philippines South Africa Morocco	63 62 60 60 58 57 55 53 52 52 50 48 48 44 42 30 17	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

Country average vs. International average:

Higher △
Not different ○
Lower ▼

Correct Response:

C

Content Domain	Cognitive Domain
Fractions and Number Sense	Investigating and Solving Problems

Estimate of distance from explosion

Sound travels at approximately 330 meters per second. The sound of an explosion took 28 seconds to reach a person. Which of these is the closest estimate of how far away the person was from the explosion?

A. 12,000 m

B. 9,000 m

C. 8,000 m

D. 6,000 m

Item Number: P14

Correct Response:

В

Overall Percent Correct

Singapore	83	A
Japan	81	
Korea, Rep. of	78	
Hong Kong, SAR	78	
Chinese Taipei	77	
Slovak Republic	76	
Slovenia	71	
Czech Republic	71	
Malaysia	70	
Belgium (Flemish)	69	
Canada	64	
Netherlands	63	0
Finland	63	0
United States	63	
Australia	62	0
Lithuania	62	0
Hungary	61	0
Russian Federation	59	0
Thailand	59	0
International Average	e 56	
Bulgaria	55	0
Bulgaria Italy	55 52	0 0
_		0
Italy	52	0 0
Italy Latvia (LSS)	52 52	0 0 0
Italy Latvia (LSS) Israel	52 52 51	0 0 0 0 0
Italy Latvia (LSS) Israel Turkey	52 52 51 50	0 0 0 0 0 0 0
Italy Latvia (LSS) Israel Turkey Cyprus	52 52 51 50 50	0 0 0 0 0 0 0 0 0
Italy Latvia (LSS) Israel Turkey Cyprus New Zealand	52 52 51 50 50	0 0 0 0 0 0 0 0 0
Italy Latvia (LSS) Israel Turkey Cyprus New Zealand England	52 52 51 50 50 50	0 0 0 0 0 0 0 0 0
Italy Latvia (LSS) Israel Turkey Cyprus New Zealand England Macedonia, Rep. of	52 52 51 50 50 50 50 47	0 0 0 0 0 0 0 0 0
Italy Latvia (LSS) Israel Turkey Cyprus New Zealand England Macedonia, Rep. of Moldova	52 52 51 50 50 50 50 47 45	0 0 0 0 0 0 0 0 0
Italy Latvia (LSS) Israel Turkey Cyprus New Zealand England Macedonia, Rep. of Moldova Philippines	52 52 51 50 50 50 50 47 45 43	0 0 0 0 0 0 0 0 0
Italy Latvia (LSS) Israel Turkey Cyprus New Zealand England Macedonia, Rep. of Moldova Philippines Jordan	52 52 51 50 50 50 50 47 45 43 42	0 0 0 0 0 0 0 0 0
Italy Latvia (LSS) Israel Turkey Cyprus New Zealand England Macedonia, Rep. of Moldova Philippines Jordan Tunisia	52 52 51 50 50 50 50 47 45 43 42 42	0 0 0 0 0 0 0 0 0
Italy Latvia (LSS) Israel Turkey Cyprus New Zealand England Macedonia, Rep. of Moldova Philippines Jordan Tunisia Indonesia	52 52 51 50 50 50 47 45 43 42 42 41	0 0 0 0 0 0 0 0 0
Italy Latvia (LSS) Israel Turkey Cyprus New Zealand England Macedonia, Rep. of Moldova Philippines Jordan Tunisia Indonesia Romania	52 52 51 50 50 50 47 45 43 42 42 41 40	0 0 0 0 0 0 0 0 0
Italy Latvia (LSS) Israel Turkey Cyprus New Zealand England Macedonia, Rep. of Moldova Philippines Jordan Tunisia Indonesia Romania Iran, Islamic Rep.	52 52 51 50 50 50 47 45 43 42 42 41 40 38	0 0 0 0 0 0 0
Italy Latvia (LSS) Israel Turkey Cyprus New Zealand England Macedonia, Rep. of Moldova Philippines Jordan Tunisia Indonesia Romania Iran, Islamic Rep. Chile	52 52 51 50 50 50 47 45 43 42 42 41 40 38 37	0 0 0 0 0 0 0 0

Country average vs. International average:

Content Domain	Cognitive Domain
Fractions and Number Sense	Investigating and Solving Problems

Fraction of cherries in basket

Robin and Jim took cherries from a basket. Robin took $\frac{1}{3}$ of the cherries and Jim took $\frac{1}{6}$ of the cherries. What fraction of the cherries remained in the basket?

- A. $\frac{1}{2}$
- B. $\frac{1}{3}$
- C. $\frac{1}{6}$
- D. $\frac{1}{18}$

Item Number: P15

Correct Response:

Α

Overall Percent Correct

Singapore	85	
Hong Kong, SAR	75	
Chinese Taipei	68	
Belgium (Flemish)	62	
Japan	62	
Netherlands	61	
Cyprus	56	A A A
Malaysia	55	A
Korea, Rep. of	55	
Hungary	55	
Canada	53	
United States	52	0
Russian Federation	51	Ο
Australia	51	0
Slovenia	51	Ο
Latvia (LSS)	49	Ο
Finland	48	0
Slovak Republic	48	0
Romania	47	0
1 tale te	4.0	_
Lithuania	46	0
International Average		0
		0
International Averag	e 45	
International Average Moldova	e 45	0
International Average Moldova Czech Republic	e 45 44 43	0
International Average Moldova Czech Republic Israel	e 45 44 43 43	0 0
International Average Moldova Czech Republic Israel New Zealand	44 43 43 43	0 0 0
International Average Moldova Czech Republic Israel New Zealand Bulgaria	44 43 43 43 43 43	0 0 0 0 0 0 0
International Average Moldova Czech Republic Israel New Zealand Bulgaria England	44 43 43 43 43 43 42	0 0 0 0 0 0
International Average Moldova Czech Republic Israel New Zealand Bulgaria England Macedonia, Rep. of	44 43 43 43 43 43 42 38	0 0 0 0 0 0 0
International Average Moldova Czech Republic Israel New Zealand Bulgaria England Macedonia, Rep. of Jordan	44 43 43 43 43 43 42 38 34	0 0 0 0 0 0 0
International Average Moldova Czech Republic Israel New Zealand Bulgaria England Macedonia, Rep. of Jordan Indonesia	44 43 43 43 43 42 38 34 34	0 0 0 0 0 0 0
International Average Moldova Czech Republic Israel New Zealand Bulgaria England Macedonia, Rep. of Jordan Indonesia Italy	44 43 43 43 43 43 42 38 34 34 32	0 0 0 0 0 0 0
International Average Moldova Czech Republic Israel New Zealand Bulgaria England Macedonia, Rep. of Jordan Indonesia Italy Iran, Islamic Rep.	44 43 43 43 43 43 42 38 34 34 32 32	0 0 0 0 0 0 0
International Average Moldova Czech Republic Israel New Zealand Bulgaria England Macedonia, Rep. of Jordan Indonesia Italy Iran, Islamic Rep. Turkey	44 43 43 43 43 42 38 34 34 32 32 32	0 0 0 0 0 0 0
International Average Moldova Czech Republic Israel New Zealand Bulgaria England Macedonia, Rep. of Jordan Indonesia Italy Iran, Islamic Rep. Turkey Tunisia	44 43 43 43 43 42 38 34 34 32 32 32 31	0 0 0 0 0 0 0
International Average Moldova Czech Republic Israel New Zealand Bulgaria England Macedonia, Rep. of Jordan Indonesia Italy Iran, Islamic Rep. Turkey Tunisia Thailand	44 43 43 43 43 42 38 34 34 32 32 32 31 29	0 0 0 0 0 0 0
International Average Moldova Czech Republic Israel New Zealand Bulgaria England Macedonia, Rep. of Jordan Indonesia Italy Iran, Islamic Rep. Turkey Tunisia Thailand Philippines	44 43 43 43 43 42 38 34 32 32 32 31 29 22	0 0 0 0 0 0
International Average Moldova Czech Republic Israel New Zealand Bulgaria England Macedonia, Rep. of Jordan Indonesia Italy Iran, Islamic Rep. Turkey Tunisia Thailand Philippines Chile	e 45 44 43 43 43 42 38 34 32 32 31 29 22 22	0 0 0 0 0 0

Country average vs. International average:

Higher Not different Lower

Content Domain	Cognitive Domain	
Fractions and Number Sense	Using Routine Procedures	

Write decimal as fraction

Write 0.48 as a fraction reduced to its lowest terms.		
Answer:		

Item Number: P17

SCORING

Correct Response

• 12/25

Incorrect Response

- 48/100 OR 24/50
- Any fraction other than 48/100 with 48 as numerator
- Any fraction with 48 as denominator
- 4/8 OR 2/4 OR 1/2
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task)

Overall Percent Correct

Singapore Korea, Rep. of Hong Kong, SAR Chinese Taipei Japan Belgium (Flemish) Moldova Canada Slovenia United States Iran, Islamic Rep.	87 78 74 71 65 56 55 50 48 46 43	A A A A A A A A A A
Bulgaria	42	0
Australia	42	0
Slovak Republic	42	0
Russian Federation Romania	42 41	0
Malaysia	40	0
Hungary	40	0
International Average		
Tunisia	34	0
Netherlands	31	0
Czech Republic	30	0
Latvia (LSS)	28	Ο
Italy	25	\blacksquare
Israel	24	
Turkey	24	\blacksquare
Thailand	24	*
Thailand Lithuania	24 24	_
Thailand Lithuania New Zealand	24 24 23	V
Thailand Lithuania New Zealand Cyprus	24 24 23 22	V
Thailand Lithuania New Zealand Cyprus Jordan	24 24 23 22 22	V
Thailand Lithuania New Zealand Cyprus Jordan Indonesia	24 24 23 22 22 22	V
Thailand Lithuania New Zealand Cyprus Jordan Indonesia Finland	24 24 23 22 22 22 19	V
Thailand Lithuania New Zealand Cyprus Jordan Indonesia Finland England	24 24 23 22 22 22 19 18	V
Thailand Lithuania New Zealand Cyprus Jordan Indonesia Finland England Macedonia, Rep. of	24 24 23 22 22 22 19 18	V
Thailand Lithuania New Zealand Cyprus Jordan Indonesia Finland England Macedonia, Rep. of Philippines	24 24 23 22 22 22 19 18 13	V
Thailand Lithuania New Zealand Cyprus Jordan Indonesia Finland England Macedonia, Rep. of Philippines Chile	24 24 23 22 22 22 29 19 18 13 12	V
Thailand Lithuania New Zealand Cyprus Jordan Indonesia Finland England Macedonia, Rep. of Philippines	24 24 23 22 22 22 19 18 13	_

Country average vs. International average:

Content Domain	Cognitive Domain	
Fractions and Number Sense	Using Routine Procedures	

Subtraction of decimals to 0.001

Subtract: 4.722 – 1.935 =	
A. 2.787	
B. 2.797	
C. 2.887	
D. 2.897	

Item Number: R07

Overall Percent Correct

Malaysia	92	A
Singapore	90	
Hungary	90	
Slovenia	90	
Korea, Rep. of	88	A
Russian Federation	88	
Slovak Republic	87	
Japan	86	
Lithuania	86	
Czech Republic	85	0
Chinese Taipei	84	
Hong Kong, SAR	83	
Thailand	83	
Tunisia	82	0
Bulgaria	81	0
Moldova	80	0
Canada	80	0
Latvia (LSS)	79	0
Indonesia	78	0
Romania	77	O
United States	77	O
Italy	77	0
International Average		
Chile	75	0
Australia	74	0
Belgium (Flemish)	73	0
Finland	72	0
Cyprus	71	0
Macedonia, Rep. of	71	0
Iran, Islamic Rep.	71	0
Turkey	71	0
Netherlands	69	0
Philippines	69	•
Jordan	65	•

Country average vs.
International average:
Higher
Not different

O

63

62

61

59

Israel

Morocco

England

New Zealand

South Africa

Lower

Correct Response:

A

Content Domain	Cognitive Domain	
Fractions and Number Sense	Using Complex Procedures	

Average weight of salt crystals

The total weight of a pile of 500 salt crystals is 6.5 g. What is the average weight of a salt crystal?

A. 0.0078 g

B. 0.013 g

 $C.\ 0.0325 \ g$

D. 0.078 g

Item Number: R08

Correct Response:

В

Overall Percent Correct

Hong Kong, SAR Chinese Taipei Singapore Japan Korea, Rep. of Hungary Slovak Republic Russian Federation Malaysia Belgium (Flemish) Lithuania Slovenia Netherlands Bulgaria Moldova Finland	75 75 74 73 72 67 66 65 64 63 57 57 57 55 54	
International Averag	e 52	
Romania Czech Republic Chile Canada Tunisia Turkey Latvia (LSS) Macedonia, Rep. of Australia Indonesia Italy Thailand United States New Zealand Jordan England Israel Iran, Islamic Rep. Morocco South Africa Cyprus Philippines	52 50 49 48 48 47 47 47 46 45 44 43 41 40 40 36 35 35 31 29	

Country average vs. International average:

Content Domain	Cognitive Domain	
Fractions and Number Sense	Using Routine Procedures	

Subtraction of 4-digit whole numbers

Subtract:	7003 - <u>4078</u>		
A. 2035			
B. 2925 C. 3005			
D. 3925			

Item Number: R13

Correct Response:

В

Overall Percent Correct

Malaysia	94	A
Singapore	92	
Chinese Taipei	90	
Hong Kong, SAR	90	
Korea, Rep. of	88	
Hungary	87	
Slovak Republic	86	
Japan	86	
Belgium (Flemish)	85	
Slovenia	83	
Canada	83	
Czech Republic	82	0
United States	81	
Lithuania	80	0
Tunisia	80	
Russian Federation	79	0
Moldova	79	0
Netherlands	79	0
Australia	77	0
Thailand	77	0
Finland	76	0
Bulgaria	76	0
International Average	e 74	
Latvia (LSS)	74	0
Iran, Islamic Rep.	73	0
Cyprus	70	0
Turkey	69	0
Jordan	69	0
Romania	68	0
Israel	67	0
Italy	67	0
Macedonia, Rep. of	65	\blacksquare
Chile	59	\blacksquare
Philippines	58	\blacksquare
New Zealand	58	* * * * * * * * * * * * * * * * * * *
Indonesia	55	\blacksquare
Morocco	54	\blacksquare
England	51	\blacksquare
South Africa	37	\blacksquare

Country average vs. International average:

Content Domain	Cognitive Domain
Fractions and Number Sense	Investigating and Solving Problems

How much money left if spent 5/8

Laura had \$240. She spent $\frac{5}{8}$ of it. How much money did she have left?
Answer:

Item Number: R14

SCORING

 $\textbf{Note:} \ \ \textbf{There is no distinction made between responses with and without units.}$

Correct Response

• 90

Incorrect Response

- 150 [money spent]
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task)

Overall Percent Correct

Singapore Hong Kong, SAR Malaysia Japan Korea, Rep. of Chinese Taipei Finland Netherlands Belgium (Flemish) Hungary Moldova Australia	78 66 59 50 50 49 48 47 45 40 38 37	A A A A O O
Slovenia Slovak Republic Cyprus Canada Czech Republic	35 33 33 30 30	0 0 0 0
International Average Bulgaria Russian Federation United States Italy New Zealand England Latvia (LSS) Israel Tunisia Romania Thailand Iran, Islamic Rep. Lithuania Turkey Macedonia, Rep. of Jordan Indonesia Chile Philippines South Africa Morocco	27 27 25 24 24 24 24 23 22 21 21 20 19 17 14 14 11 6 4 3 1	0 0 0 0 0 0 0 0 0 0 0 0

Country average vs. International average:

Content Domain	Cognitive Domain
Fractions and Number Sense	Investigating and Solving Problems

Money from total magazine sales

John sold 60 magazines and Mark sold 80 magazines. The magazines were all sold for the same price. The total amount of money received for the magazines was \$700. How much money did Mark receive?			
Answer:			

Item Number: R15

SCORING

Note: There is no distinction made between responses with and without units.

Correct Response

• 400

Incorrect Response

- 500 [price per magazine x 100]
- 350 [700 ÷ 2]
- 300 [money John received]
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task)

Overall Percent Correct

Singapore	84	
Chinese Taipei	75	<u> </u>
Hong Kong, SAR	72	<u> </u>
Korea, Rep. of	69	_
Japan	67	<u> </u>
Malaysia	65	_
Slovenia	60	<u> </u>
Belgium (Flemish)	60	<u> </u>
Hungary	58	<u> </u>
Moldova	54	_
Czech Republic	54	0
Slovak Republic	54	0
Lithuania	54	A
Netherlands	53	0
Russian Federation	52	0
Bulgaria	50	0
Latvia (LSS)	48	0
Finland	47	0
Canada	46	0
International Averag	ie 44	
Australia	44	0
		0
Australia	44	
Australia Romania	44 43	0
Australia Romania United States	44 43 41	0 0 0
Australia Romania United States Cyprus	44 43 41 40	0 0 0 0 0
Australia Romania United States Cyprus Tunisia	44 43 41 40 39	0 0 0 0 0 0
Australia Romania United States Cyprus Tunisia Thailand	44 43 41 40 39 38	0 0 0 0 0 0
Australia Romania United States Cyprus Tunisia Thailand Italy	44 43 41 40 39 38 36	0 0 0 0 0 0
Australia Romania United States Cyprus Tunisia Thailand Italy New Zealand	44 43 41 40 39 38 36 33	0 0 0 0 0 0
Australia Romania United States Cyprus Tunisia Thailand Italy New Zealand England	44 43 41 40 39 38 36 33 31	0 0 0 0 0 0
Australia Romania United States Cyprus Tunisia Thailand Italy New Zealand England Israel	44 43 41 40 39 38 36 33 31 30	0 0 0 0 0 0
Australia Romania United States Cyprus Tunisia Thailand Italy New Zealand England Israel Macedonia, Rep. of	44 43 41 40 39 38 36 33 31 30 30	0 0 0 0 0 0
Australia Romania United States Cyprus Tunisia Thailand Italy New Zealand England Israel Macedonia, Rep. of Iran, Islamic Rep.	44 43 41 40 39 38 36 33 31 30 30 28	0 0 0 0 0 0
Australia Romania United States Cyprus Tunisia Thailand Italy New Zealand England Israel Macedonia, Rep. of Iran, Islamic Rep. Indonesia Turkey Jordan	44 43 41 40 39 38 36 33 31 30 30 28 27	0 0 0 0 0 0
Australia Romania United States Cyprus Tunisia Thailand Italy New Zealand England Israel Macedonia, Rep. of Iran, Islamic Rep. Indonesia Turkey	44 43 41 40 39 38 36 33 31 30 30 28 27 26	0 0 0 0 0 0
Australia Romania United States Cyprus Tunisia Thailand Italy New Zealand England Israel Macedonia, Rep. of Iran, Islamic Rep. Indonesia Turkey Jordan	44 43 41 40 39 38 36 33 31 30 28 27 26 23	0 0 0 0 0 0
Australia Romania United States Cyprus Tunisia Thailand Italy New Zealand England Israel Macedonia, Rep. of Iran, Islamic Rep. Indonesia Turkey Jordan Chile	44 43 41 40 39 38 36 33 31 30 30 28 27 26 23 22 12 9	0 0 0 0 0 0
Australia Romania United States Cyprus Tunisia Thailand Italy New Zealand England Israel Macedonia, Rep. of Iran, Islamic Rep. Indonesia Turkey Jordan Chile Philippines	44 43 41 40 39 38 36 33 31 30 30 28 27 26 23 22 12	0 0 0 0 0

Country average vs. International average:

Content Domain	Cognitive Domain
Fractions and Number Sense	Investigating and Solving Problems

Number/fraction of 2 types of boxes

Item Number: T02A

SCORING

A: Scoring for Total Number of Boxes

Correct Response

• 7

Incorrect Response

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

Overall Percent Correct

Singapore	62	A
Chinese Taipei	60	
Korea, Rep. of	59	A
Japan	58	
Hong Kong, SAR	58	
Belgium (Flemish)	43	
Bulgaria	33	0
Malaysia	33	
Finland	32	0
Australia	32	
Netherlands	32	0
Hungary	31	
Canada	31	A
Slovenia	31	0
Latvia (LSS)	29	0
Russian Federation	29	0
United States	26	0
International Average	e 26	
Slovak Republic	25	0
England	24	0
Moldova	24	0
New Zealand	24	0
Romania	22	0
Czech Republic	22	O
Lithuania	22	O
Thailand	19	\blacksquare
Israel	18	\blacksquare
Italy	18	•
Cyprus	15	\blacksquare
Jordan	12	\blacksquare
Indonesia	10	•
Turkey	9	\blacksquare
Tunisia	8	\blacksquare
Macedonia, Rep. of	8	•
Iran, Islamic Rep.	7	\blacksquare
Chile	4	\blacksquare
Philippines	2	\blacksquare
South Africa	2	*** *** *** *** *** *** *** ***
Morocco	1	•

Country average vs. International average:

Content Domain	Cognitive Domain
Fractions and Number Sense	Investigating and Solving Problems

Number/fraction of 2 types of boxes

A book publisher sent 140 copies of a certain book to a bookstore. The publisher packed the books in two types of boxes. One type of box held 8 copies of the book, and the other type of box held 12 copies of the book. The boxes were all full, and there were equal numbers of both types of boxes.

a) How many boxes holding 12 books were sent to the bookstore?

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

b) What fraction of the books sent to the bookstore were packed in the smaller boxes?

Answer:	

Item Number: T02B

SCORING

B: Scoring for Fraction of Books in Smaller Boxes

Note: The term "equivalent" in the scoring guide below includes decimal fractions and percentages.

Correct Response

- 2/5
- Another fraction or percent equivalent to 2/5 (e.g., 8/20, 14/35, 28/70, etc.)
- Other correct

Incorrect Response

- 1/2
- 2/3 OR 8/12 OR 56/84 [fraction of boxes]
- Any integer
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task)

Overall Percent Correct

48	A
43	
43	
32	
30	
18	0
16	0
15	O
14	0
13	0
13	0
12	0
e 12	
11	0
11	0
11	0
10	O
10	0
10	0
10	0
10	0
9	O
8	•
8	\blacksquare
8	\blacksquare
7	\blacksquare
6	\blacksquare
5	•
4	\blacksquare
3	•
	•
2	\blacksquare
2	•
2	•
2	\blacksquare
1	\blacksquare
1	•
1	* * * * * * * * * * * * * * * * * * *
0	_
	43 43 43 32 30 18 16 15 14 13 13 12 e 12 11 11 10 10 10 10 9 8 8 7 6 5 4 3 2 2 2 2 1 1 1

Country average vs. International average:

Higher	
Not different	0
Lower	•

Content Domain	Cognitive Domain
Fractions and Number Sense	Investigating and Solving Problems

Height of stack from paper thickness

A sheet of paper is 0.012 cm thick. Of the following, which would be the height of a stack of 400 sheets of this paper?

A. 0.048 cm

B. 0.48 cm

C. 4.8 cm

D. 48 cm

Item Number: T04

Overall Percent Correct

Japan	83	A
Singapore	80	
Hong Kong, SAR	78	
Chinese Taipei	75	
Korea, Rep. of	75	
Belgium (Flemish)	75	
Netherlands	72	
Finland	72	
Czech Republic	70	
Slovak Republic	69	A
Malaysia	67	
Canada	67	A
Hungary	65	A
Slovenia	62	
United States	62	A
Australia	59	A
Latvia (LSS)	59	Ο
Russian Federation	59	0
Lithuania	54	0
Bulgaria	54	0
New Zealand	54	0
International Average		
England	53	0
Moldova	49	0
Italy	48	0
Israel	47	•
Romania	46	0
Thailand	45	•
Cyprus	44	
Jordan	36	_
Turkey	36	•
Iran, Islamic Rep.	33	
Macedonia, Rep. of	33	
Indonesia	33	V
Tunisia	31	▼
Chile	23	
	_	_
Philippines	22	•
Philippines Morocco South Africa	22 22 20	• •

Country average vs. International average:

Higher △
Not different ○
Lower ▼

Correct Response:

C

Content Domain	Cognitive Domain
Fractions and Number Sense	Using Complex Procedures

Two possibilities for actual height

The height of a boy was been rounded to the new for the boy's actual height	arest 10 cm.	
Answer:	_ cm and	 cm

Item Number: V01

SCORING

Correct Response

- One answer 140 and the other answer is in an acceptable range, 135 $\leq x \leq$ 140 or 140 $\leq x \leq$ 145.
- Neither answer is 140 cm but both are in the acceptable range $135 \le x < 140$ and/or 140 < x < 145.

Incorrect Response

- Both answers within the intervals $145 \le x \le 150$ and/or $130 \le x \le 135$
- 130 AND 150
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task)

Overall Percent Correct

Finland	85	A
Czech Republic	82	
Slovak Republic	79	
Singapore	78	
Canada	72	
Australia	69	
Russian Federation	69	
Japan	69	
Korea, Rep. of	66	
Hungary	66	
Hong Kong, SAR	66	
Chinese Taipei	65	
Netherlands	64	
Belgium (Flemish)	61	
England	61	
Thailand	61	
New Zealand	58	
Lithuania	57	
United States	56	
International Average	e 44	
Israel	44	0
Moldova	43	0
Moldova Slovenia	43 41	0
Moldova Slovenia Bulgaria	43 41 40	0 0
Moldova Slovenia Bulgaria Latvia (LSS)	43 41 40 39	0 0 0
Moldova Slovenia Bulgaria Latvia (LSS) Malaysia	43 41 40 39 33	0 0 0 0
Moldova Slovenia Bulgaria Latvia (LSS) Malaysia Jordan	43 41 40 39 33 29	0 0 0 0
Moldova Slovenia Bulgaria Latvia (LSS) Malaysia Jordan Italy	43 41 40 39 33 29 25	0 0 0 0
Moldova Slovenia Bulgaria Latvia (LSS) Malaysia Jordan Italy Indonesia	43 41 40 39 33 29 25 24	0 0 0 0
Moldova Slovenia Bulgaria Latvia (LSS) Malaysia Jordan Italy Indonesia Cyprus	43 41 40 39 33 29 25 24 21	0 0 0 0
Moldova Slovenia Bulgaria Latvia (LSS) Malaysia Jordan Italy Indonesia Cyprus Romania	43 41 40 39 33 29 25 24 21	0 0 0 0
Moldova Slovenia Bulgaria Latvia (LSS) Malaysia Jordan Italy Indonesia Cyprus Romania Macedonia, Rep. of	43 41 40 39 33 29 25 24 21 15	0 0 0 0
Moldova Slovenia Bulgaria Latvia (LSS) Malaysia Jordan Italy Indonesia Cyprus Romania Macedonia, Rep. of Philippines	43 41 40 39 33 29 25 24 21 15 13 9	0 0 0 0
Moldova Slovenia Bulgaria Latvia (LSS) Malaysia Jordan Italy Indonesia Cyprus Romania Macedonia, Rep. of Philippines Chile	43 41 40 39 33 29 25 24 21 15 13 9	0 0 0 0
Moldova Slovenia Bulgaria Latvia (LSS) Malaysia Jordan Italy Indonesia Cyprus Romania Macedonia, Rep. of Philippines Chile Tunisia	43 41 40 39 33 29 25 24 21 15 13 9 8 7	0 0 0 0
Moldova Slovenia Bulgaria Latvia (LSS) Malaysia Jordan Italy Indonesia Cyprus Romania Macedonia, Rep. of Philippines Chile Tunisia South Africa	43 41 40 39 33 29 25 24 21 15 13 9 8 7 6	0 0 0 0
Moldova Slovenia Bulgaria Latvia (LSS) Malaysia Jordan Italy Indonesia Cyprus Romania Macedonia, Rep. of Philippines Chile Tunisia South Africa Iran, Islamic Rep.	43 41 40 39 33 29 25 24 21 15 13 9 8 7 6	0 0 0 0
Moldova Slovenia Bulgaria Latvia (LSS) Malaysia Jordan Italy Indonesia Cyprus Romania Macedonia, Rep. of Philippines Chile Tunisia South Africa Iran, Islamic Rep. Turkey	43 41 40 39 33 29 25 24 21 15 13 9 8 7 6 5 4	0 0 0
Moldova Slovenia Bulgaria Latvia (LSS) Malaysia Jordan Italy Indonesia Cyprus Romania Macedonia, Rep. of Philippines Chile Tunisia South Africa Iran, Islamic Rep.	43 41 40 39 33 29 25 24 21 15 13 9 8 7 6	0 0 0 0

Country average vs. International average:

Content Domain	Cognitive Domain
Fractions and Number Sense	Investigating and Solving Problems

Ratio of nitrate to total fertilizer

In making a garden fertilizer, a gardener mixes 2 kg of a nitrate, 3 kg of a phosphate, and 6 kg of potash. What is the ratio of nitrate to the total amount of fertilizer?

- A. $\frac{11}{9}$
- B. $\frac{2}{3}$
- C. $\frac{2}{9}$
- D. $\frac{2}{11}$

Item Number: V03

Correct Response:

D

Overall Percent Correct

Singapore Korea, Rep. of Chinese Taipei Netherlands Hong Kong, SAR Finland Malaysia Japan Canada United States Belgium (Flemish) Slovenia Hungary Australia Italy Russian Federation	87 84 74 74 65 62 61 55 55 54 53 50 48 47 46	
International Averag	e 45	
New Zealand	44	0
Thailand	44	0
Indonesia	43	0
England	42	0
Romania	40	0
Bulgaria	40	0
Cyprus	40	0
Israel	40	0
Slovak Republic	37	0
Jordan	36	—
Latvia (LSS)	35	Ť
Turkey	35	*
Iran, Islamic Rep.	35	Ť
Moldova	34	·
Czech Republic	30	·
Tunisia	29	Ť
Macedonia, Rep. of	26	<u> </u>
Lithuania	23	· •
Chile	22	•
Philippines	21	V
Morocco	15	•
South Africa	15	* * * * * * * * * * * * * * * * * * *

Country average vs. International average:

Higher △
Not different ○
Lower ▼

Content Domain	Cognitive Domain
Algebra	Knowing

Equation representing relationship

n is a number. When n is multiplied by 7, and 6 is then added, the result is 41. Which of these equations represents this relation?

A. 7n + 6 = 41

B. $7n \pm 6 = 41$

C. $7n \times 6 = 41$

D. 7(n + 6) = 41

Item Number: B12

Correct Response:

Α

Overall Percent Correct

Hong Kong, SAR	93	
Singapore	89	
Japan	86	
Korea, Rep. of	85	
Chinese Taipei	84	
Slovenia	83	
Canada	82	
Russian Federation	82	
Slovak Republic	81	
Belgium (Flemish)	81	
Netherlands	80	
Hungary	80	
United States	77	
Bulgaria	76	
Australia	72	
Czech Republic	72	
Latvia (LSS)	71	
Lithuania	71	O
Finland	68	O
Israel	68	O
Thailand	67	O
Romania	67	0
Cyprus	66	0
International Average	65	

Moldova	65	0
Macedonia, Rep. of	63	0
England	62	0
Italy	58	\blacksquare
New Zealand	58	\blacksquare
Tunisia	58	\blacksquare
Malaysia	57	\blacksquare
Jordan	46	\blacksquare
Iran, Islamic Rep.	46	\blacksquare
Turkey	41	\blacksquare
Chile	38	\blacksquare
Indonesia	37	\blacksquare
Morocco	35	\blacksquare
South Africa	21	\blacksquare
Philippines	19	\blacksquare

Country average vs. International average:

Higher △ Not different ○ Lower ▼

Content Domain	Cognitive Domain
Algebra	Using Routine Procedures

Value of x from equivalent ratios

If the ratio 7 to 13 is the same as the ratio x to 52, what is the value of x?

A. 7

B. 13

C. 28

D. 364

Item Number: D08

Overall Percent Correct

Singapore Korea, Rep. of Chinese Taipei Hong Kong, SAR Malaysia Canada Japan Australia United States Slovenia	96 93 90 88 84 84 82 80 78	A A A A A A A A A A A A A A A A A A A
Russian Federation Hungary Belgium (Flemish) Italy New Zealand England Thailand Netherlands Cyprus Czech Republic	76 75 74 73 73 72 70 70	▲
International Average Slovak Republic	e 69	0
Bulgaria Latvia (LSS) Macedonia, Rep. of Romania Finland Jordan Israel Moldova Tunisia Indonesia Turkey Iran, Islamic Rep. Lithuania Chile Philippines South Africa Morocco	68 66 64 63 61 61 60 60 59 59 58 49 47 38 35	

Country average vs. International average:

Higher △
Not different ○
Lower ▼

Correct Response:

C

Content Domain	Cognitive Domain
Algebra	Knowing

Equation to determine cost of cards

The cost, C, of printing greeting cards consists of a fixed charge of 100 cents and a charge of 6 cents for each card printed. Which of these equations can be used to determine the cost of printing n cards?

A.
$$C = (100 + 6n)$$
 cents

B.
$$C = (106 + n)$$
 cents

C.
$$C = (6 + 100n)$$
 cents

D.
$$C = (106n)$$
 cents

E.
$$C = (600n)$$
 cents

Item Number: D10

Overall Percent Correct

Chinese Taipei Japan Hong Kong, SAR Korea, Rep. of Netherlands Thailand Singapore Bulgaria Belgium (Flemish) Canada Slovenia Australia United States Russian Federation England Indonesia New Zealand Macedonia, Rep. of Philippines Czech Republic International Average		
Hungary Finland	48 48	0
Slovak Republic	47	0
Cyprus	16	0
Cyprus	46 46	0
Cyprus Jordan Romania	46	0
Jordan Romania		0
Jordan	46 45	0
Jordan Romania Italy	46 45 42	0
Jordan Romania Italy Israel	46 45 42 42	0
Jordan Romania Italy Israel Malaysia	46 45 42 42 42	0
Jordan Romania Italy Israel Malaysia Lithuania	46 45 42 42 42 42	0
Jordan Romania Italy Israel Malaysia Lithuania Turkey	46 45 42 42 42 42 41	0
Jordan Romania Italy Israel Malaysia Lithuania Turkey Chile	46 45 42 42 42 42 41 37	0
Jordan Romania Italy Israel Malaysia Lithuania Turkey Chile Moldova Iran, Islamic Rep. Latvia (LSS)	46 45 42 42 42 42 41 37 33	0
Jordan Romania Italy Israel Malaysia Lithuania Turkey Chile Moldova Iran, Islamic Rep.	46 45 42 42 42 41 37 33 30 29 27	0
Jordan Romania Italy Israel Malaysia Lithuania Turkey Chile Moldova Iran, Islamic Rep. Latvia (LSS)	46 45 42 42 42 42 41 37 33 30 29	0

Country average vs. International average:

Higher
Not different
Lower

Correct Response:

Α

Content Domain	Cognitive Domain
Algebra	Investigating and Solving Problems

Find 1/3 of number from relationship

If 4 times a number is 48, what is $\frac{1}{3}$ of the number?

A. 4

B. 8

C. 12

D. 16

Item Number: F11

Correct Response:

Α

Overall Percent Correct

Hong Kong, SAR	89	
Korea, Rep. of	85	
Chinese Taipei	83	A A A A A A A A A A A A A A A A A A A
Singapore	82	
Japan	73	
Belgium (Flemish)	72	
Finland	68	
Bulgaria	66	
Hungary	63	
Russian Federation	63	
Australia	54	
Slovenia	54	
Malaysia	54	
Canada	53	
United States	50	0
Cyprus	49	0
International Average	47	
Latvia (LSS)	46	0
Israel	44	O
Israel Turkey	44 44	0
		0
Turkey	44	0 0 0
Turkey New Zealand	44 43	0 0 0
Turkey New Zealand Romania	44 43 41	0 0 0
Turkey New Zealand Romania Netherlands	44 43 41 41	0 0 0
Turkey New Zealand Romania Netherlands Moldova	44 43 41 41 41	0 0 0
Turkey New Zealand Romania Netherlands Moldova Czech Republic	44 43 41 41 41 40	0 0 0
Turkey New Zealand Romania Netherlands Moldova Czech Republic England	44 43 41 41 41 40 40	0 0 0
Turkey New Zealand Romania Netherlands Moldova Czech Republic England Slovak Republic	44 43 41 41 41 40 40 38	0 0 0
Turkey New Zealand Romania Netherlands Moldova Czech Republic England Slovak Republic Jordan	44 43 41 41 41 40 40 38 36	0 0 0
Turkey New Zealand Romania Netherlands Moldova Czech Republic England Slovak Republic Jordan Iran, Islamic Rep.	44 43 41 41 41 40 40 38 36 36	0 0 0
Turkey New Zealand Romania Netherlands Moldova Czech Republic England Slovak Republic Jordan Iran, Islamic Rep. Macedonia, Rep. of	44 43 41 41 40 40 38 36 36 34	0 0 0
Turkey New Zealand Romania Netherlands Moldova Czech Republic England Slovak Republic Jordan Iran, Islamic Rep. Macedonia, Rep. of Thailand	44 43 41 41 40 40 38 36 36 34 31 29 27	0 0 0
Turkey New Zealand Romania Netherlands Moldova Czech Republic England Slovak Republic Jordan Iran, Islamic Rep. Macedonia, Rep. of Thailand Italy	44 43 41 41 40 40 38 36 36 34 31 29	0 0 0
Turkey New Zealand Romania Netherlands Moldova Czech Republic England Slovak Republic Jordan Iran, Islamic Rep. Macedonia, Rep. of Thailand Italy South Africa	44 43 41 41 40 40 38 36 36 34 31 29 27	0 0 0
Turkey New Zealand Romania Netherlands Moldova Czech Republic England Slovak Republic Jordan Iran, Islamic Rep. Macedonia, Rep. of Thailand Italy South Africa Chile	44 43 41 41 40 40 38 36 36 34 31 29 27 23	0 0 0
Turkey New Zealand Romania Netherlands Moldova Czech Republic England Slovak Republic Jordan Iran, Islamic Rep. Macedonia, Rep. of Thailand Italy South Africa Chile Indonesia	44 43 41 41 40 40 38 36 36 34 31 29 27 23 20	0 0 0

Country average vs. International average:

15

Morocco

Tunisia

Higher △ Not different ○ Lower ▼

Content Domain	Cognitive Domain
Algebra	Knowing

Equation from x/y table

The table shows a relation between x and y.

x	2	3	4	5
у	7	10	13	16

Which of these equations expresses this relation?

- A. y = x + 5
- B. $y = x \pm 5$
- C. $y = \frac{1}{3}(x \pm 1)$
- D. y = 3x + 1

Item Number: H10

Overall Percent Correct

Korea, Rep. of	84	
Hungary	80	
Japan	76	
Chinese Taipei	72	
Singapore	71	
Netherlands	71	
Australia	68	
Hong Kong, SAR	68	
Russian Federation	65	
Slovenia	60	
Belgium (Flemish)	60	
United States	57	
England	57	
Slovak Republic	57	0
Canada	55	
Czech Republic	53	0
New Zealand	52	0
Macedonia, Rep. of	51	0
Malaysia	51	0
Jordan	50	0
Latvia (LSS)	50	0
International Average	49	

international Average	72	
Bulgaria	47	0
Tunisia	41	\blacksquare
Israel	41	
Italy	40	\blacksquare
Finland	39	
Indonesia	37	
Lithuania	36	\blacksquare
Romania	36	
Cyprus	36	\blacksquare
Thailand	33	
Turkey	32	\blacksquare
Iran, Islamic Rep.	31	
Moldova	31	\blacksquare
Philippines	22	
Chile	21	
Morocco	20	\blacksquare
South Africa	19	

Country average vs. International average:

Higher
Not different
Lower

Correct Response:

Content Domain	Cognitive Domain
Algebra	Knowing

Symbolic linear equation of magazines

represents the number of magazines that Lina reads each week. Which of these represents the total number of magazines that Lina reads in 6 weeks?

A. 6+

B. 6×

C. =+6

D. (+) × 6

Item Number: H12

Overall Percent Correct

Singapore	95	
Belgium (Flemish)	88	
Chinese Taipei	87	
Netherlands	87	
Canada	86	
United States	86	
Malaysia	86	
Japan	85	
Australia	83	
Finland	82	
Hungary	81	
Slovenia	81	
Korea, Rep. of	81	
Czech Republic	80	
England	79	
Slovak Republic	79	
New Zealand	77	
Latvia (LSS)	77	
Russian Federation	77	0
Israel	77	
Cyprus	75	0
Tunisia	75	0
Bulgaria	73	0
Italy	72	0
International Average	72	

international Average	12	
Romania	71	0
Lithuania	66	O
Hong Kong, SAR	64	
Jordan	64	
Thailand	63	
Moldova	63	
Indonesia	54	
Chile	54	
Iran, Islamic Rep.	51	
Turkey	51	\blacksquare
Macedonia, Rep. of	47	
Philippines	45	
Morocco	44	\blacksquare
South Africa	36	\blacksquare

Country average vs. International average:

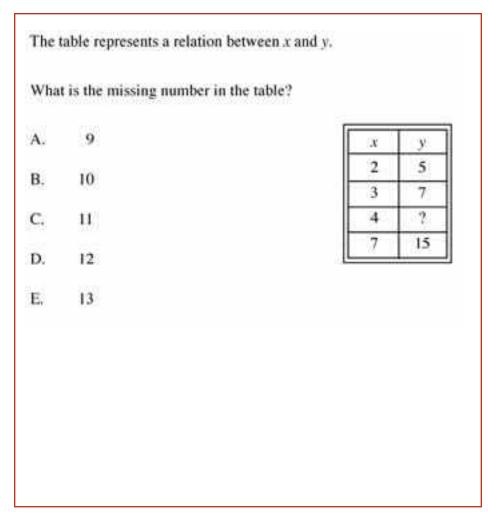
Higher △
Not different ○
Lower ▼

Correct Response:

В

Content Domain	Cognitive Domain
Algebra	Using Routine Procedures

Missing number in table



Item Number: J17

Overall Percent Correct

Netherlands 81 ▲ Chinese Taipei 79 ▲ Japan 78 ▲ Korea, Rep. of 78 ▲ Hong Kong, SAR 77 ▲ Hungary 74 ▲ Slovenia 73 ▲ New Zealand 72 ▲ Canada 71 O Australia 70 O Moldova 69 O Israel 69 O Israel 69 O Slovak Republic 68 O Thailand 68 O Belgium (Flemish) 67 O Finland 67 O Singapore 67 O Russian Federation 66 O Italy 65 O Ithuania 65 O International Average 65 Latvia (LSS) 65 O Bulgaria 64 O			
Japan 78 ▲ Korea, Rep. of 78 ▲ Hong Kong, SAR 77 ▲ Hungary 74 ▲ Slovenia 73 ▲ New Zealand 72 ▲ Canada 71 O Australia 70 O Moldova 69 O Israel 69 O Slovak Republic 68 O Thailand 68 O Belgium (Flemish) 67 O Finland 67 O Singapore 67 O Russian Federation 66 O Italy 65 O Tunisia 65 O Lithuania 65 O International Average 65 O Bulgaria 64 O Cyprus 64 O Romania 63 O United States 63 <td< td=""><td>Netherlands</td><td>81</td><td></td></td<>	Netherlands	81	
Korea, Rep. of 78 Hong Kong, SAR 77 Hungary 74 Slovenia 73 New Zealand 72 Canada 71 Australia 70 Moldova 69 Israel 69 Slovak Republic 68 Thailand 68 Belgium (Flemish) 67 Finland 67 Singapore 67 Russian Federation 66 Italy 65 Tunisia 65 Lithuania 65 International Average 65 Latvia (LSS) 65 Bulgaria 64 Cyprus 64 Romania 63 United States 63 Czech Republic 63 Macedonia, Rep. of 63 England 62 Jordan 61 Malaysia 58 Turkey 58 Indonesia	Chinese Taipei	79	
Hong Kong, SAR 77	Japan	78	
Hungary 74 Slovenia 73 New Zealand 72 Canada 71 Australia 70 Moldova 69 Israel 69 Slovak Republic 68 Thailand 68 Belgium (Flemish) 67 Finland 67 Singapore 67 Russian Federation 66 Italy 65 Tunisia 65 Lithuania 65 Lithuania 65 Latvia (LSS) 65 Bulgaria 64 Cyprus 64 Cyprus 64 Romania 63 United States 63 Czech Republic 63 Macedonia, Rep. of 63 England 62 Jordan 61 Malaysia 58 Turkey 58 Iran, Islamic Rep. 53 Philippines 48 Chile 47 South Africa 43	Korea, Rep. of	78	
Hungary 74 Slovenia 73 New Zealand 72 Canada 71 Australia 70 Moldova 69 Israel 69 Slovak Republic 68 Thailand 68 Belgium (Flemish) 67 Finland 67 Singapore 67 Russian Federation 66 Italy 65 Tunisia 65 Lithuania 65 Lithuania 65 Latvia (LSS) 65 Bulgaria 64 Cyprus 64 Cyprus 64 Romania 63 United States 63 Czech Republic 63 Macedonia, Rep. of 63 England 62 Jordan 61 Malaysia 58 Turkey 58 Iran, Islamic Rep. 53 Philippines 48 Chile 47 South Africa 43	Hong Kong, SAR	77	
Slovenia 73 A New Zealand 72 A Canada 71 O Australia 70 O Moldova 69 O Israel 69 O Slovak Republic 68 O Thailand 68 O Belgium (Flemish) 67 O Finland 67 O Singapore 67 O Russian Federation 66 O Italy 65 O Tunisia 65 O Lithuania 65 O Lithuania 65 O International Average 65 O Bulgaria 64 O Cyprus 64 O Romania 63 O United States 63 O Czech Republic 63 O Macedonia, Rep. of 63 O England 62	Hungary	74	
Canada 71 O Australia 70 O Moldova 69 O Israel 69 O Slovak Republic 68 O Thailand 68 O Belgium (Flemish) 67 O Finland 67 O Singapore 67 O Russian Federation 66 O Italy 65 O Tunisia 65 O Lithuania 65 O International Average 65 O Bulgaria 64 O Cyprus 64 O Romania 63 O United States 63 O Czech Republic 63 O Macedonia, Rep. of 63 O England 62 O Jordan 61 O Malaysia 58 V Turkey 58 V Indonesia 57 V Iran, Islamic Rep.<	Slovenia	73	
Australia 70 0 Moldova 69 0 Israel 69 0 Slovak Republic 68 0 Thailand 68 0 Belgium (Flemish) 67 0 Finland 67 0 Singapore 67 0 Russian Federation 66 0 Italy 65 0 Tunisia 65 0 Lithuania 65 0 International Average 65 Latvia (LSS) 65 0 Bulgaria 64 0 Cyprus 64 0 Romania 63 0 United States 63 0 Czech Republic 63 0 Macedonia, Rep. of 63 0 England 62 0 Jordan 61 0 Malaysia 58 0 Turkey 58 V Indonesia 57 V Iran, Islamic Rep. 53 V Philippines 48 Chile 47 South Africa	New Zealand	72	
Moldova 69	Canada	71	0
Israel	Australia	70	0
Slovak Republic 68 O Thailand 68 O Belgium (Flemish) 67 O Finland 67 O Singapore 67 O Russian Federation 66 O Italy 65 O Tunisia 65 O Lithuania 65 O International Average 65 O Latvia (LSS) 65 O Bulgaria 64 O Cyprus 64 O Romania 63 O United States 63 O Czech Republic 63 O Macedonia, Rep. of 63 O England 62 O Jordan 61 O Malaysia 58 O Turkey 58 V Indonesia 57 V Iran, Islamic Rep. 53 V Philippines <t< td=""><td>Moldova</td><td>69</td><td>0</td></t<>	Moldova	69	0
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Finland 67 O Singapore 67 O Russian Federation 66 O Italy 65 O Tunisia 65 O Lithuania 65 O International Average 65 O Latvia (LSS) 65 O Bulgaria 64 O Cyprus 64 O Romania 63 O United States 63 O Czech Republic 63 O Macedonia, Rep. of 63 O England 62 O Jordan 61 O Malaysia 58 O Turkey 58 V Indonesia 57 V Iran, Islamic Rep. 53 V Philippines 48 V Chile 47 V South Africa 43 V	Thailand	68	0
Finland 67 O Singapore 67 O Russian Federation 66 O Italy 65 O Tunisia 65 O Lithuania 65 O International Average 65 O Latvia (LSS) 65 O Bulgaria 64 O Cyprus 64 O Romania 63 O United States 63 O Czech Republic 63 O Macedonia, Rep. of 63 O England 62 O Jordan 61 O Malaysia 58 O Turkey 58 V Indonesia 57 V Iran, Islamic Rep. 53 V Philippines 48 V Chile 47 V South Africa 43 V	Belgium (Flemish)	67	
Russian Federation 66 O Italy 65 O Tunisia 65 O Lithuania 65 O International Average 65 U Latvia (LSS) 65 O Bulgaria 64 O Cyprus 64 O Romania 63 O United States 63 O Czech Republic 63 O Macedonia, Rep. of 63 O England 62 O Jordan 61 O Malaysia 58 O Turkey 58 V Indonesia 57 V Iran, Islamic Rep. 53 V Philippines 48 Chile 47 South Africa 55 O Tunisia 65 O Turkey 58 V Chile 47 South Africa 55 O Tunisia 65 O T	_	67	0
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Latvia (LSS) 65 O Bulgaria 64 O Cyprus 64 O Romania 63 O United States 63 O Czech Republic 63 O Macedonia, Rep. of 63 O England 62 O Jordan 61 O Malaysia 58 O Turkey 58 ▼ Indonesia 57 ▼ Iran, Islamic Rep. 53 ▼ Philippines 48 ▼ Chile 47 ▼ South Africa 43 ▼	Lithuania	65	0
Bulgaria 64 O Cyprus 64 O Romania 63 O United States 63 O Czech Republic 63 O Macedonia, Rep. of 63 O England 62 O Jordan 61 O Malaysia 58 O Turkey 58 ▼ Indonesia 57 ▼ Iran, Islamic Rep. 53 ▼ Philippines 48 ▼ Chile 47 ▼ South Africa 43 ▼			0
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Romania 63 O United States 63 O Czech Republic 63 O Macedonia, Rep. of 63 O England 62 O Jordan 61 O Malaysia 58 O Turkey 58 V Indonesia 57 V Iran, Islamic Rep. 53 V Philippines 48 Chile 47 South Africa 43	International Averag Latvia (LSS)	e 65 65	0
United States 63 O Czech Republic 63 O Macedonia, Rep. of 63 O England 62 O Jordan 61 O Malaysia 58 O Turkey 58 V Indonesia 57 V Iran, Islamic Rep. 53 V Philippines 48 Chile 47 South Africa 43	International Averag Latvia (LSS) Bulgaria	e 65 65 64	0
Czech Republic 63 O Macedonia, Rep. of 63 O England 62 O Jordan 61 O Malaysia 58 O Turkey 58 V Indonesia 57 V Iran, Islamic Rep. 53 V Philippines 48 Chile 47 South Africa 43	International Average Latvia (LSS) Bulgaria Cyprus	e 65 65 64 64	0 0
Macedonia, Rep. of 63 O England 62 O Jordan 61 O Malaysia 58 O Turkey 58 V Indonesia 57 V Iran, Islamic Rep. 53 V Philippines 48 Chile 47 South Africa 43	International Average Latvia (LSS) Bulgaria Cyprus Romania	e 65 65 64 64 63	0 0 0 0
England 62 O Jordan 61 O Malaysia 58 O Turkey 58 V Indonesia 57 V Iran, Islamic Rep. 53 V Philippines 48 V Chile 47 V South Africa 43	International Average Latvia (LSS) Bulgaria Cyprus Romania United States	65 65 64 64 63 63	0 0 0 0 0
Jordan 61 O Malaysia 58 O Turkey 58 V Indonesia 57 V Iran, Islamic Rep. 53 V Philippines 48 V Chile 47 V South Africa 43 V	International Average Latvia (LSS) Bulgaria Cyprus Romania United States Czech Republic	65 64 64 63 63 63	0 0 0 0 0 0
Malaysia 58 O Turkey 58 ▼ Indonesia 57 ▼ Iran, Islamic Rep. 53 ▼ Philippines 48 ▼ Chile 47 ▼ South Africa 43 ▼	International Average Latvia (LSS) Bulgaria Cyprus Romania United States Czech Republic Macedonia, Rep. of	65 64 64 63 63 63 63	0 0 0 0 0
Turkey 58 V Indonesia 57 V Iran, Islamic Rep. 53 V Philippines 48 V Chile 47 V South Africa 43 V	International Average Latvia (LSS) Bulgaria Cyprus Romania United States Czech Republic Macedonia, Rep. of England	65 64 64 63 63 63 63 63	0 0 0 0 0 0 0 0 0
Indonesia 57 Iran, Islamic Rep. 53 Philippines 48 Chile 47 South Africa 43 Morocco 40	International Average Latvia (LSS) Bulgaria Cyprus Romania United States Czech Republic Macedonia, Rep. of England Jordan	65 64 64 63 63 63 62 61	0 0 0 0 0 0
Iran, Islamic Rep. 53 Philippines 48 Chile 47 South Africa 43 Morocco 40	International Average Latvia (LSS) Bulgaria Cyprus Romania United States Czech Republic Macedonia, Rep. of England Jordan Malaysia	65 65 64 64 63 63 63 62 61 58	0 0 0 0 0 0 0 0 0 0 0 0
Philippines 48 V Chile 47 V South Africa 43 V Morocco 40	International Average Latvia (LSS) Bulgaria Cyprus Romania United States Czech Republic Macedonia, Rep. of England Jordan Malaysia Turkey	65 65 64 64 63 63 63 62 61 58 58	0 0 0 0 0 0 0 0 0 0 0 0
Chile 47 ▼ South Africa 43 ▼ Morocco 40 ▼	International Average Latvia (LSS) Bulgaria Cyprus Romania United States Czech Republic Macedonia, Rep. of England Jordan Malaysia Turkey Indonesia	e 65 65 64 64 63 63 63 63 62 61 58 58	0 0 0 0 0 0 0 0 0 0 0 0
South Africa 43 V Morocco 40 V	International Average Latvia (LSS) Bulgaria Cyprus Romania United States Czech Republic Macedonia, Rep. of England Jordan Malaysia Turkey Indonesia Iran, Islamic Rep.	65 65 64 64 63 63 63 62 61 58 57 53	0 0 0 0 0 0 0 0 0 0 0 0
Morocco 40 ▼	International Average Latvia (LSS) Bulgaria Cyprus Romania United States Czech Republic Macedonia, Rep. of England Jordan Malaysia Turkey Indonesia Iran, Islamic Rep. Philippines	65 65 64 64 63 63 63 62 61 58 58 57 53 48	0 0 0 0 0 0 0 0 0 0 0 0
1VIOTOCCO 40 ▼	International Average Latvia (LSS) Bulgaria Cyprus Romania United States Czech Republic Macedonia, Rep. of England Jordan Malaysia Turkey Indonesia Iran, Islamic Rep. Philippines Chile	65 65 64 64 63 63 63 63 62 61 58 57 53 48 47	0 0 0 0 0 0 0 0 0 0 0 0
	International Average Latvia (LSS) Bulgaria Cyprus Romania United States Czech Republic Macedonia, Rep. of England Jordan Malaysia Turkey Indonesia Iran, Islamic Rep. Philippines Chile South Africa	65 65 64 64 63 63 63 63 62 61 58 57 53 48 47 43	0 0 0 0 0 0 0 0 0 0 0 0

Country average vs. International average:

Higher
Not different
Lower

Correct Response:

Α

Content Domain	Cognitive Domain
Algebra	Investigating and Solving Problems

Distance traveled by elevator

In a sequence of starts and stops, an elevator travels from the first floor to the fifth floor and then to the second floor. From there, the elevator travels to the fourth floor and then to the third floor. If the floors are 3 m apart, how far has the elevator traveled?

A. 18 m

B. 27 m

C. 30 m

D. 45 m

Item Number: L12

Overall Percent Correct

Korea, Rep. of	77	
Japan	74	
Chinese Taipei	72	
Hong Kong, SAR	72	
Finland	72	
Belgium (Flemish)	70	A
Australia	69	
Singapore	69	
Czech Republic	66	
Malaysia	63	A
Slovak Republic	62	0
Hungary	61	
Canada	60	
Lithuania	60	0
New Zealand	59	0
Russian Federation	59	0
Slovenia	58	0
Netherlands	58	0
England	57	0
Latvia (LSS)	55	0
United States		_
	55	0
International Averag	e 53	
International Averag Cyprus	e 53 52	0
International Averag Cyprus Italy	e 53 52 51	0
International Averag Cyprus Italy Moldova	e 53 52 51 49	0 0
International Averag Cyprus Italy Moldova Macedonia, Rep. of	e 53 52 51 49 45	0 0
International Averag Cyprus Italy Moldova Macedonia, Rep. of Tunisia	52 51 49 45 44	0 0
International Averag Cyprus Italy Moldova Macedonia, Rep. of Tunisia Turkey	52 51 49 45 44 43	0 0
International Averag Cyprus Italy Moldova Macedonia, Rep. of Tunisia Turkey Romania	52 51 49 45 44 43 42	0 0
International Averag Cyprus Italy Moldova Macedonia, Rep. of Tunisia Turkey Romania Jordan	52 51 49 45 44 43 42 39	0 0
International Averag Cyprus Italy Moldova Macedonia, Rep. of Tunisia Turkey Romania Jordan Chile	e 53 52 51 49 45 44 43 42 39 39	0 0
International Average Cyprus Italy Moldova Macedonia, Rep. of Tunisia Turkey Romania Jordan Chile Israel	53 52 51 49 45 44 43 42 39 39 39	0 0
International Average Cyprus Italy Moldova Macedonia, Rep. of Tunisia Turkey Romania Jordan Chile Israel Iran, Islamic Rep.	53 52 51 49 45 44 43 42 39 39 39 39	0 0
International Averag Cyprus Italy Moldova Macedonia, Rep. of Tunisia Turkey Romania Jordan Chile Israel Iran, Islamic Rep. Thailand	53 52 51 49 45 44 43 42 39 39 39 38 38	0 0
International Averag Cyprus Italy Moldova Macedonia, Rep. of Tunisia Turkey Romania Jordan Chile Israel Iran, Islamic Rep. Thailand Indonesia	e 53 52 51 49 45 44 43 42 39 39 39 38 38 37	0 0
International Averag Cyprus Italy Moldova Macedonia, Rep. of Tunisia Turkey Romania Jordan Chile Israel Iran, Islamic Rep. Thailand Indonesia South Africa	e 53 52 51 49 45 44 43 42 39 39 39 38 38 37 33	0 0
International Averag Cyprus Italy Moldova Macedonia, Rep. of Tunisia Turkey Romania Jordan Chile Israel Iran, Islamic Rep. Thailand Indonesia South Africa Morocco	e 53 52 51 49 45 44 43 42 39 39 39 38 38 37 33 32	0 0
International Averag Cyprus Italy Moldova Macedonia, Rep. of Tunisia Turkey Romania Jordan Chile Israel Iran, Islamic Rep. Thailand Indonesia South Africa	e 53 52 51 49 45 44 43 42 39 39 39 38 38 37 33	0

Country average vs. International average:

Higher △
Not different ○
Lower ▼

Correct Response:

C

Content Domain	Cognitive Domain
Algebra	Communicating and Reasoning

Correct equation based on x/y table

The table represents a relation between x and y.

Which of the following equations could represent the same relation?

- A. y = 2x + 2
- B. y = 2x 1
- C. y = 3x + 2
- D. y = 3x + 1
- E. y = 3x 2

Item Number: L14

Overall Percent Correct

Korea, Rep. of	80	
Hungary	75	
Chinese Taipei	75	
Singapore	74	
Hong Kong, SAR	74	
Japan	69	
Belgium (Flemish)	67	
Australia	64	
Netherlands	64	
Russian Federation	61	
Slovak Republic	56	
Slovenia	54	0
Canada	53	0
England	51	0
Czech Republic	50	0
United States	49	0
New Zealand	49	0
Macedonia, Rep. of	48	0
Jordan	48	0
Latvia (LSS)	45	0

International Average	45	
Bulgaria	44	0
Israel	41	0
Malaysia	41	O
Italy	39	Ο
Lithuania	36	0
Romania	35	0
Tunisia	33	\blacksquare
Moldova	33	\blacksquare
Finland	32	\blacksquare
Indonesia	27	\blacksquare
Thailand	24	\blacksquare
Cyprus	24	\blacksquare
Iran, Islamic Rep.	22	\blacksquare
Turkey	21	\blacksquare
South Africa	14	\blacksquare
Morocco	14	\blacksquare
Philippines	13	\blacksquare
Chile	12	•

Country average vs. International average:

Higher
Not different
Lower

Correct Response:

Ε

Content Domain	Cognitive Domain
Algebra	Using Routine Procedures

Values in proportionality table

The table shows some values of x and y, where x is proportional to y.

	4	8	Q
000	9	P	45

What are the values of P and Q?

A.
$$P = 40$$
 and $Q = 13$

B.
$$P = 18$$
 and $Q = 17$

C.
$$P = 20$$
 and $Q = 18$

D.
$$P = 40$$
 and $Q = 18$

E.
$$P = 18$$
 and $Q = 20$

Item Number: L15

Overall Percent Correct

Chinese Taipei	69	
Japan	62	
Singapore	57	
Korea, Rep. of	54	
Hong Kong, SAR	51	
Belgium (Flemish)	49	
Netherlands	49	
Russian Federation	43	
Malaysia	43	
Slovak Republic	38	0
Canada	38	0
Hungary	38	0
Jordan	37	0
Slovenia	34	0
United States	34	O
Romania	34	0
International Average	e 33	

international Average	33	
Australia	33	0
Bulgaria	32	O
Thailand	30	O
Indonesia	29	O
Italy	28	O
Czech Republic	28	O
England	28	O
Lithuania	26	O
Moldova	26	O
Cyprus	26	O
New Zealand	24	▼
Turkey	24	▼
Iran, Islamic Rep.	24	\blacksquare
Latvia (LSS)	23	▼
Macedonia, Rep. of	23	\blacksquare
South Africa	21	V
Finland	21	
Philippines	21	\blacksquare
Israel	20	\blacksquare
Morocco	17	
Chile	15	
Tunisia	15	\blacksquare
I		

Country average vs. International average:

Higher
Not different
Lower

Correct Response:

Ε

Content Domain	Cognitive Domain
Algebra	Using Routine Procedures

Value of x in mathematical equation

Find the value of x if $12x - 10 = 6x + 32$	
Answer:	

Item Number: L17

SCORING

Correct Response

• 7

- Incorrect Response $3\frac{2}{3}$ OR $2\frac{1}{3}$ OR $1\frac{2}{9}$ [uses incorrect operation: 32 10 = 22, 12x + 6x = 18x, or both]
- Any expression or equation, other than x = 7, containing x
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task)

Overall Percent Correct

lanan	85	A
Japan Hong Kong, SAR	80	
Korea, Rep. of	80	
Slovak Republic	78	
Russian Federation	78 77	
Slovenia	7 <i>7</i>	
Singapore	76 75	
	75 74	
Hungary Chinese Taipei	74 73	A
Romania	73 70	•
Czech Republic	70 66	A
Lithuania	62	
Latvia (LSS)	62 58	
Belgium (Flemish)	58 58	A
Moldova	58 56	
1	56 54	0
Macedonia, Rep. of	٠.	0
Cyprus	51 E1	•
Israel	51	0
Italy	46 44	0
International Average	44	
Malaysia Bulgaria	43 34	0
United States	34	_
Canada	33	_
Turkey	33 32	_
Australia	32 31	* * * *
Thailand	٥.	▼
IIIaiidIIU	20	_
England	29	\blacksquare
England	26	V
Finland	26 24	V
Finland Iran, Islamic Rep.	26 24 23	V
Finland Iran, Islamic Rep. Netherlands	26 24 23 19	V
Finland Iran, Islamic Rep. Netherlands New Zealand	26 24 23 19	V
Finland Iran, Islamic Rep. Netherlands New Zealand Jordan	26 24 23 19 19	V
Finland Iran, Islamic Rep. Netherlands New Zealand Jordan Indonesia	26 24 23 19 19 18	V
Finland Iran, Islamic Rep. Netherlands New Zealand Jordan Indonesia Chile	26 24 23 19 19 18 18	V
Finland Iran, Islamic Rep. Netherlands New Zealand Jordan Indonesia Chile Morocco	26 24 23 19 19 18 18 12 7	V
Finland Iran, Islamic Rep. Netherlands New Zealand Jordan Indonesia Chile Morocco Philippines	26 24 23 19 19 18 18 12 7	V
Finland Iran, Islamic Rep. Netherlands New Zealand Jordan Indonesia Chile Morocco	26 24 23 19 19 18 18 12 7	\blacksquare

Country average vs. International average:

Higher 0 Not different Lower

Content Domain	Cognitive Domain
Algebra	Using Routine Procedures

Value of expression substituting x=3

If $x = 3$, what is the value of $\frac{5x + 3}{4x - 3}$?
Answer:

Item Number: N13

SCORING

Correct Response

- . 2
- 18/9, 2/1 or other fraction equivalent to 2
- · Other correct

Incorrect Response

- Indicates the correct substitution of *x* = 3 in numerator and/or denominator but student did not correctly complete the solution.
- Indicates a wrong substitution such as 5x = 53 or 5x = 5 + 3 in the numerator; for example, any fractions with 56 or 11 as numerators, or 40 or 4 as denominators.
- A response containing the variable *x*
- Cancels or ignores x's (e.g., 8/1, 8, 7, etc.)
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task)

Overall Percent Correct

Singapore	83	
Chinese Taipei	81	
Hong Kong, SAR	81	
Hungary	80	
Russian Federation	79	
Slovenia	75	
Korea, Rep. of	75	
Slovak Republic	72	
Japan	69	
Lithuania	67	
Belgium (Flemish)	67	
Canada	67	
Bulgaria	65	
Latvia (LSS)	64	
Czech Republic	62	0
United States	61	
Australia	61	0
Romania	59	0
Moldova	57	0
International Averag	e 53	
Macedonia, Rep. of	53	0
Macedonia, Rep. of Israel	53 53	0
1 1		
Israel Netherlands	53	0
Israel	53 50	0
Israel Netherlands Malaysia	53 50 48	0 0
Israel Netherlands Malaysia Cyprus	53 50 48 47	0 0 0
Israel Netherlands Malaysia Cyprus Thailand	53 50 48 47 47	0 0 0 0 0
Israel Netherlands Malaysia Cyprus Thailand Tunisia	53 50 48 47 47	0 0 0 0 0
Israel Netherlands Malaysia Cyprus Thailand Tunisia Italy	53 50 48 47 47 47	0 0 0 0 0 0
Israel Netherlands Malaysia Cyprus Thailand Tunisia Italy England	53 50 48 47 47 47 47 46	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Israel Netherlands Malaysia Cyprus Thailand Tunisia Italy England Finland	53 50 48 47 47 47 47 46 44	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Israel Netherlands Malaysia Cyprus Thailand Tunisia Italy England Finland New Zealand	53 50 48 47 47 47 47 46 44 42	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Israel Netherlands Malaysia Cyprus Thailand Tunisia Italy England Finland New Zealand Jordan	53 50 48 47 47 47 47 46 44 42 40	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Israel Netherlands Malaysia Cyprus Thailand Tunisia Italy England Finland New Zealand Jordan Turkey Indonesia	53 50 48 47 47 47 47 46 44 42 40 35	0 0 0 0 0
Israel Netherlands Malaysia Cyprus Thailand Tunisia Italy England Finland New Zealand Jordan Turkey	53 50 48 47 47 47 47 46 44 42 40 35 28	0 0 0 0 0
Israel Netherlands Malaysia Cyprus Thailand Tunisia Italy England Finland New Zealand Jordan Turkey Indonesia Iran, Islamic Rep.	53 50 48 47 47 47 46 44 42 40 35 28 28	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Israel Netherlands Malaysia Cyprus Thailand Tunisia Italy England Finland New Zealand Jordan Turkey Indonesia Iran, Islamic Rep. Philippines	53 50 48 47 47 47 46 44 42 40 35 28 28	0 0 0 0 0
Israel Netherlands Malaysia Cyprus Thailand Tunisia Italy England Finland New Zealand Jordan Turkey Indonesia Iran, Islamic Rep. Philippines Chile	53 50 48 47 47 47 46 44 42 40 35 28 28 15	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:

Higher
Not different
Lower

Content Domain	Cognitive Domain
Algebra	Knowing

Expression equivalent to $n \times n \times n$

Which of these expressions is equivalent to $n \times n \times n$ for all values of n?

- A. $\frac{n}{3}$
- B. n + 3
- C. 3*n*
- D. n^3

Item Number: P09

Correct Response:

D

Overall Percent Correct

Singapore	90	
Korea, Rep. of	86	
Hong Kong, SAR	85	
United States	85	A A A A A
Japan	85	A
Tunisia	84	A
Chinese Taipei	83	
Czech Republic	81	A
Belgium (Flemish)	80	0
Slovak Republic	80	
Indonesia	80	
Slovenia	80	A
Thailand	80	
Hungary	79	
Latvia (LSS)	77	0
Australia	77	0
Russian Federation	76	0
Canada	75	0
Cyprus	74	0
Malaysia	74	0
Italy	72	0
Lithuania	71	Ο
International Average	e 71	
Iran, Islamic Rep.	71	0
Bulgaria	69	Ο
Israel	67	Ο
Chile	67	0
Romania	66	0
New Zealand	66	Ο
England	61	•
Jordan	61	•
Netherlands	55	•
South Africa	55	<!--</td-->
Moldova	53	▼
Finland	53	▼
Philippines	49	•

Country average vs. International average:

47

Turkey

Morocco

Higher △ Not different ○ Lower ▼

Content Domain	Cognitive Domain
Algebra	Knowing

Equivalent expression: k+k+k+k

For all numbers k, k+k+k+k+k can be written as

A. k+5B. 5kC. k^5 D. 5(k+1)

Item Number: P11

Overall Percent Correct

Slovak Republic 80 Hong Kong, SAR 80 Singapore 76 Chinese Taipei 76 Hungary 75 Slovenia 72 Czech Republic 70 Korea, Rep. of 69 Belgium (Flemish) 69 Russian Federation 68 Malaysia 67 Latvia (LSS) 67 Cyprus 65 Cyprus 65 Bulgaria 65 Romania 65 Macedonia, Rep. of 62
Singapore 76 A Chinese Taipei 76 A Hungary 75 Slovenia 72 A Czech Republic 70 A Korea, Rep. of 69 Belgium (Flemish) 69 Russian Federation 68 A Malaysia 67 A Latvia (LSS) 67 A Cyprus 65 Cyprus 65 Bulgaria 65 Romania 65 Macedonia, Rep. of 62
Chinese Taipei 76 Hungary 75 Slovenia 72 Czech Republic 70 Korea, Rep. of 69 Belgium (Flemish) 69 Russian Federation 68 Malaysia 67 Latvia (LSS) 67 Cyprus 65 Cyprus 65 Romania 65 Macedonia, Rep. of 62
Hungary 75 ▲ Slovenia 72 ▲ Czech Republic 70 ▲ Korea, Rep. of 69 ▲ Belgium (Flemish) 69 ▲ Russian Federation 68 ▲ Malaysia 67 ▲ Latvia (LSS) 67 ▲ Cyprus 65 O Bulgaria 65 O Romania 65 O Macedonia, Rep. of 62 O
Slovenia 72 ▲ Czech Republic 70 ▲ Korea, Rep. of 69 ▲ Belgium (Flemish) 69 ▲ Russian Federation 68 ▲ Malaysia 67 ▲ Latvia (LSS) 67 ▲ Cyprus 65 O Bulgaria 65 O Romania 65 O Macedonia, Rep. of 62
Czech Republic 70 ▲ Korea, Rep. of 69 ▲ Belgium (Flemish) 69 ▲ Russian Federation 68 ▲ Malaysia 67 ▲ Latvia (LSS) 67 ▲ Cyprus 65 O Bulgaria 65 O Romania 65 O Macedonia, Rep. of 62
Korea, Rep. of Belgium (Flemish) Russian Federation 68 Malaysia 67 Latvia (LSS) 67 Cyprus 65 Bulgaria 65 Romania 65 Macedonia, Rep. of 69 ▲
Belgium (Flemish) 69 Russian Federation 68 Malaysia 67 Latvia (LSS) 67 Cyprus 65 Bulgaria 65 Romania 65 Macedonia, Rep. of 62
Russian Federation 68 Malaysia 67 Latvia (LSS) 67 Cyprus 65 Bulgaria 65 Romania 65 Macedonia, Rep. of 62
Malaysia 67 ▲ Latvia (LSS) 67 ▲ Cyprus 65 O Bulgaria 65 O Romania 65 O Macedonia, Rep. of 62 O
Latvia (LSS) 67 ▲ Cyprus 65 O Bulgaria 65 O Romania 65 O Macedonia, Rep. of 62 O
Bulgaria 65 O Romania 65 O Macedonia, Rep. of 62 O
Romania 65 O Macedonia, Rep. of 62 O
Romania 65 O Macedonia, Rep. of 62 O
Japan 61 <mark>O</mark>
Turkey 59 <mark>O</mark>
Israel 58 <mark>O</mark>
International Average 57
Netherlands 57 <mark>O</mark>
Italy 57 <mark>O</mark>
Finland 57 <mark>O</mark>
Canada 56 <mark>O</mark>
Moldova 55 <mark>O</mark>
Australia 54 <mark>O</mark>
New Zealand 54 <mark>O</mark>
Tunisia 53 <mark>O</mark>
Lithuania 52 <mark>O</mark>
Jordan 48 🔻
England 48 🔻
United States 46 ▼
Indonesia 41 🔻
South Africa 38 ▼
Jordan 48 V England 48 V United States 46 V Indonesia 41 V South Africa 38 V Philippines 37 V Iran, Islamic Rep. 36 V Chile 35 V Thailand 33 V
Iran, Islamic Rep. 36
Chile 35 ▼
Morocco 19 ▼

Country average vs. International average:

Higher △
Not different ○
Lower ▼

Correct Response:

В

Content Domain	Cognitive Domain
Algebra	Knowing

Expression when a, b, c are real

Which of the following is true when a, b, and c are different real numbers?

A. a - b = b - a

B. a(b - c) = b(c - a)

C. b - c = c - b

D. ab = ba

E. ab - c = ab - b

Item Number: R10

Overall Percent Correct

Korea, Rep. of Hong Kong, SAR Chinese Taipei Hungary Belgium (Flemish) Singapore Czech Republic Japan Slovak Republic Bulgaria Canada Latvia (LSS) Romania Australia Slovenia United States Netherlands Verterlands Verterland	Russian Federation	72	
Chinese Taipei 64 Hungary 58 Belgium (Flemish) 56 Singapore 53 Czech Republic 50 Japan 49 Slovak Republic 48 Bulgaria 47 Canada 43 Latvia (LSS) 42 Romania 42 Australia 41 Slovenia 41 United States 40 Netherlands 40 International Average 37 Tunisia 37 Moldova 36 Israel 35 Jordan 31 Macedonia, Rep. of 30 New Zealand 30 England 30 Lithuania 30 Thailand 29 Cyprus 28 Malaysia 26 Italy 23 Morocco 21 Turkey 20 Finland	Korea, Rep. of	69	
Chinese Taipei 64 Hungary 58 Belgium (Flemish) 56 Singapore 53 Czech Republic 50 Japan 49 Slovak Republic 48 Bulgaria 47 Canada 43 Latvia (LSS) 42 Romania 42 Australia 41 Slovenia 41 United States 40 Netherlands 40 International Average 37 Tunisia 37 Moldova 36 Israel 35 Jordan 31 Macedonia, Rep. of 30 New Zealand 30 England 30 Lithuania 30 Thailand 29 Cyprus 28 Malaysia 26 Italy 23 Morocco 21 Turkey 20 Finland	Hong Kong, SAR	67	
Belgium (Flemish) 56 Singapore 53 Czech Republic 50 Japan 49 A A Slovak Republic 48 Bulgaria 47 Canada 43 Latvia (LSS) 42 Romania 42 Australia 41 Slovenia 41 United States 40 Netherlands 40 International Average 37 Tunisia 37 Moldova 36 Israel 35 Jordan 31 Macedonia, Rep. of 30 New Zealand 30 England 30 Lithuania 30 Thailand 29 Cyprus 28 Malaysia 26 Italy 23 Morocco 21 Turkey 20 Finland 19 V Finland <td>Chinese Taipei</td> <td>64</td> <td></td>	Chinese Taipei	64	
Belgium (Flemish) 56 Singapore 53 Czech Republic 50 Japan 49 A A Slovak Republic 48 Bulgaria 47 Canada 43 Latvia (LSS) 42 Romania 42 Australia 41 Slovenia 41 United States 40 Netherlands 40 International Average 37 Tunisia 37 Moldova 36 Israel 35 Jordan 31 Macedonia, Rep. of 30 New Zealand 30 England 30 Lithuania 30 Thailand 29 Cyprus 28 Malaysia 26 Italy 23 Morocco 21 Turkey 20 Finland 19 V Finland <td>Hungary</td> <td>58</td> <td></td>	Hungary	58	
Czech Republic 50 O Japan 49 ▲ Slovak Republic 48 ▲ Bulgaria 47 ▲ Canada 43 O Latvia (LSS) 42 O Romania 42 O Australia 41 O Slovenia 41 O United States 40 O Netherlands 40 O International Average 37 Tunisia 37 O Moldova 36 O Israel 35 O Jordan 31 O Macedonia, Rep. of 30 O New Zealand 30 O England 30 O Lithuania 30 O Thailand 29 ▼ Cyprus 28 ▼ Malaysia 26 ▼ Italy 23 ▼	Belgium (Flemish)	56	
Czech Republic 50 O Japan 49 ▲ Slovak Republic 48 ▲ Bulgaria 47 ▲ Canada 43 O Latvia (LSS) 42 O Romania 42 O Australia 41 O Slovenia 41 O United States 40 O Netherlands 40 O International Average 37 Tunisia 37 O Moldova 36 O Israel 35 O Jordan 31 O Macedonia, Rep. of 30 O New Zealand 30 O England 30 O Lithuania 30 O Thailand 29 ▼ Cyprus 28 ▼ Malaysia 26 ▼ Italy 23 ▼	Singapore	53	
Slovak Republic 48 Bulgaria 47 Canada 43 Latvia (LSS) 42 Romania 42 Australia 41 Slovenia 41 United States 40 Netherlands 40 International Average 37 Tunisia 37 Moldova 36 Israel 35 Jordan 31 Macedonia, Rep. of 30 New Zealand 30 England 30 Lithuania 30 Thailand 29 Cyprus 28 Malaysia 26 Italy 23 Morocco 21 Turkey 20 Finland 19 South Africa 19 Iran, Islamic Rep. 18 Indonesia 14 Chile 11	Czech Republic	50	
Bulgaria 47 ▲ Canada 43 O Latvia (LSS) 42 O Romania 42 O Australia 41 O Slovenia 41 O United States 40 O Netherlands 40 O International Average 37 Tunisia 37 O Moldova 36 O Israel 35 O Jordan 31 O Macedonia, Rep. of 30 O New Zealand 30 O England 30 O Lithuania 30 O Thailand 29 ▼ Cyprus 28 ▼ Malaysia 26 ▼ Italy 23 ▼ Morocco 21 ▼ Turkey 20 ▼ Finland 19 ▼ South Africa 19 ▼ Iran, Islamic Rep. 18 ▼ <td>Japan</td> <td>49</td> <td></td>	Japan	49	
Canada 43 O Latvia (LSS) 42 O Romania 42 O Australia 41 O Slovenia 41 O United States 40 O Netherlands 40 O International Average 37 Tunisia 37 O Moldova 36 O Israel 35 O Jordan 31 O Macedonia, Rep. of 30 O New Zealand 30 O England 30 O Lithuania 30 O Thailand 29 ▼ Cyprus 28 ▼ Malaysia 26 ▼ Italy 23 ▼ Morocco 21 ▼ Turkey 20 ▼ Finland 19 ▼ South Africa 19 ▼ Indonesia 14 ▼ Chile 11 ▼	Slovak Republic	48	
Latvia (LSS) 42 O Romania 42 O Australia 41 O Slovenia 41 O United States 40 O Netherlands 40 O International Average 37 Tunisia 37 O Moldova 36 O Israel 35 O Jordan 31 O Macedonia, Rep. of 30 O New Zealand 30 O England 30 O Lithuania 30 O Thailand 29 ▼ Cyprus 28 ▼ Malaysia 26 ▼ Italy 23 ▼ Morocco 21 ▼ Turkey 20 ▼ Finland 19 ▼ South Africa 19 ▼ Iran, Islamic Rep. 18 ▼ Indonesia 14 ▼ Chile 11 ▼ <td>Bulgaria</td> <td>47</td> <td></td>	Bulgaria	47	
Romania 42 O Australia 41 O Slovenia 41 O United States 40 O Netherlands 40 O International Average 37 Tunisia 37 O Moldova 36 O Israel 35 O Jordan 31 O Macedonia, Rep. of 30 O New Zealand 30 O England 30 O Lithuania 30 O Lithuania 30 O Cyprus 28 V Malaysia 26 V Italy 23 V Morocco 21 Turkey 20 Finland 19 South Africa 19 Iran, Islamic Rep. 18 Indonesia 14 Chile	Canada	43	0
Australia 41 O Slovenia 41 O United States 40 O Netherlands 40 O International Average 37 Tunisia 37 O Moldova 36 O Israel 35 O Jordan 31 O Macedonia, Rep. of 30 O New Zealand 30 O England 30 O Lithuania 30 O Lithuania 30 O Cyprus 28 V Malaysia 26 V Italy 23 V Morocco 21 Turkey 20 Finland 19 South Africa 19 Iran, Islamic Rep. 18 Indonesia 14 Chile 11	Latvia (LSS)	42	0
Slovenia 41 O United States 40 O Netherlands 40 O International Average 37 Tunisia 37 O Moldova 36 O Israel 35 O Jordan 31 O Macedonia, Rep. of 30 O New Zealand 30 O England 30 O Lithuania 30 O Lithuania 30 O Thailand 29 V Cyprus 28 V Malaysia 26 V Italy 23 V Morocco 21 V Turkey 20 Finland 19 South Africa 19 Iran, Islamic Rep. 18 V Indonesia 14 Chile	Romania	42	0
United States 40 O Netherlands 40 O International Average 37 Tunisia 37 O Moldova 36 O Israel 35 O Jordan 31 O Macedonia, Rep. of 30 O New Zealand 30 O England 30 O Lithuania 30 O Lithuania 30 O Thailand 29 V Cyprus 28 V Malaysia 26 V Italy 23 V Morocco 21 V Turkey 20 V Finland 19 South Africa 19 Iran, Islamic Rep. 18 Indonesia 14 V Chile 11	Australia	41	0
Netherlands 40 O International Average 37 Tunisia 37 O Moldova 36 O Israel 35 O Jordan 31 O Macedonia, Rep. of 30 O New Zealand 30 O England 30 O Lithuania 30 O Thailand 29 V Cyprus 28 V Malaysia 26 V Italy 23 V Morocco 21 V Turkey 20 V Finland 19 V South Africa 19 V Iran, Islamic Rep. 18 V Indonesia 14 V Chile 11 V	Slovenia	41	0
International Average 37 Tunisia 37 0 Moldova 36 0 Israel 35 0 Jordan 31 0 Macedonia, Rep. of 30 0 New Zealand 30 0 England 30 0 Lithuania 30 0 Thailand 29 ▼ Cyprus 28 ▼ Malaysia 26 ▼ Italy 23 ▼ Morocco 21 ▼ Turkey 20 ▼ Finland 19 ▼ South Africa 19 ▼ Iran, Islamic Rep. 18 ▼ Indonesia 14 ▼ Chile 11 ▼	United States	40	0
Tunisia 37 O Moldova 36 O Israel 35 O Jordan 31 O Macedonia, Rep. of 30 O New Zealand 30 O England 30 O Lithuania 30 O Thailand 29 ▼ Cyprus 28 ▼ Malaysia 26 ▼ Italy 23 ▼ Morocco 21 ▼ Turkey 20 ▼ Finland 19 ▼ South Africa 19 ▼ Iran, Islamic Rep. 18 ▼ Indonesia 14 ▼ Chile 11 ▼			0
Moldova 36 O Israel 35 O Jordan 31 O Macedonia, Rep. of 30 O New Zealand 30 O England 30 O Lithuania 30 O Thailand 29 V Cyprus 28 V Malaysia 26 V Italy 23 V Morocco 21 V Turkey 20 V Finland 19 V South Africa 19 V Iran, Islamic Rep. 18 V Indonesia 14 V Chile 11 V	International Averag	e 37	
Israel 35 O Jordan 31 O Macedonia, Rep. of 30 O New Zealand 30 O England 30 O Lithuania 30 O Thailand 29 V Cyprus 28 V Malaysia 26 V Italy 23 V Morocco 21 V Turkey 20 V Finland 19 V South Africa 19 V Iran, Islamic Rep. 18 V Indonesia 14 V Chile 11 V			
Jordan 31 O Macedonia, Rep. of 30 O New Zealand 30 O England 30 O Lithuania 30 O Thailand 29 V Cyprus 28 V Malaysia 26 V Italy 23 V Morocco 21 V Turkey 20 V Finland 19 V South Africa 19 Iran, Islamic Rep. 18 V Indonesia 14 V Chile 11 V			
Macedonia, Rep. of 30 O New Zealand 30 O England 30 O Lithuania 30 O Thailand 29 V Cyprus 28 V Malaysia 26 V Italy 23 V Morocco 21 V Turkey 20 V Finland 19 V South Africa 19 Iran, Islamic Rep. 18 Indonesia 14 V Chile 11 V			
New Zealand 30 O England 30 O Lithuania 30 O Thailand 29 ▼ Cyprus 28 ▼ Malaysia 26 ▼ Italy 23 ▼ Morocco 21 ▼ Turkey 20 ▼ Finland 19 ▼ South Africa 19 Iran, Islamic Rep. 18 ▼ Indonesia 14 ▼ Chile 11 ▼	Israel	35	0
England 30 O Lithuania 30 O Thailand 29 ▼ Cyprus 28 ▼ Malaysia 26 ▼ Italy 23 ▼ Morocco 21 ▼ Turkey 20 ▼ Finland 19 ▼ South Africa 19 Iran, Islamic Rep. 18 Indonesia 14 ▼ Chile 11	Israel Jordan	35 31	0
Lithuania 30 O Thailand 29 V Cyprus 28 V Malaysia 26 V Italy 23 V Morocco 21 V Turkey 20 V Finland 19 V South Africa 19 Iran, Islamic Rep. 18 Indonesia 14 Chile 11	Israel Jordan Macedonia, Rep. of	35 31 30	0 0 0
Thailand 29 ▼ Cyprus 28 ▼ Malaysia 26 ▼ Italy 23 ▼ Morocco 21 ▼ Turkey 20 ▼ Finland 19 ▼ South Africa 19 ▼ Iran, Islamic Rep. 18 ▼ Indonesia 14 ▼ Chile 11	Israel Jordan Macedonia, Rep. of New Zealand	35 31 30 30	0 0 0
Thailand 29 Cyprus 28 Malaysia 26 Italy 23 Morocco 21 Turkey 20 Finland 19 South Africa 19 Iran, Islamic Rep. 18 Indonesia 14 Chile 11 Philippines 8	Israel Jordan Macedonia, Rep. of New Zealand England	35 31 30 30 30	0 0 0 0
Cyprus 28 W Malaysia 26 W Italy 23 W Morocco 21 W Turkey 20 W Finland 19 W South Africa 19 W Iran, Islamic Rep. 18 W Indonesia 14 W Chile 11 W	Israel Jordan Macedonia, Rep. of New Zealand England Lithuania	35 31 30 30 30 30	0 0 0 0 0
Malaysia 26 V Italy 23 V Morocco 21 V Turkey 20 V Finland 19 V South Africa 19 V Iran, Islamic Rep. 18 V Indonesia 14 V Chile 11 V	Israel Jordan Macedonia, Rep. of New Zealand England Lithuania Thailand	35 31 30 30 30 30 29	0 0 0 0 0
Italy 23 Morocco 21 Turkey 20 Finland 19 South Africa 19 Iran, Islamic Rep. 18 Indonesia 14 Chile 11 Philippines 8	Israel Jordan Macedonia, Rep. of New Zealand England Lithuania Thailand Cyprus	35 31 30 30 30 30 29 28	0 0 0 0 0
Morocco 21 V Turkey 20 V Finland 19 V South Africa 19 V Iran, Islamic Rep. 18 V Indonesia 14 V Chile 11 V	Israel Jordan Macedonia, Rep. of New Zealand England Lithuania Thailand Cyprus Malaysia	35 31 30 30 30 30 29 28 26	0 0 0 0 0
Turkey 20 V Finland 19 V South Africa 19 V Iran, Islamic Rep. 18 V Indonesia 14 V Chile 11 V	Israel Jordan Macedonia, Rep. of New Zealand England Lithuania Thailand Cyprus Malaysia Italy	35 31 30 30 30 30 29 28 26 23	0 0 0 0 0
Finland 19 South Africa 19 Iran, Islamic Rep. 18 Indonesia 14 Chile 11 Philippines 8	Israel Jordan Macedonia, Rep. of New Zealand England Lithuania Thailand Cyprus Malaysia Italy Morocco	35 31 30 30 30 30 29 28 26 23 21	0 0 0 0 0
South Africa 19 V Iran, Islamic Rep. 18 V Indonesia 14 V Chile 11 V Philippines 8 V	Israel Jordan Macedonia, Rep. of New Zealand England Lithuania Thailand Cyprus Malaysia Italy Morocco Turkey	35 31 30 30 30 30 29 28 26 23 21 20	0 0 0 0 0
Iran, Islamic Rep. 18 ▼ Indonesia 14 ▼ Chile 11 ▼ Philippines 8 ▼	Israel Jordan Macedonia, Rep. of New Zealand England Lithuania Thailand Cyprus Malaysia Italy Morocco Turkey Finland	35 31 30 30 30 30 29 28 26 23 21 20	0 0 0 0 0
Indonesia 14 ▼ Chile 11 ▼ Philippines 8 ▼	Israel Jordan Macedonia, Rep. of New Zealand England Lithuania Thailand Cyprus Malaysia Italy Morocco Turkey Finland South Africa	35 31 30 30 30 30 29 28 26 23 21 20 19	0 0 0 0 0
Chile 11 ▼ Philippines 8 ▼	Israel Jordan Macedonia, Rep. of New Zealand England Lithuania Thailand Cyprus Malaysia Italy Morocco Turkey Finland South Africa Iran, Islamic Rep.	35 31 30 30 30 30 29 28 26 23 21 20 19 19	0 0 0 0 0
Philippines 8	Israel Jordan Macedonia, Rep. of New Zealand England Lithuania Thailand Cyprus Malaysia Italy Morocco Turkey Finland South Africa Iran, Islamic Rep. Indonesia	35 31 30 30 30 30 29 28 26 23 21 20 19 19 18 14	0 0 0 0 0
	Israel Jordan Macedonia, Rep. of New Zealand England Lithuania Thailand Cyprus Malaysia Italy Morocco Turkey Finland South Africa Iran, Islamic Rep. Indonesia Chile	35 31 30 30 30 30 29 28 26 23 21 20 19 19 18 14	0 0 0 0 0

Country average vs. International average:

Higher △ Not different ○ Lower ▼

Correct Response:

Content Domain	Cognitive Domain
Algebra	Knowing

Operations on negative number

If k represents a negative number, which of these is a positive number?

A. k^2

B. *k* ³

C. 2k

 $\mathrm{D.}\,\frac{k}{2}$

Item Number: R12

Overall Percent Correct

Chinese Taipei	84	
Russian Federation	81	
Hong Kong, SAR	79	
Korea, Rep. of	69	
Japan	69	
Slovenia	67	
Latvia (LSS)	67	
Hungary	67	
Slovak Republic	66	
Bulgaria	66	
Lithuania	64	
Belgium (Flemish)	63	
Singapore	63	
Romania	59	
Czech Republic	55	O
Moldova	49	O
Italy	49	O
Israel	48	O
International Averag	e 47	
United States	46	0
Netherlands	42	O
Malaysia	42	O
Tunisia	41	O
Macedonia, Rep. of	40	O
Canada	39	O
Australia	34	\blacksquare
Turkey	33	\blacksquare
Thailand	32	○▼▼▼
Indonesia	30	\blacksquare
Iran, Islamic Rep.	30	\blacksquare

Country average vs. International average:

Cyprus

Chile

England

Finland

Philippines New Zealand

South Africa

Morocco Jordan •

▼ ▼

29

29

28

27

27 25

25

20

Higher
Not different
Lower

Correct Response:

Α

Content Domain	Cognitive Domain
Algebra	Investigating and Solving Problems

Total club members: boys and girls

A club has 86 members, and there are 14 more girls than boys. How many boys and how many girls are members of the club?

Show your work.

Item Number: T01

SCORING

Correct Response

- 36 boys and 50 girls [Numerical method: e.g., $86 \div 2 = 43$; 43 7 = 36 boys; 43 + 7 = 50 girls]
- 36 boys and 50 girls [Algebraic method: e.g., b + (b + 14) = 86; 2b = 72; b = 36; g = 36 + 14 = 50]
- Other fully satisfactory method including "guess and check" with justification that 36 + 50 = 86

Partial Response

- Either 36 boys or 50 girls, with or without another (incorrect) number
- 36 and 50 are given [Makes correct computations but reverses labels or does not include any mention of which is boys or girls]
- 36 boys and 50 girls, no method shown
- Gives an algebraic equation or system of equations that can lead to the correct solution
- · Other partially correct

Incorrect Response

- 29 boys and 57 girls [Computes 86 ÷ 2 = 43; 43 14 = 29 and 43 + 14 = 57]
- \bullet One of the numbers is 72 [Computes 86 14]
- 29 boys and 43 girls [Computes 43 14 = 29]
- Gives an algebraic equation or system of equations that cannot lead to a correct solution
- · Other incorrect (including crossed out/erased, stray marks, illegible, or off task)

Overall Percent Correct

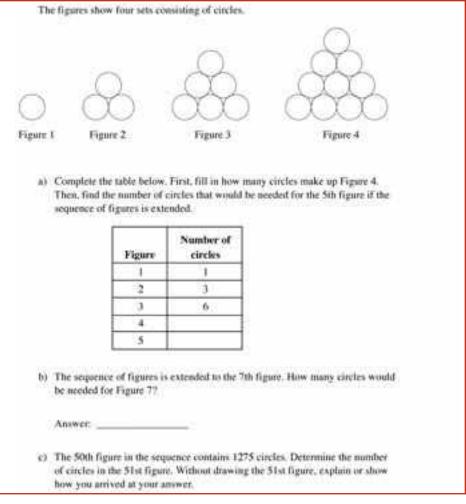
Singapore		
	72	
Chinese Taipei	66	
Hong Kong, SAR	62	
Belgium (Flemish)	62	
Korea, Rep. of	61	
Slovak Republic	53	
Japan	53	
Hungary	46	
Czech Republic	46	
Canada	42	
Bulgaria	41	0
Russian Federation	40	0
Netherlands	38	0
Romania	38	0
Australia	37	0
Slovenia	37	0
England	34	0
Cyprus	34	0
International Average	e 33	
Finland	32	0
Latvia (LSS)	32	0
New Zealand	32	0
New Zealand Malaysia	32 32	O
		0
Malaysia	32	0
Malaysia Israel	32 30	0
Malaysia Israel United States	32 30 29	0
Malaysia Israel United States Moldova Italy Lithuania	32 30 29 26	0
Malaysia Israel United States Moldova Italy	32 30 29 26 24	0
Malaysia Israel United States Moldova Italy Lithuania	32 30 29 26 24 23	0
Malaysia Israel United States Moldova Italy Lithuania Turkey	32 30 29 26 24 23 20	0
Malaysia Israel United States Moldova Italy Lithuania Turkey Thailand	32 30 29 26 24 23 20	0
Malaysia Israel United States Moldova Italy Lithuania Turkey Thailand Macedonia, Rep. of	32 30 29 26 24 23 20 20	0
Malaysia Israel United States Moldova Italy Lithuania Turkey Thailand Macedonia, Rep. of Iran, Islamic Rep.	32 30 29 26 24 23 20 20 16	0
Malaysia Israel United States Moldova Italy Lithuania Turkey Thailand Macedonia, Rep. of Iran, Islamic Rep. Indonesia	32 30 29 26 24 23 20 20 16 14	0
Malaysia Israel United States Moldova Italy Lithuania Turkey Thailand Macedonia, Rep. of Iran, Islamic Rep. Indonesia Jordan	32 30 29 26 24 23 20 20 16 14 14	0
Malaysia Israel United States Moldova Italy Lithuania Turkey Thailand Macedonia, Rep. of Iran, Islamic Rep. Indonesia Jordan Tunisia	32 30 29 26 24 23 20 20 16 14 14 13	0
Malaysia Israel United States Moldova Italy Lithuania Turkey Thailand Macedonia, Rep. of Iran, Islamic Rep. Indonesia Jordan Tunisia Philippines	32 30 29 26 24 23 20 20 16 14 14 13	O
Malaysia Israel United States Moldova Italy Lithuania Turkey Thailand Macedonia, Rep. of Iran, Islamic Rep. Indonesia Jordan Tunisia Philippines Chile	32 30 29 26 24 23 20 20 16 14 14 13 10 9	0

Country average vs. International average:

Higher △
Not different ○
Lower ▼

Content Domain	Cognitive Domain
Algebra	Investigating and Solving Problems

Sequence of figures with circles



Item Number: V04A

SCORING

A. Scoring for Number of Circles in Figures 4 and 5

Correct Response

• 10 AND 15

Incorrect Response

- 10 and any number other than 15
- 10 and no numerical response for 5th figure
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task)

Overall Percent Correct

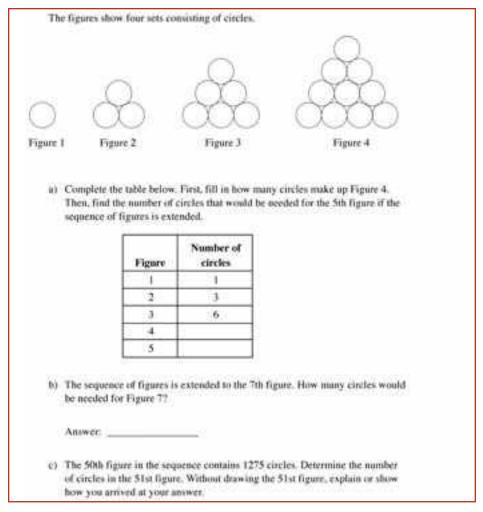
Korea, Rep. of	91	
Japan	91	
Singapore	89	
Chinese Taipei	87	
Hong Kong, SAR	87	
Netherlands	83	
England	81	
Belgium (Flemish)	81	
Canada	81	
Australia	81	
New Zealand	81	
Finland	80	
Czech Republic	79	
Hungary	77	
Slovenia	77	
Slovak Republic	77	
Malaysia	73	
United States	73	
Bulgaria	68	0
Russian Federation	67	0
Italy	66	0
International Average	e 65	
International Average Lithuania	e 65 64	0
		0
Lithuania	64	
Lithuania Cyprus	64 64	0
Lithuania Cyprus Moldova	64 64 64	0
Lithuania Cyprus Moldova Latvia (LSS)	64 64 64 63	0 0 0 0
Lithuania Cyprus Moldova Latvia (LSS) Israel	64 64 64 63 63	0 0 0 0 0
Lithuania Cyprus Moldova Latvia (LSS) Israel Romania	64 64 64 63 63 57	0 0 0 0 0
Lithuania Cyprus Moldova Latvia (LSS) Israel Romania Thailand	64 64 64 63 63 57	0 0 0 0 0
Lithuania Cyprus Moldova Latvia (LSS) Israel Romania Thailand Macedonia, Rep. of	64 64 64 63 63 57 54	0 0 0 0 0
Lithuania Cyprus Moldova Latvia (LSS) Israel Romania Thailand Macedonia, Rep. of Indonesia	64 64 64 63 63 57 54 51	0 0 0 0 0
Lithuania Cyprus Moldova Latvia (LSS) Israel Romania Thailand Macedonia, Rep. of Indonesia Turkey	64 64 63 63 57 54 51 47	0 0 0 0 0
Lithuania Cyprus Moldova Latvia (LSS) Israel Romania Thailand Macedonia, Rep. of Indonesia Turkey Jordan	64 64 63 63 57 54 51 47 43	0 0 0 0 0
Lithuania Cyprus Moldova Latvia (LSS) Israel Romania Thailand Macedonia, Rep. of Indonesia Turkey Jordan Tunisia	64 64 64 63 63 57 54 51 47 43 41	0 0 0 0 0
Lithuania Cyprus Moldova Latvia (LSS) Israel Romania Thailand Macedonia, Rep. of Indonesia Turkey Jordan Tunisia Iran, Islamic Rep.	64 64 64 63 63 57 54 51 47 43 41 39	0 0 0 0 0
Lithuania Cyprus Moldova Latvia (LSS) Israel Romania Thailand Macedonia, Rep. of Indonesia Turkey Jordan Tunisia Iran, Islamic Rep. Chile	64 64 63 63 57 54 51 47 43 41 39 36	0 0 0 0
Lithuania Cyprus Moldova Latvia (LSS) Israel Romania Thailand Macedonia, Rep. of Indonesia Turkey Jordan Tunisia Iran, Islamic Rep. Chile Philippines	64 64 63 63 57 54 51 47 43 41 39 36 35 27	0 0 0 0 0

Country average vs. International average:

Higher
Not different
Lower

Content Domain	Cognitive Domain
Algebra	Investigating and Solving Problems

Sequence of figures with circles



Item Number: V04B

SCORING

B. Scoring for Number of Circles in Figure 7

Correct Response

• 28

Incorrect Response

- 21
- 22
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task)

Overall Percent Correct

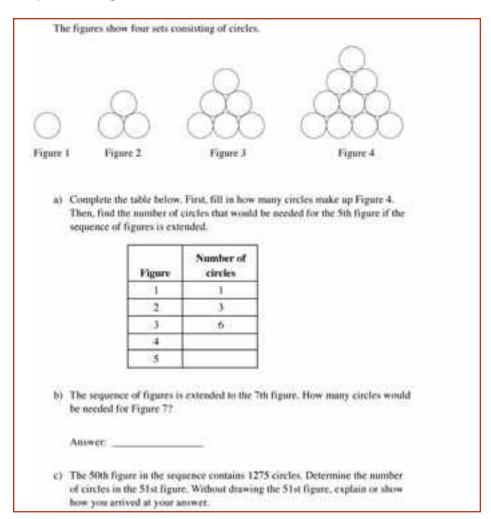
	0.0	
Korea, Rep. of	86	A
Japan	83	
Hong Kong, SAR	83	
Singapore	82	
Chinese Taipei	81	
Canada	72	
Australia	71	
Belgium (Flemish)	70	
England	68	
Netherlands	67	
Slovak Republic	67	
Hungary	66	
Slovenia	66	
Czech Republic	64	
New Zealand	64	
Malaysia	64	
Finland	62	
United States	62	_
Russian Federation	54	0
International Average	54	
Bulgaria	54	O
Bulgaria Cyprus	54 53	0
Cyprus	53	0
Cyprus Moldova	53 52	0
Cyprus Moldova Italy	53 52 52	0 0
Cyprus Moldova Italy Israel	53 52 52 52	0 0 0
Cyprus Moldova Italy Israel Latvia (LSS)	53 52 52 52 52 50	0 0 0 0
Cyprus Moldova Italy Israel Latvia (LSS) Lithuania	53 52 52 52 52 50 47	0 0 0 0 0 0
Cyprus Moldova Italy Israel Latvia (LSS) Lithuania Romania	53 52 52 52 52 50 47 47	0 0 0 0 0 0
Cyprus Moldova Italy Israel Latvia (LSS) Lithuania Romania Thailand	53 52 52 52 52 50 47 47 46	0 0 0 0 0 0
Cyprus Moldova Italy Israel Latvia (LSS) Lithuania Romania Thailand Macedonia, Rep. of	53 52 52 52 52 50 47 47 46 41	0 0 0 0 0 0
Cyprus Moldova Italy Israel Latvia (LSS) Lithuania Romania Thailand Macedonia, Rep. of Indonesia	53 52 52 52 52 50 47 47 46 41 38	0 0 0 0 0 0
Cyprus Moldova Italy Israel Latvia (LSS) Lithuania Romania Thailand Macedonia, Rep. of Indonesia Turkey	53 52 52 52 52 50 47 47 46 41 38 33	0 0 0 0 0 0
Cyprus Moldova Italy Israel Latvia (LSS) Lithuania Romania Thailand Macedonia, Rep. of Indonesia Turkey Jordan	53 52 52 52 52 50 47 47 46 41 38 33 30	0 0 0 0 0 0
Cyprus Moldova Italy Israel Latvia (LSS) Lithuania Romania Thailand Macedonia, Rep. of Indonesia Turkey Jordan Tunisia	53 52 52 52 50 47 47 46 41 38 33 30 29	0 0 0 0 0 0
Cyprus Moldova Italy Israel Latvia (LSS) Lithuania Romania Thailand Macedonia, Rep. of Indonesia Turkey Jordan Tunisia Iran, Islamic Rep.	53 52 52 52 52 50 47 47 46 41 38 33 30 29 24	0 0 0 0 0 0
Cyprus Moldova Italy Israel Latvia (LSS) Lithuania Romania Thailand Macedonia, Rep. of Indonesia Turkey Jordan Tunisia Iran, Islamic Rep. Chile	53 52 52 52 52 50 47 47 46 41 38 33 30 29 24 24	0 0 0 0 0 0
Cyprus Moldova Italy Israel Latvia (LSS) Lithuania Romania Thailand Macedonia, Rep. of Indonesia Turkey Jordan Tunisia Iran, Islamic Rep. Chile Philippines	53 52 52 52 52 50 47 47 46 41 38 33 30 29 24 24 21	0 0 0 0 0 0
Cyprus Moldova Italy Israel Latvia (LSS) Lithuania Romania Thailand Macedonia, Rep. of Indonesia Turkey Jordan Tunisia Iran, Islamic Rep. Chile Philippines Morocco	53 52 52 52 52 50 47 47 46 41 38 33 30 29 24 24 21 12	0 0 0 0 0 0 0
Cyprus Moldova Italy Israel Latvia (LSS) Lithuania Romania Thailand Macedonia, Rep. of Indonesia Turkey Jordan Tunisia Iran, Islamic Rep. Chile Philippines	53 52 52 52 52 50 47 47 46 41 38 33 30 29 24 24 21	0 0 0 0 0

Country average vs. International average:

Higher △
Not different ○
Lower ▼

Content Domain	Cognitive Domain
Algebra	Communicating and Reasoning

Sequence of figures with circles



Item Number: V04C

SCORING

C. Scoring for Explanation and Answer for 51st Figure

Correct Response

- 1326. Correct general expression $\frac{n (n + 1)}{2}$, $\frac{51(52)}{2}$, or equivalent
- 1326 [Adds 1275 + 51]
- Other fully correct, including [(figure number)² number of circles in previous figure]

Partial Response

- 1326 without showing how obtained
- · Correct method but does not write 1326 as answer
- · Other partially correct

Incorrect Response

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

Overall Percent Correct

Korea, Rep. of	70	A
Chinese Taipei	68	
Japan	66	
Singapore	65	
Hong Kong, SAR	57	
Netherlands	48	
Belgium (Flemish)	44	
Canada	43	
Australia	39	
Hungary	38	
Malaysia	37	
Slovenia	37	O
England	35	O
United States	34	
Czech Republic	34	O
Slovak Republic	31	0
New Zealand	31	0
International Average	e 30	
Finland	30	0
Israel	27	0
Russian Federation	27	0
Moldova	26	O
Bulgaria	26	O
Thailand	25	O
Italy	24	\blacksquare
Indonesia	24	\blacksquare
Latvia (LSS)	22	•
Romania	19	\blacksquare
Lithuania	19	•
Cyprus	15	•
Macedonia, Rep. of	13	\blacksquare
Jordan	13	•
Turkey	11	\blacksquare
Philippines	9	•
Chile	8	* * * * * * * * * * * * * * * * * * *
Tunisia	8	•
Iran, Islamic Rep.	8	•
South Africa	3	•
Morocco	3	•

Country average vs. International average:

Higher △
Not different ○
Lower ▼

Content Domain	Cognitive Domain
Measurement	Knowing

Units to measure mass of egg

What units would be best to use to measure the weight (mass) of an egg?

- A. centimeters
- B. milliliters
- C. grams
- D. kilograms

Item Number: D11

Overall Percent Correct

Japan	98	
Slovak Republic	96	
Hungary	96	
Czech Republic	95	
Korea, Rep. of	93	
Bulgaria	93	
Slovenia	93	
Singapore	93	
Belgium (Flemish)	92	
Russian Federation	92	
Australia	91	
Italy	90	
Netherlands	89	
Latvia (LSS)	89	
Malaysia	88	
Lithuania	88	
Finland	87	
Macedonia, Rep. of	87	
New Zealand	87	
Tunisia	86	
England	86	
Canada	85	
Romania	85	Ο
Moldova	82	Ο
Hong Kong, SAR	82	0
International Average	81	

Cyprus	79	0
Turkey	78	O
Israel	75	\blacksquare
Chinese Taipei	73	\blacksquare
Jordan	73	\blacksquare
Thailand	69	\blacksquare
Chile	69	\blacksquare
Iran, Islamic Rep.	68	\blacksquare
United States	68	\blacksquare
Morocco	55	\blacksquare
South Africa	48	\blacksquare
Philippines	47	\blacksquare
Indonesia	34	\blacksquare

Country average vs. International average:

Higher A
Not different O
Lower

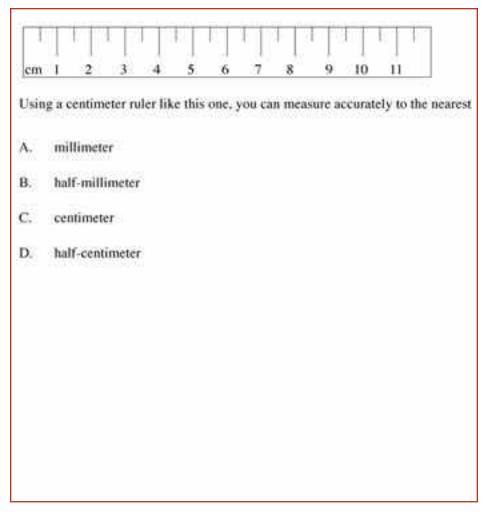
Not different O

Correct Response:

C

Content Domain	Cognitive Domain
Measurement	Knowing

Measurement accuracy of ruler



Item Number: F10

Overall Percent Correct

Finland Belgium (Flemish) Slovenia Latvia (LSS) Russian Federation Czech Republic Netherlands Hungary Bulgaria Australia Korea, Rep. of Italy Slovak Republic Lithuania Hong Kong, SAR New Zealand Singapore Canada	81 80 75 74 74 72 71 65 63 61 61 60 59 57 56 52	A A A A A A A A A A
England	51	0
International Averag		
Israel Chinese Taipei	48 47	0
	4/	
i i		
Romania	45	
Romania Macedonia, Rep. of	45 43	
Romania Macedonia, Rep. of United States	45 43 42	
Romania Macedonia, Rep. of United States Moldova	45 43 42 41	
Romania Macedonia, Rep. of United States Moldova Thailand	45 43 42 41 37	
Romania Macedonia, Rep. of United States Moldova Thailand Indonesia	45 43 42 41 37 35	
Romania Macedonia, Rep. of United States Moldova Thailand Indonesia Japan	45 43 42 41 37 35 35	
Romania Macedonia, Rep. of United States Moldova Thailand Indonesia Japan Chile	45 43 42 41 37 35 35 33	
Romania Macedonia, Rep. of United States Moldova Thailand Indonesia Japan Chile Malaysia	45 43 42 41 37 35 35 33 29	
Romania Macedonia, Rep. of United States Moldova Thailand Indonesia Japan Chile Malaysia Tunisia	45 43 42 41 37 35 35 35 32 29	
Romania Macedonia, Rep. of United States Moldova Thailand Indonesia Japan Chile Malaysia Tunisia South Africa	45 43 42 41 37 35 35 33 29 29 27	
Romania Macedonia, Rep. of United States Moldova Thailand Indonesia Japan Chile Malaysia Tunisia South Africa Cyprus	45 43 42 41 37 35 35 33 29 29 27 24	
Romania Macedonia, Rep. of United States Moldova Thailand Indonesia Japan Chile Malaysia Tunisia South Africa Cyprus Iran, Islamic Rep.	45 43 42 41 37 35 35 33 29 29 27 24 23	
Romania Macedonia, Rep. of United States Moldova Thailand Indonesia Japan Chile Malaysia Tunisia South Africa Cyprus Iran, Islamic Rep. Jordan	45 43 42 41 37 35 35 33 29 29 27 24 23 23	
Romania Macedonia, Rep. of United States Moldova Thailand Indonesia Japan Chile Malaysia Tunisia South Africa Cyprus Iran, Islamic Rep.	45 43 42 41 37 35 35 33 29 29 27 24 23	· · · · · · · · · · · · · · · · · · ·

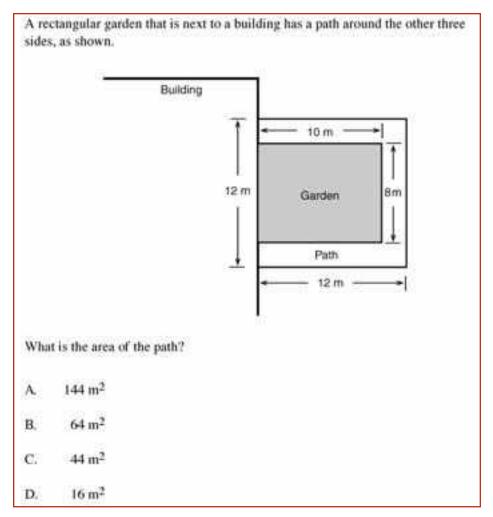
Country average vs. International average:

Higher △ Not different ○ Lower ▼

Correct Response:

Content Domain	Cognitive Domain
Measurement	Investigating and Solving Problems

Area of path around garden



Item Number: J10

Overall Percent Correct

Hong Kong, SAR	79	A
Singapore	78	
Japan	74	
Chinese Taipei	73	
Korea, Rep. of	67	A
Netherlands	57	
Australia	52	
Malaysia	52	
Slovak Republic	51	O
Canada	51	O
Belgium (Flemish)	51	
Finland	46	O
Hungary	46	O
Slovenia	46	O
Cyprus	45	O
Italy	45	O
Bulgaria	42	O
International Average	42	
Czech Republic	40	O
England	40	O
New Zealand	40	0
Tunisia	38	0
Russian Federation	38	O
Thailand	35	O
Moldova	34	0
United States	33	
Morocco	31	
Lithuania	31	
Macedonia, Rep. of	30	
Romania	29	
Jordan	29	
Israel	28	
Latvia (LSS)	28	
Iran, Islamic Rep.	26	
Indonesia	25	\blacksquare
Turkey	22	* * * * * * * * * * * * *
Chile	18	\blacksquare
Philippines	15	\blacksquare
South Africa	15	•

Country average vs. International average:

Higher
Not different
Lower

Correct Response:

В

Content Domain	Cognitive Domain
Measurement	Investigating and Solving Problems

Most paces to walk to end of hallway

Four girls measured the length of their paces. The chart shows their measurements.

Name	Length of Pace
Polly	80 cm
Maria	65 cm
Helen	75 cm
Susan	60 cm

Who would take the most paces in walking from one end of a hallway to the other?

- A. Polly
- B. Maria
- C. Helen
- D. Susan

Item Number: L13

Overall Percent Correct

Belgium (Flemish)	94	A
Hungary	91	A
Finland	90	A
Netherlands	90	A
Japan	86	A
Lithuania	84	A A A A
Latvia (LSS)	81	A
Chinese Taipei	81	A
Czech Republic	81	A
Slovak Republic	81	A A A A
Chile	81	A
Australia	79	A
Slovenia	79	A
Russian Federation	77	A A A A
Canada	76	A
Italy	75	A
Jordan	75	A
Hong Kong, SAR	75	
England	74	0
Korea, Rep. of	72	0
Cyprus	70	0
Romania	68	0
New Zealand	68	0
International Average	67	
Tunisia	67	0
Israel	67	0
Moldova	66	0
Bulgaria	65	0
Singapore	62	0
United States	57	* * *
Macedonia, Rep. of	56	▼
Thailand	54	▼
Malaysia	50	▼

Country average vs. International average:

48

45

27

23

20

•

Iran, Islamic Rep.

Turkey

Indonesia

Morocco

Philippines

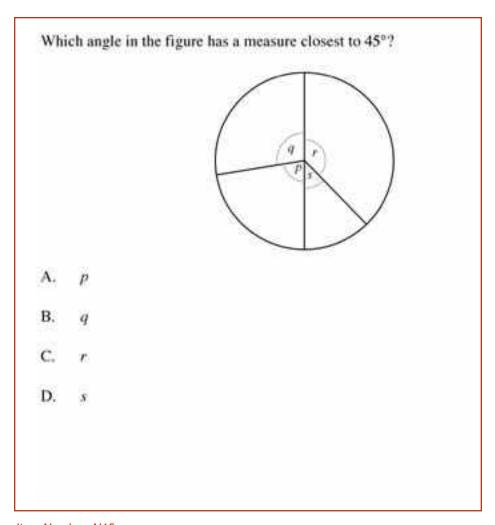
South Africa

Higher △
Not different ○
Lower ▼

Correct Response:

Content Domain	Cognitive Domain
Measurement	Knowing

Angle closest to 45 degrees



Item Number: N15

Overall Percent Correct

Japan	81	A
Korea, Rep. of	81	<u> </u>
Chinese Taipei	79	A
Slovak Republic	76	A
Canada	73	
Finland	73	A
Russian Federation	73	A
Hong Kong, SAR	73	A
Singapore	72	A
Hungary	72	A
Belgium (Flemish)	70	A
Latvia (LSS)	70	A
Australia	68	0
Thailand	64	0
Malaysia	63	0
Romania	62	0
Iran, Islamic Rep.	61	0
Czech Republic	61	0
Bulgaria	61	0
England	61	0
Slovenia	61	0
International Average		0
International Average Macedonia, Rep. of	60	0
International Average Macedonia, Rep. of Moldova	60 60 58	0
International Average Macedonia, Rep. of	60 60 58 58	0 0
International Average Macedonia, Rep. of Moldova Lithuania Cyprus	60 58 58 56	0 0 0
International Average Macedonia, Rep. of Moldova Lithuania Cyprus New Zealand	60 60 58 58 56 56	0 0 0 0
International Average Macedonia, Rep. of Moldova Lithuania Cyprus New Zealand Tunisia	60 60 58 58 56 56 56	0 0 0 0 0
International Average Macedonia, Rep. of Moldova Lithuania Cyprus New Zealand Tunisia Netherlands	60 58 58 56 56 53 52	0 0 0 0 0 0
International Average Macedonia, Rep. of Moldova Lithuania Cyprus New Zealand Tunisia Netherlands Indonesia	60 58 58 56 56 56 53 52 51	0 0 0 0 0 0
International Average Macedonia, Rep. of Moldova Lithuania Cyprus New Zealand Tunisia Netherlands Indonesia Israel	60 60 58 58 56 56 53 52 51 51	0 0 0 0 0 0
International Average Macedonia, Rep. of Moldova Lithuania Cyprus New Zealand Tunisia Netherlands Indonesia	60 60 58 58 56 56 53 52 51 51 51	0 0 0 0 0 0
International Average Macedonia, Rep. of Moldova Lithuania Cyprus New Zealand Tunisia Netherlands Indonesia Israel United States Italy	60 60 58 58 56 56 56 53 52 51 51 51	0 0 0 0 0 0
International Average Macedonia, Rep. of Moldova Lithuania Cyprus New Zealand Tunisia Netherlands Indonesia Israel United States Italy Chile	60 60 58 58 56 56 53 52 51 51 51 48	0 0 0 0 0 0
International Average Macedonia, Rep. of Moldova Lithuania Cyprus New Zealand Tunisia Netherlands Indonesia Israel United States Italy	60 60 58 58 56 56 53 52 51 51 51 48 45	0 0 0 0 0 0
International Average Macedonia, Rep. of Moldova Lithuania Cyprus New Zealand Tunisia Netherlands Indonesia Israel United States Italy Chile	60 60 58 58 56 56 53 52 51 51 51 48 45 45	0 0 0 0 0 0
International Average Macedonia, Rep. of Moldova Lithuania Cyprus New Zealand Tunisia Netherlands Indonesia Israel United States Italy Chile Turkey Jordan Morocco	50 60 58 58 56 56 53 52 51 51 51 51 48 45 45	0 0 0 0 0 0
International Average Macedonia, Rep. of Moldova Lithuania Cyprus New Zealand Tunisia Netherlands Indonesia Israel United States Italy Chile Turkey Jordan	60 60 58 58 56 56 53 52 51 51 51 48 45 45	0 0 0 0 0

Country average vs. International average:

Higher △
Not different ○
Lower ▼

Correct Response:

Content Domain	Cognitive Domain
Measurement	Investigating and Solving Problems

Ratio of width/perimeter in rectangle

√ha	nt is the ratio of	the width of the	ectangle to its perimeter?
	$\frac{1}{2}$		
3.	$\frac{1}{3}$		
B.	$\frac{1}{4}$		

Item Number: P08

Overall Percent Correct

Singapore	56	A
Chinese Taipei	53	
Hong Kong, SAR	45	
Japan	44	
Italy	32	
Korea, Rep. of	30	
Belgium (Flemish)	29	
Romania	28	O
Russian Federation	26	0
Bulgaria	25	0
International Averag	e 22	
Slovak Republic	21	0
Malaysia	21	0
Slovenia	21	O
Moldova	21	0
Jordan	20	0
Czech Republic	20	0
Latvia (LSS)	20	0
Lithuania	19	0
Australia	18	0
Turkey	18	O
South Africa	18	0
Tunisia	17	O
Indonesia	17	0
Cyprus	17	0
Hungary	16	0
New Zealand	16	O
Canada	16	•
Israel	15	\blacksquare
Netherlands	15	0
Iran, Islamic Rep.	15	\blacksquare
Chile	14	•
England	13	•
Macedonia, Rep. of	13	•
Morocco	12	\blacksquare
United States	11	\blacksquare
Finland	11	* * * * * * * * * * * * * * * * * * *
Thailand	9	\blacksquare
Philippines	8	•

Country average vs. International average:

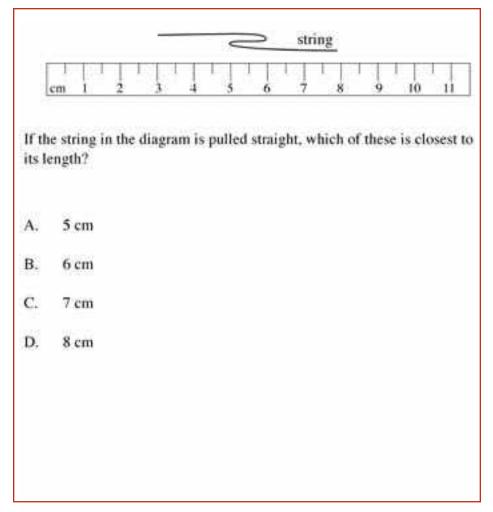
Higher A
Not different O
Lower

Note of the second of the

Correct Response:

Content Domain	Cognitive Domain
Measurement	Using Complex Procedures

Length of string pulled straight



Item Number: P12

Overall Percent Correct

Hungary	59	A
Japan	57	
Slovak Republic	57	_
Netherlands	56	<u> </u>
Belgium (Flemish)	54	<u> </u>
Hong Kong, SAR	53	<u> </u>
Czech Republic	53	_
Chinese Taipei	53	<u> </u>
Latvia (LSS)	53	_
Singapore	52	<u> </u>
Australia	52	<u> </u>
Slovenia	52	
Finland	50	0
Korea, Rep. of	50	A
Russian Federation	48	0
Malavsia	46	0
Canada	46	0
New Zealand	45	0
Lithuania	44	0
England	43	0
Lingiana		
International Averag	e 41	
International Averag	e 41	0
		0
Thailand	41	_
Thailand Moldova	41 40	0
Thailand Moldova Bulgaria	41 40 39	0
Thailand Moldova Bulgaria United States Tunisia	41 40 39 39	0 0
Thailand Moldova Bulgaria United States	41 40 39 39 38	0 0 0
Thailand Moldova Bulgaria United States Tunisia Cyprus	41 40 39 39 38 36	0 0 0 0 0
Thailand Moldova Bulgaria United States Tunisia Cyprus Romania	41 40 39 39 38 36 36	0 0 0 0 0 0
Thailand Moldova Bulgaria United States Tunisia Cyprus Romania Israel	41 40 39 39 38 36 36 34	0 0 0 0 0 0 0
Thailand Moldova Bulgaria United States Tunisia Cyprus Romania Israel Iran, Islamic Rep.	41 40 39 39 38 36 36 36 34 33	0 0 0 0 0 0 0
Thailand Moldova Bulgaria United States Tunisia Cyprus Romania Israel Iran, Islamic Rep.	41 40 39 39 38 36 36 34 33 32	0 0 0 0 0 0 0
Thailand Moldova Bulgaria United States Tunisia Cyprus Romania Israel Iran, Islamic Rep. Italy Macedonia, Rep. of	41 40 39 39 38 36 36 34 33 32 32	0 0 0 0 0 0 0
Thailand Moldova Bulgaria United States Tunisia Cyprus Romania Israel Iran, Islamic Rep. Italy Macedonia, Rep. of Turkey	41 40 39 39 38 36 36 34 33 32 32 30	0 0 0 0 0 0 0
Thailand Moldova Bulgaria United States Tunisia Cyprus Romania Israel Iran, Islamic Rep. Italy Macedonia, Rep. of Turkey Jordan	41 40 39 39 38 36 36 34 33 32 32 30 26	0 0 0 0 0 0 0
Thailand Moldova Bulgaria United States Tunisia Cyprus Romania Israel Iran, Islamic Rep. Italy Macedonia, Rep. of Turkey Jordan Chile	41 40 39 39 38 36 36 34 33 32 32 30 26 25	0 0 0 0 0 0 0
Thailand Moldova Bulgaria United States Tunisia Cyprus Romania Israel Iran, Islamic Rep. Italy Macedonia, Rep. of Turkey Jordan Chile Indonesia	41 40 39 39 38 36 36 34 33 32 32 30 26 25 23	0 0 0 0 0 0 0 0
Thailand Moldova Bulgaria United States Tunisia Cyprus Romania Israel Iran, Islamic Rep. Italy Macedonia, Rep. of Turkey Jordan Chile Indonesia Philippines	41 40 39 39 38 36 36 34 33 32 32 30 26 25 23 15	0 0 0 0 0 0 0

Country average vs. International average:

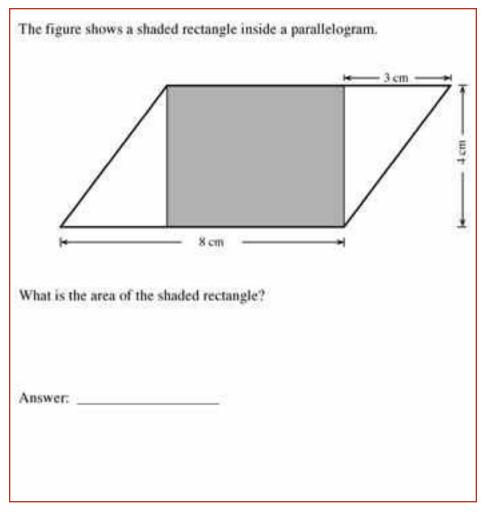
Higher △
Not different ○
Lower ▼

Correct Response:

C

Content Domain	Cognitive Domain
Measurement	Investigating and Solving Problems

Area of rectangle inside parallelogram



Item Number: T03

SCORING

Note: There is no distinction made between responses with or without units.

Correct Response

• 20

Incorrect Response

- 32 [4 x 8]
- 18 [perimeter]
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task)

Overall Percent Correct

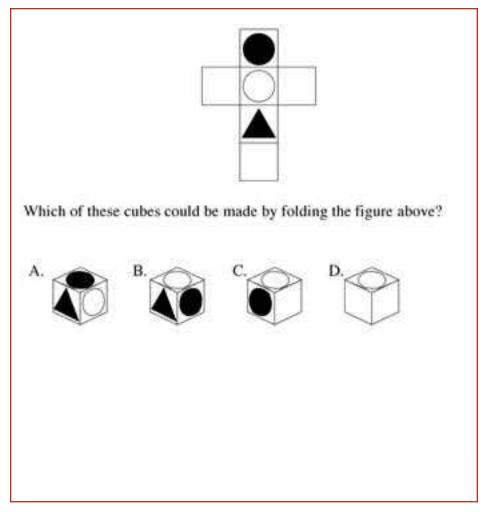
Singapore		
	83	
Japan	80	
Hong Kong, SAR	78	
Korea, Rep. of	78	
Chinese Taipei	75	
Belgium (Flemish)	65	
Canada	58	
Slovak Republic	57	
Finland	57	
Malaysia	56	
Netherlands	55	0
Australia	55	
Bulgaria	52	O
Slovenia	49	0
Russian Federation	49	0
Italy	48	0
England	48	0
Czech Republic	46	0
Hungary	45	0
Latvia (LSS)	44	0
International Averag	je 43	
Romania	43	0
	4.4	
New Zealand	41	O
New Zealand Cyprus	41	0
		0
Cyprus	41	O O ▼
Cyprus Moldova Tunisia Lithuania	41 38 38 35	○○▼▼
Cyprus Moldova Tunisia	41 38 38	○ ○ ▼ ▼
Cyprus Moldova Tunisia Lithuania	41 38 38 35	○ ○ ▼ ▼
Cyprus Moldova Tunisia Lithuania United States	41 38 38 35 34 33 28	○ ○ ▼ ▼
Cyprus Moldova Tunisia Lithuania United States Thailand Israel Jordan	41 38 38 35 34 33	○ ○ ▼ ▼
Cyprus Moldova Tunisia Lithuania United States Thailand Israel	41 38 38 35 34 33 28 26 25	○ ○ ▼ ▼
Cyprus Moldova Tunisia Lithuania United States Thailand Israel Jordan	41 38 38 35 34 33 28 26	○ ○ ▼ ▼
Cyprus Moldova Tunisia Lithuania United States Thailand Israel Jordan Iran, Islamic Rep.	41 38 38 35 34 33 28 26 25 25 20	○ ○ ▼ ▼
Cyprus Moldova Tunisia Lithuania United States Thailand Israel Jordan Iran, Islamic Rep. Macedonia, Rep. of Turkey Indonesia	41 38 38 35 34 33 28 26 25 25 20 20	○ ○ ▼ ▼
Cyprus Moldova Tunisia Lithuania United States Thailand Israel Jordan Iran, Islamic Rep. Macedonia, Rep. of Turkey Indonesia Morocco	41 38 38 35 34 33 28 26 25 25 20 20 8	○ ○ ▼ ▼
Cyprus Moldova Tunisia Lithuania United States Thailand Israel Jordan Iran, Islamic Rep. Macedonia, Rep. of Turkey Indonesia	41 38 38 35 34 33 28 26 25 25 20 20 8 7	○ ○ ▼ ▼
Cyprus Moldova Tunisia Lithuania United States Thailand Israel Jordan Iran, Islamic Rep. Macedonia, Rep. of Turkey Indonesia Morocco	41 38 38 35 34 33 28 26 25 25 20 20 8	0

Country average vs. International average:

Higher
Not different
Lower

Content Domain	Cognitive Domain
Geometry	Using Complex Procedures

Cube from folded 2-dimensional net



Item Number: B11

Overall Percent Correct

Japan	89	A
Korea, Rep. of	85	
Hong Kong, SAR	84	
Singapore	83	
Chinese Taipei	83	
Netherlands	82	A
Belgium (Flemish)	82	A
Czech Republic	78	A
Finland	77	A
Australia	75	A
Slovak Republic	74	A
Canada	74	A
Malaysia	71	A
Latvia (LSS)	71	A
New Zealand	70	A
Slovenia	68	
Hungary	68	A
United States	65	A
England	64	0
Bulgaria	64	0
Lithuania	60	0
Russian Federation	60	0
International Averag	e 59	
International Averag		0
International Averag Italy Thailand	e 59 55 53	0
Italy	55	
Italy Thailand	55 53	
ltaly Thailand Chile	55 53 48	
Italy Thailand Chile Israel Moldova	55 53 48 48	
Italy Thailand Chile Israel	55 53 48 48 47	
Italy Thailand Chile Israel Moldova Cyprus Romania	55 53 48 48 47 45	
Italy Thailand Chile Israel Moldova Cyprus	55 53 48 48 47 45 42 39	
Italy Thailand Chile Israel Moldova Cyprus Romania Macedonia, Rep. of	55 53 48 48 47 45 42	
Italy Thailand Chile Israel Moldova Cyprus Romania Macedonia, Rep. of Indonesia Tunisia	55 53 48 48 47 45 42 39 38	
Italy Thailand Chile Israel Moldova Cyprus Romania Macedonia, Rep. of Indonesia	55 53 48 48 47 45 42 39 38 37	
Italy Thailand Chile Israel Moldova Cyprus Romania Macedonia, Rep. of Indonesia Tunisia Turkey Jordan	55 53 48 48 47 45 42 39 38 37 34	
Italy Thailand Chile Israel Moldova Cyprus Romania Macedonia, Rep. of Indonesia Tunisia Turkey Jordan Iran, Islamic Rep.	55 53 48 48 47 45 42 39 38 37 34	
Italy Thailand Chile Israel Moldova Cyprus Romania Macedonia, Rep. of Indonesia Tunisia Turkey Jordan	55 53 48 48 47 45 42 39 38 37 34 34	
Italy Thailand Chile Israel Moldova Cyprus Romania Macedonia, Rep. of Indonesia Tunisia Turkey Jordan Iran, Islamic Rep. Philippines	55 53 48 48 47 45 42 39 38 37 34 34 28 24	O O

Country average vs. International average:

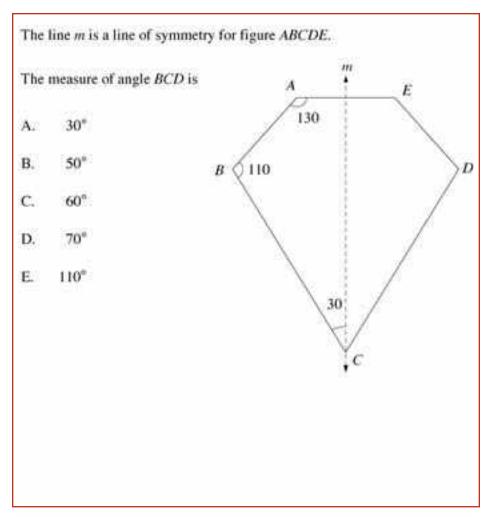
Higher △
Not different ○
Lower ▼

Correct Response:

C

Content Domain	Cognitive Domain	
Geometry	Investigating and Solving Problems	

Angles in symmetric polygon



Item Number: D07

Overall Percent Correct

I	Hong Kong, SAR	82	A
l	Korea, Rep. of	82	
l	Singapore	82	
١	Japan	80	
l	Bulgaria	80	
١	Latvia (LSS)	79	
l	Russian Federation	79	
١	Tunisia	77	
l	Slovak Republic	77	
l	Chinese Taipei	74	
l	Czech Republic	73	
١	Canada	72	
l	Lithuania	71	
l	Moldova	71	
l	Cyprus	69	
l	Finland	69	
l	Slovenia	66	0
١	Romania	66	Ο
l	Italy	65	0
l	Macedonia, Rep. of	65	0
l	Belgium (Flemish)	65	0
١	Netherlands	64	0
l	Australia	62	0
	International Average		
١	Malaysia	59	0
١	Israel	58	0
l	Thailand	58	O
١	Hungary	56	\blacksquare
l	New Zealand	54	•
l	United States	52	•
١	Iran, Islamic Rep.	50	•
l	England	46	•
١	Jordan	44	•
l	Indonesia	43	•
l	Morocco	36	•
	Chile	35	* * * * * * * * * * * * * * * * * * *
	Turkey	35	•
l	Philippines South Africa	23 19	•

Country average vs. International average:

Higher △
Not different ○
Lower ▼

Correct Response:

C

Content Domain	Cognitive Domain	
Geometry	Knowing	

NOT true for all rectangles

Of the following, which is NOT true for all rectangles?

- A. The opposite sides are parallel.
- B. The opposite sides are equal.
- C. All angles are right angles.
- D. The diagonals are equal.
- E. The diagonals are perpendicular.

Item Number: J11

Correct Response:

E

Overall Percent Correct

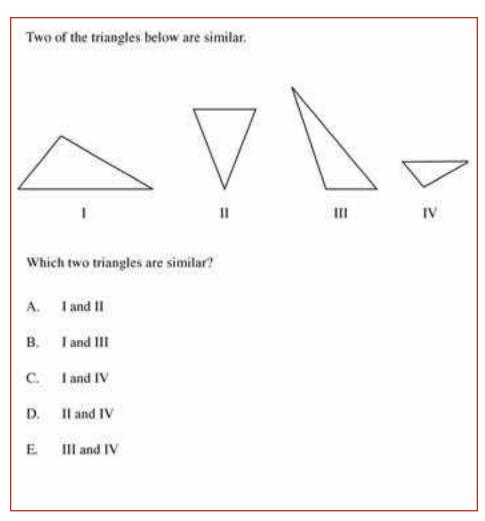
Japan 76 ▲ Tunisia 75 ▲ Belgium (Flemish) 74 ▲ Korea, Rep. of 73 ▲ Chinese Taipei 71 ▲ Russian Federation 71 ▲ Hungary 69 ▲ Bulgaria 68 ▲ Thailand 67 ▲ Latvia (LSS) 64 ▲ Slovak Republic 64 ▲ Slovenia 62 O Singapore 61 O Australia 61 O Romania 59 O England 58 O Italy 56 O Lithuania 55 O Cyprus 54 O Macedonia, Rep. of 54 O International Average 54 New Zealand 53 O Hong Kong, SAR 53 O Moldova 53 <td< th=""><th></th><th></th><th></th></td<>			
Tunisia 75 Belgium (Flemish) 74 Korea, Rep. of 73 Chinese Taipei 71 Russian Federation 71 Hungary 69 Bulgaria 68 Thailand 67 Latvia (LSS) 64 Slovak Republic 64 Slovenia 62 Singapore 61 Australia 61 Romania 59 England 58 Oltaly 56 Canada 55 Cyprus 54 Macedonia, Rep. of 54 New Zealand 53 Hong Kong, SAR 53 Moldova 53 Malaysia 52 Jordan 50 United States 46 Iran, Islamic Rep. 46 Netherlands 42 Irurkey 42 Israel 39 Finland 38 Chile 36 Indonesia 94 Czech Republic 38 W Morocco 27 Windorces Finland 38 Chile 36 Indonesia 34 Philippines 29 Czech Republic 28 Morocco 27	Japan	76	A
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Korea, Rep. of 73 ▲ Chinese Taipei 71 ▲ Russian Federation 71 ▲ Hungary 69 ▲ Bulgaria 68 ▲ Thailand 67 ▲ Latvia (LSS) 64 ▲ Slovak Republic 64 ▲ Slovenia 62 ○ Singapore 61 ○ Australia 61 ○ Romania 59 ○ England 58 ○ Italy 56 ○ Lithuania 55 ○ Cyprus 54 ○ Macedonia, Rep. of 54 ○ International Average 54 ○ New Zealand 53 ○ Hong Kong, SAR 53 ○ Moldova 53 ○ Malaysia 52 ○ Jordan 50 ○ United States 46	Belgium (Flemish)	74	
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Russian Federation 71	Chinese Taipei	71	
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Latvia (LSS) 64 ▲ Slovak Republic 64 ▲ Slovenia 62 ○ Singapore 61 ○ Australia 61 ○ Romania 59 ○ England 58 ○ Italy 56 ○ Lithuania 55 ○ Canada 55 ○ Cyprus 54 ○ Macedonia, Rep. of 54 ○ International Average 54 ○ New Zealand 53 ○ Hong Kong, SAR 53 ○ Moldova 53 ○ Malaysia 52 ○ Jordan 50 ○ United States 46 ▼ Iran, Islamic Rep. 46 ○ Netherlands 42 ▼ Israel 39 ▼ Finland 38 ▼ Chile 36 ▼ Indonesia 34 ▼ Philippines	Thailand	67	
Slovenia 62 O Singapore 61 O Australia 61 O Romania 59 O England 58 O Italy 56 O Lithuania 55 O Canada 55 O Cyprus 54 O Macedonia, Rep. of 54 O International Average 54 O New Zealand 53 O Hong Kong, SAR 53 O Moldova 53 O Malaysia 52 O Jordan 50 O United States 46 V Iran, Islamic Rep. 46 O Netherlands 42 V Israel 39 Y Finland 38 Y Chile 36 Y Indonesia 34 Y Philippines 29 Y	Latvia (LSS)	64	
Singapore 61 O Australia 61 O Romania 59 O England 58 O Italy 56 O Lithuania 55 O Canada 55 O Cyprus 54 O Macedonia, Rep. of 54 O International Average 54 O New Zealand 53 O Hong Kong, SAR 53 O Moldova 53 O Malaysia 52 O Jordan 50 O United States 46 V Iran, Islamic Rep. 46 O Netherlands 42 V Israel 39 V Finland 38 V Chile 36 V Indonesia 34 V Philippines 29 V Czech Republic 28 V	Slovak Republic	64	
Australia 61 0 Romania 59 0 England 58 0 Italy 56 0 Lithuania 55 0 Canada 55 0 Cyprus 54 0 Macedonia, Rep. of 54 0 International Average 54 New Zealand 53 0 Hong Kong, SAR 53 0 Malaysia 52 0 Jordan 50 0 United States 46 V Iran, Islamic Rep. 46 0 Netherlands 42 0 Turkey 42 Israel 39 Finland 38 V Chile 36 V Indonesia 34 Philippines 29 Czech Republic 28 Morocco 27	Slovenia	62	0
Romania 59 O England 58 O Italy 56 O Lithuania 55 O Canada 55 O Cyprus 54 O Macedonia, Rep. of 54 O International Average 54 O International Average 54 O International Average 54 O Indoys 53 O Hong Kong, SAR 53 O Moldova 53 O Malaysia 52 O Jordan 50 O United States 46 ▼ Iran, Islamic Rep. 46 O Netherlands 42 ▼ Israel 39 ▼ Finland 38 ▼ Chile 36 ▼ Indonesia 34 ▼ Philippines 29 ▼ Czech Republic 28 ▼ Morocco 27 ▼	Singapore	61	0
England 58 O Italy 56 O Lithuania 55 O Canada 55 O Cyprus 54 O Macedonia, Rep. of 54 O International Average 54 O International Average 54 O International Average 54 O Inog Kong, SAR 53 O Moldova 53 O Malaysia 52 O Jordan 50 O United States 46 ▼ Iran, Islamic Rep. 46 O Netherlands 42 O Turkey 42 ▼ Israel 39 ▼ Finland 38 ▼ Chile 36 ▼ Indonesia 34 ▼ Philippines 29 ▼ Czech Republic 28 ▼ Morocco 27 ▼	Australia	61	0
Italy	Romania	59	0
Lithuania 55 O Canada 55 O Cyprus 54 O Macedonia, Rep. of 54 O International Average 54 New Zealand 53 O Hong Kong, SAR 53 O Malaysia 52 O Jordan 50 O United States 46 V Iran, Islamic Rep. 46 O Netherlands 42 O Turkey 42 V Israel 39 V Finland 38 V Chile 36 V Indonesia 34 V Philippines 29 Czech Republic 28 W Morocco 27	England	58	0
Canada 55 ○ Cyprus 54 ○ Macedonia, Rep. of 54 ○ International Average 54 New Zealand 53 ○ Hong Kong, SAR 53 ○ Moldova 53 ○ Malaysia 52 ○ Jordan 50 ○ United States 46 ▼ Iran, Islamic Rep. 46 ○ Netherlands 42 ○ Irurkey 42 ▼ Israel 39 ▼ Finland 38 ▼ Chile 36 ▼ Indonesia 34 ▼ Philippines 29 ▼ Czech Republic 28 ▼ Morocco 27 ▼	Italy	56	0
Cyprus 54 O Macedonia, Rep. of 54 O International Average 54 New Zealand 53 O Hong Kong, SAR 53 O Moldova 53 O Malaysia 52 O Jordan 50 O United States 46 V Iran, Islamic Rep. 46 O Netherlands 42 O Turkey 42 V Israel 39 V Finland 38 V Chile 36 V Indonesia 34 V Philippines 29 Czech Republic 28 W Morocco 27	Lithuania	55	0
Macedonia, Rep. of 54 O International Average 54 O New Zealand 53 O Hong Kong, SAR 53 O Moldova 53 O Malaysia 52 O Jordan 50 O United States 46 ▼ Iran, Islamic Rep. 46 O Netherlands 42 O Turkey 42 ▼ Israel 39 ▼ Finland 38 ▼ Chile 36 ▼ Indonesia 34 ▼ Philippines 29 ▼ Czech Republic 28 ▼ Morocco 27 ▼	Canada	55	0
International Average 54 New Zealand 53 0 Hong Kong, SAR 53 0 Moldova 53 0 Malaysia 52 0 Jordan 50 0 United States 46 ▼ Iran, Islamic Rep. 46 0 Netherlands 42 0 Turkey 42 ▼ Israel 39 ▼ Finland 38 ▼ Chile 36 ▼ Indonesia 34 ▼ Philippines 29 ▼ Czech Republic 28 ▼ Morocco 27 ▼	Cyprus	54	0
New Zealand 53 O Hong Kong, SAR 53 O Moldova 53 O Malaysia 52 O Jordan 50 O United States 46 ▼ Iran, Islamic Rep. 46 O Netherlands 42 O Turkey 42 ▼ Israel 39 ▼ Finland 38 ▼ Chile 36 ▼ Indonesia 34 ▼ Philippines 29 ▼ Czech Republic 28 ▼ Morocco 27 ▼			
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Moldova 53 O Malaysia 52 O Jordan 50 O United States 46 ▼ Iran, Islamic Rep. 46 O Netherlands 42 O Turkey 42 ▼ Israel 39 ▼ Finland 38 ▼ Chile 36 ▼ Indonesia 34 ▼ Philippines 29 ▼ Czech Republic 28 ▼ Morocco 27 ▼			0
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Turkey 42 V Israel 39 V Finland 38 V Chile 36 V Indonesia 34 V Philippines 29 V Czech Republic 28 V Morocco 27 V	International Averag New Zealand Hong Kong, SAR Moldova Malaysia Jordan United States	53 53 53 53 52 50 46	0 0 0 0 0
Israel 39 V Finland 38 V Chile 36 V Indonesia 34 V Philippines 29 V Czech Republic 28 V Morocco 27 V South Africa 24	International Averag New Zealand Hong Kong, SAR Moldova Malaysia Jordan United States Iran, Islamic Rep.	53 53 53 53 52 50 46 46	0 0 0 0 0
Finland 38 V Chile 36 V Indonesia 34 V Philippines 29 V Czech Republic 28 V Morocco 27 V South Africa 24	International Averag New Zealand Hong Kong, SAR Moldova Malaysia Jordan United States Iran, Islamic Rep. Netherlands	53 53 53 53 52 50 46 46 42	0 0 0 0 0
Chile 36 V Indonesia 34 V Philippines 29 V Czech Republic 28 V Morocco 27 V South Africa 24	International Averag New Zealand Hong Kong, SAR Moldova Malaysia Jordan United States Iran, Islamic Rep. Netherlands Turkey	54 53 53 53 52 50 46 46 42 42	0 0 0 0 0
Indonesia 34 ♥ Philippines 29 ♥ Czech Republic 28 ♥ Morocco 27 ♥ South Africa 24	International Averag New Zealand Hong Kong, SAR Moldova Malaysia Jordan United States Iran, Islamic Rep. Netherlands Turkey Israel	e 54 53 53 53 52 50 46 46 42 42 39	0 0 0 0 0
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Czech Republic28▼Morocco27▼South Africa24▼	International Averag New Zealand Hong Kong, SAR Moldova Malaysia Jordan United States Iran, Islamic Rep. Netherlands Turkey Israel Finland Chile	53 53 53 52 50 46 46 42 42 39 38 36	0 0 0 0 0
Morocco 27 ▼ South Africa 24 ▼	International Averag New Zealand Hong Kong, SAR Moldova Malaysia Jordan United States Iran, Islamic Rep. Netherlands Turkey Israel Finland Chile Indonesia	53 53 53 52 50 46 46 42 42 39 38 36 34	0 0 0 0 0
South Africa 24 ▼	International Averag New Zealand Hong Kong, SAR Moldova Malaysia Jordan United States Iran, Islamic Rep. Netherlands Turkey Israel Finland Chile Indonesia Philippines	53 53 53 52 50 46 46 42 42 39 38 36 34 29	0 0 0 0 0
	International Averag New Zealand Hong Kong, SAR Moldova Malaysia Jordan United States Iran, Islamic Rep. Netherlands Turkey Israel Finland Chile Indonesia Philippines Czech Republic	54 53 53 53 52 50 46 46 42 42 39 38 36 34 29 28	0 0 0 0 0

Country average vs. International average:

Higher △
Not different ○
Lower ▼

Content Domain	Cognitive Domain	
Geometry	Knowing	

Two similar triangles



Item Number: J15

Overall Percent Correct

Japan	84	
Korea, Rep. of	82	
Singapore	76	
Malaysia	74	
Chinese Taipei	74	
Bulgaria	74	
Russian Federation	71	
Slovak Republic	70	0
Lithuania	69	0
Thailand	69	
Macedonia, Rep. of	68	0
Moldova	68	0
Latvia (LSS)	68	O
Hungary	67	0
Belgium (Flemish)	66	O
Australia	66	O
Slovenia	66	0
Romania	66	O
Czech Republic	66	O
Canada	65	O
Italy	65	O
Hong Kong, SAR	65	O
Finland	63	O
Netherlands	62	O
United States	62	O
International Average	e 62	
Iran, Islamic Rep.	61	O
England	60	0
New Zealand	57	0
Cyprus	55	0
Jordan	53	
Turkey	52	\blacksquare
Tunisia	48	
Morocco	46	•

Country average vs. International average: Higher Not different O

46

44

42

41

Chile

Israel

Indonesia

Philippines

South Africa

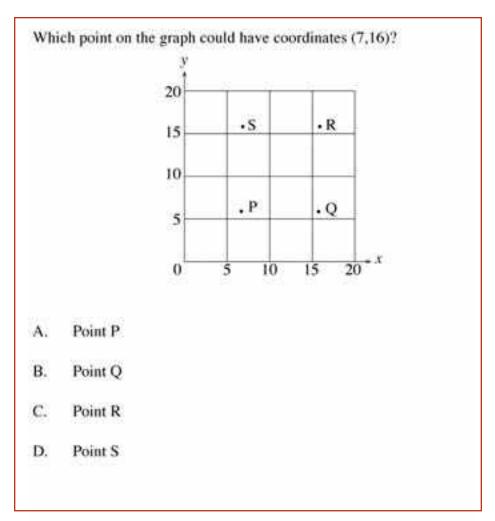
Lower

Correct Response:

C

Content Domain	Cognitive Domain	
Geometry	Using Routine Procedures	

Point on graph from coordinates



Item Number: J16

Overall Percent Correct

Japan Korea, Rep. of Chinese Taipei Hong Kong, SAR Singapore Netherlands Malaysia Slovenia Slovak Republic England Australia Finland New Zealand Hungary Russian Federation Belgium (Flemish) Canada United States Lithuania	84 84 83 81 80 78 76 76 75 74 72 72 71 71 67 67 63 62	
Czech Republic	58	0
International Average		
Jordan Iran, Islamic Rep. Bulgaria Israel Indonesia Moldova Romania Latvia (LSS) Macedonia, Rep. of Thailand Turkey Morocco Cyprus Philippines Chile South Africa Tunisia	57 55 53 51 50 48 47 46 44 37 32 26 24 23 23 20 10	0 0 0 0 V V V V V V V V

Country average vs. International average:

Higher
Not different
Lower

Correct Response:

Content Domain	Cognitive Domain	
Geometry	Investigating and Solving Problems	

Measure of angle in quadrilateral

In a quadrilateral, each of two angles has a measure of 115°. If the measure of a third angle is 70°, what is the measure of the remaining angle?

- A. 60°
- B. 70°
- C. 130°
- D. 140°
- E. None of the above

Item Number: L16

Correct Response:

Α

Overall Percent Correct

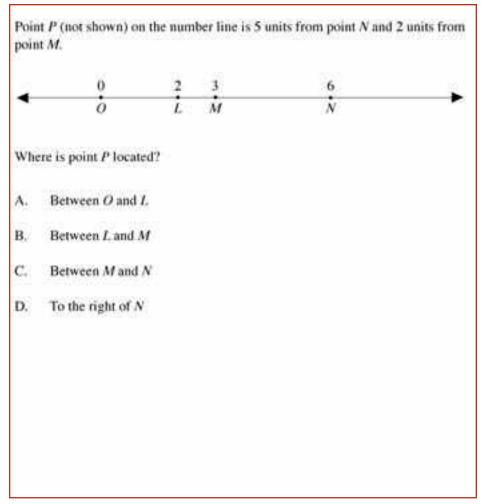
Japan	73	A
Belgium (Flemish)	70	
Singapore	67	
Chinese Taipei	61	
Hong Kong, SAR	60	
Korea, Rep. of	56	
Finland	53	
Slovenia	53	
Bulgaria	49	0
Malaysia	49	
Russian Federation	49	0
Slovak Republic	49	0
Romania	48	0
England	43	0
Italy	41	0
Moldova	40	0
Czech Republic	40	0
International Average	e 40	
Hungary	39	0
Netherlands	39	0
Latvia (LSS)	39	0
Tunisia	38	0
Australia	36	0
Macedonia, Rep. of	36	0
Canada	36	0
Lithuania	35	0
Jordan	35	0
Israel	35	0
Cyprus	30	0
Turkey	29	\blacksquare
New Zealand	27	\blacksquare
Morocco	26	\blacksquare
Iran, Islamic Rep.	23	\blacksquare
Chile	23	\blacksquare
Thailand	22	\blacksquare
Indonesia	22	* * * * * * * * * * * * * * * * * * *
United States	19	\blacksquare
South Africa	15	\blacksquare
Philippines	13	\blacksquare

Country average vs. International average:

Higher △ Not different ○ Lower ▼

Content Domain	Cognitive Domain	
Geometry	Using Routine Procedures	

Position of point on number line



Item Number: N12

Overall Percent Correct

Korea, Rep. of	67	
Netherlands	67	
Japan	66	
Belgium (Flemish)	65	
Hong Kong, SAR	63	
Russian Federation	60	
Chinese Taipei	56	
Hungary	51	
Finland	51	O
Canada	50	
Australia	50	0
Singapore	50	0
Slovak Republic	48	O
New Zealand	47	0
Slovenia	46	0
Thailand	46	O
Czech Republic	46	O
Tunisia	44	O
International Average		
United States	42	O
Malaysia	42	O
Bulgaria	40	O
Lithuania	39	0
Moldova	39	0
Cyprus	38	0
England	36	O
Italy	34	•
Indonesia	34	•
Latvia (LSS)	32	•
Israel	32	•
Macedonia, Rep. of	31	•
Chile	31	•
Romania	20	_
	30	•
Iran, Islamic Rep.	27	V
Turkey	27 27	*
Turkey Philippines	27 27 26	* * *
Turkey Philippines South Africa	27 27 26 23	* * *
Turkey Philippines	27 27 26	<!--</td-->

Country average vs. International average:

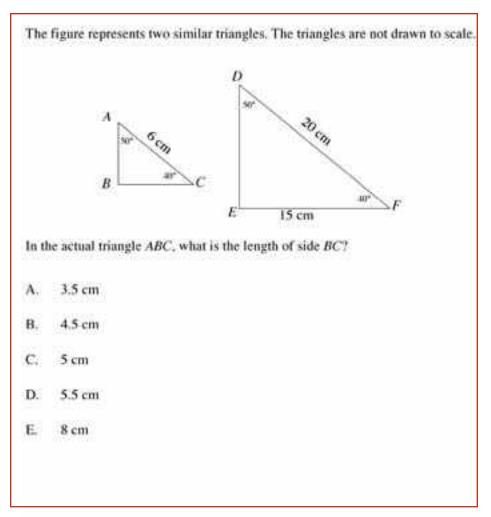
Higher △
Not different ○
Lower ▼

Correct Response:

Α

Content Domain	Cognitive Domain
Geometry	Using Routine Procedures

Length of side from similar triangle



Item Number: P10

Overall Percent Correct

Korea, Rep. of	70	A
Japan	68	
Singapore	64	
Hong Kong, SAR	56	A
Chinese Taipei	52	
Belgium (Flemish)	50	
Netherlands	44	0
Hungary	43	0
Russian Federation	41	0
Finland	39	0
Australia	39	0
Romania	38	0
Slovak Republic	38	0
International Averag	e 37	
United States	36	0
Moldova	36	0
Canada	35	0
New Zealand	34	0
Slovenia	34	0
England	34	0
Bulgaria	33	0
Czech Republic	32	0
Malaysia	32	0
Jordan	32	0
Lithuania	31	0
Cyprus	31	0
Latvia (LSS)	30	Ο
Thailand	30	•
Italy	29	
Israel	29	0
Macedonia, Rep. of	27	
Philippines	27	\blacksquare
Indonesia	26	
Iran, Islamic Rep.	26	
Tunisia	24	\blacksquare
	23	
Chile	23	•
Chile South Africa	23	•
		* * * * * * * * * * * *

Country average vs. International average:

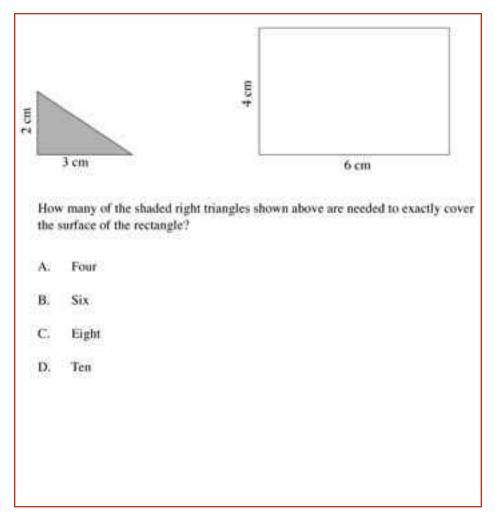
Higher
Not different
Lower

Correct Response:

В

Content Domain	Cognitive Domain
Geometry	Using Complex Procedures

Right triangles to cover rectangle



Item Number: R11

Overall Percent Correct

Japan	80	
Korea, Rep. of	76	
Hong Kong, SAR	75	
Singapore	72	<u> </u>
Belgium (Flemish)	68	<u> </u>
Netherlands	66	<u> </u>
Malaysia	60	_
Chinese Taipei	60	<u> </u>
Hungary	59	_
Slovenia	57	<u> </u>
Slovak Republic	57	<u> </u>
Australia	56	<u> </u>
Czech Republic	55	0
New Zealand	55	A
Canada	50	0
Finland	49	0
Italy	49	0
England	48	0
Latvia (LSS)	48	0
United States	47	0
International Average	e 46	
International Average Russian Federation	e 46 44	0
		0
Russian Federation	44	_
Russian Federation Lithuania	44 43	0
Russian Federation Lithuania Iran, Islamic Rep.	44 43 42	0
Russian Federation Lithuania Iran, Islamic Rep. Israel	44 43 42 41	0 0 0 0 0
Russian Federation Lithuania Iran, Islamic Rep. Israel Thailand	44 43 42 41 40	0 0 0 0 0
Russian Federation Lithuania Iran, Islamic Rep. Israel Thailand Cyprus	44 43 42 41 40 37	0 0 0 0 0
Russian Federation Lithuania Iran, Islamic Rep. Israel Thailand Cyprus Moldova	44 43 42 41 40 37 37	0 0 0 0 0
Russian Federation Lithuania Iran, Islamic Rep. Israel Thailand Cyprus Moldova Romania	44 43 42 41 40 37 37 35	0 0 0 0 0
Russian Federation Lithuania Iran, Islamic Rep. Israel Thailand Cyprus Moldova Romania Bulgaria	44 43 42 41 40 37 37 35 34	0 0 0 0 0
Russian Federation Lithuania Iran, Islamic Rep. Israel Thailand Cyprus Moldova Romania Bulgaria Tunisia	44 43 42 41 40 37 37 35 34	0 0 0 0 0
Russian Federation Lithuania Iran, Islamic Rep. Israel Thailand Cyprus Moldova Romania Bulgaria Tunisia Turkey	44 43 42 41 40 37 37 35 34 33	0 0 0 0 0
Russian Federation Lithuania Iran, Islamic Rep. Israel Thailand Cyprus Moldova Romania Bulgaria Tunisia Turkey Macedonia, Rep. of	44 43 42 41 40 37 37 35 34 33 30 30	0 0 0 0 0
Russian Federation Lithuania Iran, Islamic Rep. Israel Thailand Cyprus Moldova Romania Bulgaria Tunisia Turkey Macedonia, Rep. of Indonesia	44 43 42 41 40 37 37 35 34 33 30 30 29	0 0 0 0 0
Russian Federation Lithuania Iran, Islamic Rep. Israel Thailand Cyprus Moldova Romania Bulgaria Tunisia Turkey Macedonia, Rep. of Indonesia Chile	44 43 42 41 40 37 37 35 34 33 30 29 27	0 0 0 0 0
Russian Federation Lithuania Iran, Islamic Rep. Israel Thailand Cyprus Moldova Romania Bulgaria Tunisia Turkey Macedonia, Rep. of Indonesia Chile Jordan	44 43 42 41 40 37 35 34 33 30 29 27 26	0 0 0

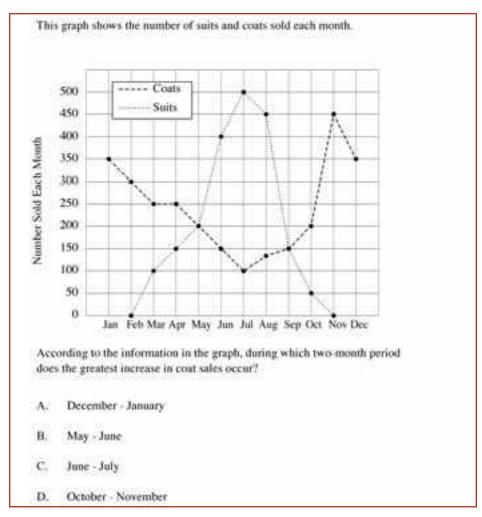
Country average vs. International average:

Higher △
Not different ○
Lower ▼

Correct Response:

Content Domain	Cognitive Domain
Data Representation, Analysis and Probability	Using Complex Procedures

Graph showing greatest increase



Item Number: B07

Overall Percent Correct

Japan	92	A
Korea, Rep. of	90	
Singapore	85	
Hong Kong, SAR	83	
Netherlands	82	
Finland	81	
Chinese Taipei	79	
Slovenia	77	
Australia	76	
Canada	75	
England	74	
United States	73	
New Zealand	72	
Hungary	72	
Belgium (Flemish)	71	
Russian Federation	70	
Malaysia	68	
Slovak Republic	65	O
Lithuania	62	0
Latvia (LSS)	62	0
Israel	62	O
Italy	61	0
International Averag	e 60	
Czech Republic	58	0
Bulgaria	55	0
Thailand	55	\blacksquare
Macedonia, Rep. of	52	•
Turkey	42	\blacksquare
Indonesia	42	\blacksquare
Cyprus	40	\blacksquare
Chile	39	\blacksquare
Jordan	38	_
		•
Romania	36	▼
Philippines	36	▼ ▼
Philippines Tunisia	36 35	*
Philippines Tunisia Moldova	36 35 30	*
Philippines Tunisia Moldova South Africa	36 35 30 23	* * * * * * * * * * * * * * * * * * *
Philippines Tunisia Moldova	36 35 30	* * * * * * * * * * * * * * * * * * *
Philippines Tunisia Moldova South Africa	36 35 30 23	* * * * * * * * * * * * * * * * * * * *

Country average vs. International average:

Higher △
Not different ○
Lower ▼

Correct Response:

D

Content Domain	Cognitive Domain
Data Representation, Analysis and Probability	Knowing

Likely result of fifth coin toss

If a fair coin is tossed, the probability that it will land heads up is $\frac{1}{2}$. In four successive tosses, a fair coin lands heads up each time. What is likely to happen when the coin is tossed a fifth time?

- A. It is more likely to land tails up than heads up.
- B. It is more likely to land heads up than tails up.
- C. It is equally likely to land heads up or tails up.
- D. More information is needed to answer the question.

Item Number: F08

Overall Percent Correct

	86	
Hungary England	81	
Netherlands	79	
Czech Republic	79 77	
Chinese Taipei	77	•
Australia	77 76	
Latvia (LSS)	76 75	A
, ,	75 75	A
Canada	75 74	A
Belgium (Flemish) Finland	74 71	A
		•
New Zealand	71	A
Bulgaria	70	A A A A
Slovenia	70	
Lithuania	70	<u> </u>
Italy	70	<u> </u>
Slovak Republic	70	A
Korea, Rep. of	65	A
Russian Federation	63	0
United States	62	A
Cyprus	60	0
Japan	58	0
International Average		
Jordan	57	0
	57 56	0
Jordan	57	0
Jordan Chile	57 56	0
Jordan Chile Hong Kong, SAR	57 56 55 55 53	0 0 0
Jordan Chile Hong Kong, SAR Israel	57 56 55 55	0 0 0
Jordan Chile Hong Kong, SAR Israel Romania	57 56 55 55 53	0 0 0
Jordan Chile Hong Kong, SAR Israel Romania Turkey	57 56 55 55 53 52	0 0 0
Jordan Chile Hong Kong, SAR Israel Romania Turkey Macedonia, Rep. of	57 56 55 55 53 52 50	0 0 0
Jordan Chile Hong Kong, SAR Israel Romania Turkey Macedonia, Rep. of Singapore	57 56 55 55 53 52 50 48	0 0 0
Jordan Chile Hong Kong, SAR Israel Romania Turkey Macedonia, Rep. of Singapore Moldova	57 56 55 55 53 52 50 48 36	0 0 0
Jordan Chile Hong Kong, SAR Israel Romania Turkey Macedonia, Rep. of Singapore Moldova South Africa	57 56 55 55 53 52 50 48 36 34	0 0 0
Jordan Chile Hong Kong, SAR Israel Romania Turkey Macedonia, Rep. of Singapore Moldova South Africa Iran, Islamic Rep.	57 56 55 55 53 52 50 48 36 34	0 0 0
Jordan Chile Hong Kong, SAR Israel Romania Turkey Macedonia, Rep. of Singapore Moldova South Africa Iran, Islamic Rep. Philippines	57 56 55 55 53 52 50 48 36 34 33 29	0

Country average vs. International average:

24

Morocco

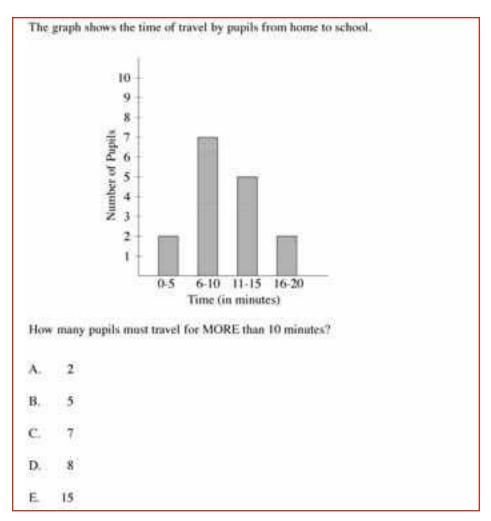
Malaysia Thailand

Higher △
Not different ○
Lower ▼

Correct Response:

Content Domain	Cognitive Domain
Data Representation, Analysis and Probability	Using Complex Procedures

Barchart histogram of travel time



Item Number: H07

Overall Percent Correct

Korea, Rep. of	93	
Hong Kong, SAR	91	
Singapore	91	
Japan	84	
England	83	
Chinese Taipei	82	
Netherlands	82	
Belgium (Flemish)	82	
Australia	79	
New Zealand	79	
Finland	78	
Canada	78	
Slovenia	77	
United States	77	
Thailand	72	
Czech Republic	70	0
Hungary	69	0
Slovak Republic	65	0
International Average	ie 64	
		0
Latvia (LSS)	61	O
Moldova	60	0
(,		_
Moldova	60	0
Moldova Italy	60 59	0
Moldova Italy Israel	60 59 59	O O ▼
Moldova Italy Israel Russian Federation	60 59 59 59	0 0 •
Moldova Italy Israel Russian Federation Cyprus	60 59 59 59 59	0 0 •
Moldova Italy Israel Russian Federation Cyprus Lithuania	60 59 59 59 59 58	0 0 •
Moldova Italy Israel Russian Federation Cyprus Lithuania Indonesia	60 59 59 59 58 58 58	0 0 •
Moldova Italy Israel Russian Federation Cyprus Lithuania Indonesia Tunisia	60 59 59 59 58 58 58 52 51	0 0 •
Moldova Italy Israel Russian Federation Cyprus Lithuania Indonesia Tunisia Philippines	60 59 59 59 58 58 58 52 51	0 0 •
Moldova Italy Israel Russian Federation Cyprus Lithuania Indonesia Tunisia Philippines Jordan	60 59 59 59 58 58 52 51 51	0 0 •
Moldova Italy Israel Russian Federation Cyprus Lithuania Indonesia Tunisia Philippines Jordan Turkey	60 59 59 59 58 58 52 51 51 50 49	0 0 •
Moldova Italy Israel Russian Federation Cyprus Lithuania Indonesia Tunisia Philippines Jordan Turkey Romania	60 59 59 59 58 58 52 51 51 50 49	0 0 •
Moldova Italy Israel Russian Federation Cyprus Lithuania Indonesia Tunisia Philippines Jordan Turkey Romania Chile	59 59 59 59 58 58 52 51 51 50 49 47	0 0 •
Moldova Italy Israel Russian Federation Cyprus Lithuania Indonesia Tunisia Philippines Jordan Turkey Romania Chile Malaysia	59 59 59 59 58 58 52 51 51 50 49 47 46 46	0 0 •
Moldova Italy Israel Russian Federation Cyprus Lithuania Indonesia Tunisia Philippines Jordan Turkey Romania Chile Malaysia Macedonia, Rep. of	59 59 59 59 58 58 52 51 51 50 49 47 46 46 46 45	0 0 •
Moldova Italy Israel Russian Federation Cyprus Lithuania Indonesia Tunisia Philippines Jordan Turkey Romania Chile Malaysia Macedonia, Rep. of Iran, Islamic Rep.	59 59 59 59 58 58 52 51 51 50 49 47 46 46 45 38	O O ▼
Moldova Italy Israel Russian Federation Cyprus Lithuania Indonesia Tunisia Philippines Jordan Turkey Romania Chile Malaysia Macedonia, Rep. of Iran, Islamic Rep. Morocco	59 59 59 58 58 52 51 51 50 49 47 46 46 45 38 36	0 0 •

Country average vs. International average:

Higher △
Not different ○
Lower ▼

Correct Response:

Content Domain	Cognitive Domain
Data Representation, Analysis and Probability	Investigating and Solving Problems

Defective bulbs from random sample

From a batch of 3,000 light bulbs, 100 were selected at random and tested. If 5 of the light bulbs in the sample were found to be defective, about how many defective light bulbs would be expected in the entire batch?
A. 15
B. 60
C. 150
D. 300
E. 600

Item Number: H11

Overall Percent Correct

Netherlands	86	A
Hong Kong, SAR	85	
Chinese Taipei	83	
Singapore	83	
Korea, Rep. of	83	
Belgium (Flemish)	79	
Hungary	75	
Czech Republic	75	
Japan	73	
Slovenia	71	
Malaysia	71	
Slovak Republic	70	
Latvia (LSS)	70	
Finland	68	0
Canada	67	0
Russian Federation	65	0
Bulgaria	65	0
Cyprus	64	0
Australia	64	0
Thailand	64	0
International Average	e 62	
International Average England	62 59	0
		0
England	59	_
England Tunisia	59 59	0
England Tunisia United States	59 59 58	0
England Tunisia United States Romania	59 59 58 56	0 0
England Tunisia United States Romania Italy	59 59 58 56 56	0 0 0 0 0 0
England Tunisia United States Romania Italy New Zealand	59 59 58 56 56	0 0 0 0 0 0
England Tunisia United States Romania Italy New Zealand Lithuania	59 59 58 56 56 56	0 0 0 0 0 0
England Tunisia United States Romania Italy New Zealand Lithuania Turkey	59 59 58 56 56 56 56 56	0 0 0 0 0 0
England Tunisia United States Romania Italy New Zealand Lithuania Turkey Macedonia, Rep. of	59 59 58 56 56 56 56 54 54	0 0 0 0 0 0
England Tunisia United States Romania Italy New Zealand Lithuania Turkey Macedonia, Rep. of Moldova	59 59 58 56 56 56 56 54 54	0 0 0 0 0 0
England Tunisia United States Romania Italy New Zealand Lithuania Turkey Macedonia, Rep. of Moldova Israel	59 59 58 56 56 56 56 54 54 53	0 0 0 0 0 0
England Tunisia United States Romania Italy New Zealand Lithuania Turkey Macedonia, Rep. of Moldova Israel Indonesia	59 59 58 56 56 56 54 54 53 52	0 0 0 0 0 0
England Tunisia United States Romania Italy New Zealand Lithuania Turkey Macedonia, Rep. of Moldova Israel Indonesia Iran, Islamic Rep.	59 59 58 56 56 56 54 54 53 52 49	0 0 0 0 0 0
England Tunisia United States Romania Italy New Zealand Lithuania Turkey Macedonia, Rep. of Moldova Israel Indonesia Iran, Islamic Rep. Chile	59 58 56 56 56 56 54 54 53 52 49 47	0 0 0 0 0 0
England Tunisia United States Romania Italy New Zealand Lithuania Turkey Macedonia, Rep. of Moldova Israel Indonesia Iran, Islamic Rep. Chile Jordan	59 58 56 56 56 54 54 53 52 49 47 46 44	0 0 0 0 0 0
England Tunisia United States Romania Italy New Zealand Lithuania Turkey Macedonia, Rep. of Moldova Israel Indonesia Iran, Islamic Rep. Chile Jordan Philippines	59 58 56 56 56 54 54 53 52 49 47 46 44 36	0 0 0 0 0

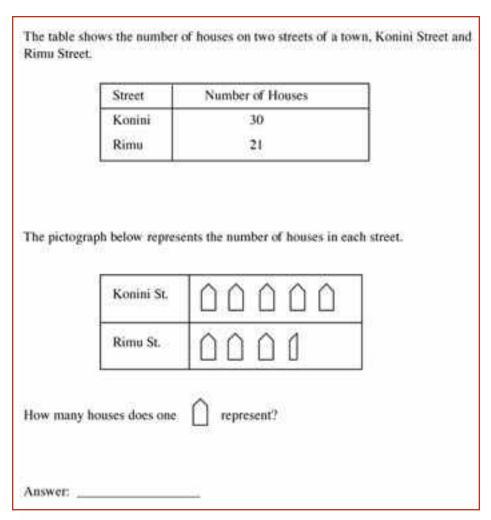
Country average vs. International average:

Higher
Not different
Lower

Correct Response:

Content Domain	Cognitive Domain
Data Representation, Analysis and Probability	Using Complex Procedures

Interpretation of pictograph of houses



Item Number: J13

SCORING

Correct Response

• 6 houses

Incorrect Response

- One house
- 5 houses
- Other incorrect (including crossed out/erased, stray marks, illegible, or off task)

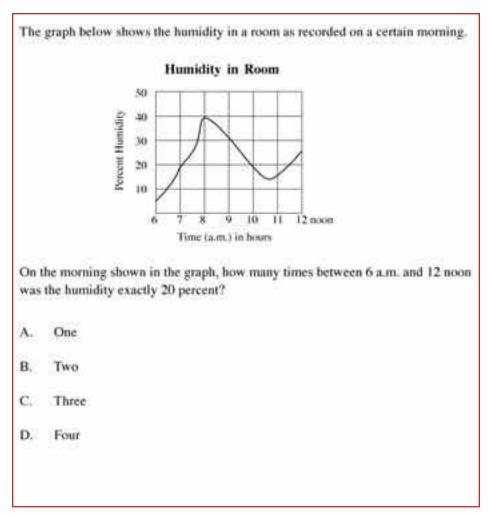
Overall Percent Correct

Singapore	95	A
Japan	93	
Hong Kong, SAR	93	
Korea, Rep. of	89	
Netherlands	88	
Chinese Taipei	88	
Canada	88	
Australia	86	
Finland	86	
Malaysia	85	
England	82	
United States	82	
New Zealand	82	
Slovenia	81	
Belgium (Flemish)	80	
Slovak Republic	79	
Latvia (LSS)	79	
Lithuania	78	0
Thailand	77	
Czech Republic	76	0
Italy	74	0
Italy Russian Federation	74 73	0
,	73	
Russian Federation	73	
Russian Federation International Averag	73 e 69	0 0
Russian Federation International Averag Cyprus	73 e 69 67	0 0 0
Russian Federation International Averag Cyprus Romania	73 e 69 67 63	0 0 0 •
Russian Federation International Averag Cyprus Romania Turkey	73 e 69 67 63 62	0 0 0 •
Russian Federation International Averag Cyprus Romania Turkey Hungary	73 e 69 67 63 62 61	0 0 0 0
Russian Federation International Average Cyprus Romania Turkey Hungary Israel	73 e 69 67 63 62 61	0 0 0 0
Russian Federation International Average Cyprus Romania Turkey Hungary Israel Bulgaria	73 e 69 67 63 62 61 61 58	0 0 0 0
Russian Federation International Average Cyprus Romania Turkey Hungary Israel Bulgaria Iran, Islamic Rep.	73 e 69 67 63 62 61 61 58 57	0 0 0 0
Russian Federation International Average Cyprus Romania Turkey Hungary Israel Bulgaria Iran, Islamic Rep. Tunisia	73 e 69 67 63 62 61 61 58 57	0 0 0 0
Russian Federation International Average Cyprus Romania Turkey Hungary Israel Bulgaria Iran, Islamic Rep. Tunisia Macedonia, Rep. of	73 e 69 67 63 62 61 61 58 57 55	0 0 0 0
Russian Federation International Average Cyprus Romania Turkey Hungary Israel Bulgaria Iran, Islamic Rep. Tunisia Macedonia, Rep. of Chile Moldova Jordan	73 e 69 67 63 62 61 61 58 57 55 54 53	0 0 0 0
Russian Federation International Average Cyprus Romania Turkey Hungary Israel Bulgaria Iran, Islamic Rep. Tunisia Macedonia, Rep. of Chile Moldova	73 e 69 67 63 62 61 61 58 57 55 54 53 52	0 0 0 0
Russian Federation International Average Cyprus Romania Turkey Hungary Israel Bulgaria Iran, Islamic Rep. Tunisia Macedonia, Rep. of Chile Moldova Jordan	73 e 69 67 63 62 61 61 58 57 55 54 53 52 42	0 0 0 •
Russian Federation International Average Cyprus Romania Turkey Hungary Israel Bulgaria Iran, Islamic Rep. Tunisia Macedonia, Rep. of Chile Moldova Jordan Philippines	73 e 69 67 63 62 61 61 58 57 55 54 53 52 42 36	0 0 0 0
Russian Federation International Average Cyprus Romania Turkey Hungary Israel Bulgaria Iran, Islamic Rep. Tunisia Macedonia, Rep. of Chile Moldova Jordan Philippines Indonesia	73 e 69 67 63 62 61 61 58 57 55 54 53 52 42 36 31	0 0 0 0 0 0 0

Country average vs. International average:

Content Domain	Cognitive Domain
Data Representation, Analysis and Probability	Using Complex Procedures

Graph of humidity in room



Item Number: L11

Overall Percent Correct

Finland	79	A
Japan	76	A
Netherlands	76	A
Chinese Taipei	73	A
Australia	72	A
Belgium (Flemish)	72	A
Hungary	69	A
Korea, Rep. of	68	A
Singapore	68	A
Canada	68	A
England	68	A
Hong Kong, SAR	68	A
Slovak Republic	66	A
Latvia (LSS)	65	0
Bulgaria	64	0
Lithuania	64	0
United States	63	A
Czech Republic	63	0
Russian Federation	63	0
New Zealand	62	0
Malaysia	61	0
Israel	60	0
Tunisia	58	0
International Averag	e 58	
Cyprus	57	0
Iran, Islamic Rep.	51	▼
Turkey	49	▼
Slovenia	47	▼
Chile	46	▼
Thailand	44	▼
Jordan	43	▼
Macedonia, Rep. of	43	* * * * * * * * * * * * * * * * * * *
Romania	41	▼
Moldova	39	▼
Philippines	34	▼
Morocco	31	▼
Indonesia	30	▼
South Africa	29	▼

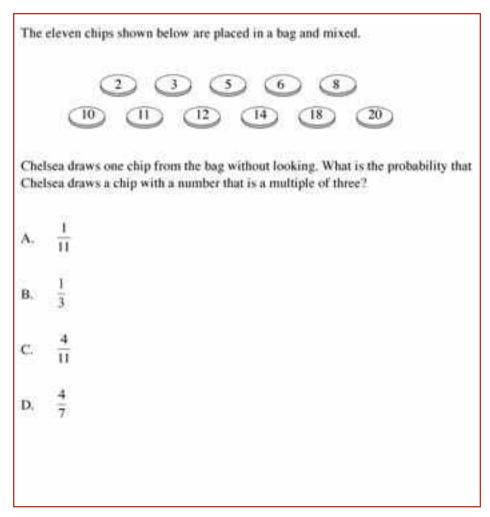
Country average vs. International average:

Higher
Not different
Lower

Correct Response:

Content Domain	Cognitive Domain
Data Representation, Analysis and Probability	Investigating and Solving Problems

Probability of drawing chip



Item Number: N18

Overall Percent Correct

Korea, Rep. of Belgium (Flemish) Japan United States Canada England Australia Chinese Taipei Finland Hong Kong, SAR Netherlands Singapore Italy New Zealand Hungary Slovenia Cyprus Czech Republic Israel	92 82 77 74 73 73 71 66 65 64 61 60 53 51 51 49	
International Average	e 48	
Slovak Republic	48	0
Bulgaria	46	0
Bulgaria Turkey	43	0
Turkey Malaysia	43 42	0
Turkey Malaysia Indonesia	43 42 39	0
Turkey Malaysia Indonesia Jordan	43 42 39 38	0
Turkey Malaysia Indonesia Jordan Russian Federation	43 42 39 38 35	0
Turkey Malaysia Indonesia Jordan Russian Federation Iran, Islamic Rep.	43 42 39 38 35 33	0
Turkey Malaysia Indonesia Jordan Russian Federation Iran, Islamic Rep. Romania	43 42 39 38 35 33	0
Turkey Malaysia Indonesia Jordan Russian Federation Iran, Islamic Rep. Romania Chile	43 42 39 38 35 33 32 31	0
Turkey Malaysia Indonesia Jordan Russian Federation Iran, Islamic Rep. Romania Chile Thailand	43 42 39 38 35 33 32 31 27	0
Turkey Malaysia Indonesia Jordan Russian Federation Iran, Islamic Rep. Romania Chile Thailand Latvia (LSS)	43 42 39 38 35 33 32 31 27 27	0
Turkey Malaysia Indonesia Jordan Russian Federation Iran, Islamic Rep. Romania Chile Thailand Latvia (LSS) Macedonia, Rep. of	43 42 39 38 35 33 32 31 27 27 25	0
Turkey Malaysia Indonesia Jordan Russian Federation Iran, Islamic Rep. Romania Chile Thailand Latvia (LSS) Macedonia, Rep. of South Africa	43 42 39 38 35 33 32 31 27 27 25 23	0
Turkey Malaysia Indonesia Jordan Russian Federation Iran, Islamic Rep. Romania Chile Thailand Latvia (LSS) Macedonia, Rep. of South Africa Philippines	43 42 39 38 35 33 32 31 27 27 25 23 23	0
Turkey Malaysia Indonesia Jordan Russian Federation Iran, Islamic Rep. Romania Chile Thailand Latvia (LSS) Macedonia, Rep. of South Africa Philippines Morocco	43 42 39 38 35 33 32 31 27 27 25 23 23 22	0
Turkey Malaysia Indonesia Jordan Russian Federation Iran, Islamic Rep. Romania Chile Thailand Latvia (LSS) Macedonia, Rep. of South Africa Philippines	43 42 39 38 35 33 32 31 27 27 25 23 23	0

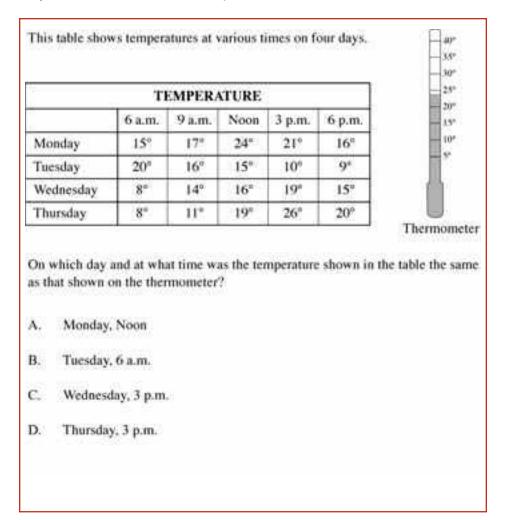
Country average vs. International average:

Higher △
Not different ○
Lower ▼

Correct Response:

Content Domain	Cognitive Domain
Data Representation, Analysis and Probability	Using Complex Procedures

Day/time in table at shown temperature



Item Number: P16

Overall Percent Correct

96	
90	
95	
95	
93	
92	
92	
91	
91	
91	
91	
91	A
90	
90	
89	A
89	
88	
87	
86	
85	0
85	
84	0
83	0
	_
81	0
81 • 79	_
79 74	0
74 72	0
74 72 67	0
79 74 72 67 66	0
74 72 67 66 65	0
79 74 72 67 66 65 65	0
79 74 72 67 66 65 65	0
74 72 67 66 65 65 65 59	0
74 72 67 66 65 65 65 59 54	0
74 72 67 66 65 65 65 65 59 54	0
74 72 67 66 65 65 65 65 59 54 50	0
74 72 67 66 65 65 65 65 59 54	_
74 72 67 66 65 65 65 65 59 54 50	0
	93 92 92 91 91 91 91 90 90 89 89 88 87 86 85 85 84

Country average vs. International average:

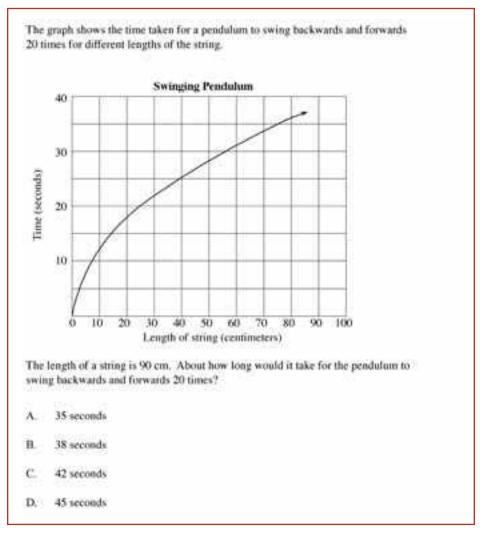
Higher
Not different
Lower

Correct Response:

Α

Content Domain	Cognitive Domain
Data Representation, Analysis and Probability	Using Complex Procedures

Time for pendulum to swing 20 times



Item Number: R09

Overall Percent Correct

Korea, Rep. of	78	A
Japan	78	
Hong Kong, SAR	71	
Singapore	71	
Netherlands	70	
Chinese Taipei	70	
England	68	
Belgium (Flemish)	68	
Finland	67	A
Australia	67	
Canada	66	
Thailand	65	
Slovenia	63	
Malaysia	62	
Hungary	62	
Slovak Republic	59	0
United States	59	0
Russian Federation	58	0
New Zealand	58	0
Lithuania	57	0
Latvia (LSS)	55	O
Israel	55	0
International Average	e 54	
Czech Republic	53	0
Bulgaria	51	0
Italy	48	0
Cyprus	46	0
Tunisia	43	•
Romania	41	•
Indonesia	40	•
Jordan	40	•
Philippines	37	•
Chile	36	•
Moldova	36	•
Macedonia, Rep. of	35	•
Morocco		
MOLOCCO	35	•
Turkey	32	*
		O V

Country average vs. International average:

Higher
Not different
Lower

Correct Response:

В

Content Domain	Cognitive Domain
Data Representation, Analysis and Probability	Communicating and Reasoning

Cheaper magazine subscription

Chris plans to order 24 issues of a magazine. He reads the following advertisements for two magazines. Ccds are the units of currency in Chris' country.

Teen Life Magazine

24 issues First four issues FREE The rest 3 ceds each.

Teen News Magazine

24 issues First six issues FREE The rest 3.5 ceds each.

Which magazine is the least expensive for 24 issues? How much less expensive? Show your work.

Item Number: V02

SCORING

Note: There is no distinction made between responses with or without units.

Correct Response

- Teen Life. Calculations of both magazines are correct (60 ceds for Teen Life and 63 ceds for Teen News) and correct savings of 3 ceds
- Other correct (e.g., Teen Life. Calculation of one magazine correct, the other not shown, and correct savings of 3 ceds).

Partial Response

- Correct calculations (60 and 63 ceds), but incorrect or no magazine identified and/or no difference given
- Correct calculation for Teen News (63 ceds), but incorrect calculation for Teen Life
- Incorrect calculation for Teen News but correct calculation for Teen Life (60 ceds)
- Teen Life, 3 ceds. No work shown
- $\bullet \ \ \text{Other partially correct response (e.g., \ correct \ calculations \ but \ incorrect \ difference)}\\$

Incorrect Response

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

Overall Percent Correct

Singapore	57	A
Korea, Rep. of	52	
Chinese Taipei	50	
Belgium (Flemish)	42	
Japan	39	
Slovak Republic	36	
Slovenia	36	
Hungary	35	
Latvia (LSS)	35	
Hong Kong, SAR	34	
Czech Republic	34	
Canada	32	
Russian Federation	30	0
Australia	29	0
Finland	28	0
Italy	27	0
United States	26	0
Netherlands	25	0
Lithuania	25	0
International Averag	ie 24	
Bulgaria	22	0
		O O
Bulgaria	22	0
Bulgaria Thailand	22 21	0 0
Bulgaria Thailand Cyprus	22 21 21	0 0
Bulgaria Thailand Cyprus Romania	22 21 21 20	0 0
Bulgaria Thailand Cyprus Romania Malaysia	22 21 21 20 19	0 0
Bulgaria Thailand Cyprus Romania Malaysia Israel	22 21 21 20 19	0 0
Bulgaria Thailand Cyprus Romania Malaysia Israel New Zealand	22 21 21 20 19 19	0 0
Bulgaria Thailand Cyprus Romania Malaysia Israel New Zealand Macedonia, Rep. of	22 21 21 20 19 19 18 17	0 0
Bulgaria Thailand Cyprus Romania Malaysia Israel New Zealand Macedonia, Rep. of England	22 21 21 20 19 19 18 17	0 0
Bulgaria Thailand Cyprus Romania Malaysia Israel New Zealand Macedonia, Rep. of England Moldova	22 21 21 20 19 19 18 17 17	0 0
Bulgaria Thailand Cyprus Romania Malaysia Israel New Zealand Macedonia, Rep. of England Moldova Jordan	22 21 21 20 19 19 18 17 17 16	0 0
Bulgaria Thailand Cyprus Romania Malaysia Israel New Zealand Macedonia, Rep. of England Moldova Jordan Turkey	22 21 21 20 19 19 18 17 17 16 12	0 0
Bulgaria Thailand Cyprus Romania Malaysia Israel New Zealand Macedonia, Rep. of England Moldova Jordan Turkey Tunisia	22 21 21 20 19 19 18 17 17 16 12 10 9	0 0
Bulgaria Thailand Cyprus Romania Malaysia Israel New Zealand Macedonia, Rep. of England Moldova Jordan Turkey Tunisia Iran, Islamic Rep.	22 21 21 20 19 19 18 17 17 16 12 10 9 9 5	0 0
Bulgaria Thailand Cyprus Romania Malaysia Israel New Zealand Macedonia, Rep. of England Moldova Jordan Turkey Tunisia Iran, Islamic Rep. Chile	22 21 21 20 19 19 18 17 17 16 12 10 9 9 5 5	0 0
Bulgaria Thailand Cyprus Romania Malaysia Israel New Zealand Macedonia, Rep. of England Moldova Jordan Turkey Tunisia Iran, Islamic Rep. Chile Indonesia	22 21 21 20 19 19 18 17 17 16 12 10 9 9 5	0
Bulgaria Thailand Cyprus Romania Malaysia Israel New Zealand Macedonia, Rep. of England Moldova Jordan Turkey Tunisia Iran, Islamic Rep. Chile Indonesia Philippines	22 21 21 20 19 19 18 17 17 16 12 10 9 9 5 5	0 0

Country average vs. 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? \bigcirc -9 \bigcirc B) -6C −1 D 1 E 9

Item Number: M012042

Correct Response:

Ε

Overall Percent Correct

Hong Kong, SAR	84	A
Korea, Republic of	84	A
Chinese Taipei	83	A
Singapore	80	A
Estonia	77	A
Japan	74	A
Russian Federation	73	A
Hungary	69	A
Israel	67	A
Serbia and Montenegro	65	A
United States	65	A
Belgium (Flemish)	63	A
Armenia	62	
Latvia	61	
Lithuania	60	
Slovak Republic	58	A
Bulgaria	57	
Moldova, Republic of	54	
Netherlands	54	A
Romania	51	0
Slovenia	51	0
Lebanon	49	0
International average	48	
miternational average		
Malaysia	48	0
Malaysia Macedonia, Republic of	48 47	0
Malaysia Macedonia, Republic of Iran, Islamic Republic of	48 47 44	0
Malaysia Macedonia, Republic of Iran, Islamic Republic of Philippines	48 47 44 44	0 0 V
Malaysia Macedonia, Republic of Iran, Islamic Republic of Philippines Indonesia	48 47 44 44 43	○▼▼
Malaysia Macedonia, Republic of Iran, Islamic Republic of Philippines Indonesia Jordan	48 47 44 44 43 41	○▼▼
Malaysia Macedonia, Republic of Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain	48 47 44 44 43 41 40	○▼▼
Malaysia Macedonia, Republic of Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus	48 47 44 44 43 41 40 38	○▼▼
Malaysia Macedonia, Republic of Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus Australia	48 47 44 44 43 41 40 38 37	○▼▼
Malaysia Macedonia, Republic of Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus	48 47 44 44 43 41 40 38 37 37	○▼▼
Malaysia Macedonia, Republic of Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus Australia	48 47 44 44 43 41 40 38 37 37	○▼▼
Malaysia Macedonia, Republic of Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus Australia Egypt England Italy	48 47 44 44 43 41 40 38 37 37 37	○▼▼
Malaysia Macedonia, Republic of Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus Australia Egypt England Italy New Zealand	48 47 44 43 41 40 38 37 37 37 37	○▼▼
Malaysia Macedonia, Republic of Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus Australia Egypt England Italy New Zealand Botswana	48 47 44 43 41 40 38 37 37 37 37 35 30	○▼▼
Malaysia Macedonia, Republic of Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus Australia Egypt England Italy New Zealand Botswana Sweden	48 47 44 43 41 40 38 37 37 37 37 35 30 28	○▼▼
Malaysia Macedonia, Republic of Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus Australia Egypt England Italy New Zealand Botswana Sweden Tunisia	48 47 44 43 41 40 38 37 37 37 35 30 28 26	○▼▼
Malaysia Macedonia, Republic of Iran, Islamic Republic of Philippines Indonesia Jordan Bahrain Cyprus Australia Egypt England Italy New Zealand Botswana Sweden	48 47 44 43 41 40 38 37 37 37 37 35 30 28 26 25	○▼▼
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	48 47 44 43 41 40 38 37 37 37 37 35 30 28 26 25 24	○▼▼
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	48 47 44 43 41 40 38 37 37 37 35 30 28 26 25 24 24	○▼▼
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	48 47 44 43 41 40 38 37 37 37 35 30 28 26 25 24 24	○▼▼
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	48 47 44 43 41 40 38 37 37 37 35 30 28 26 25 24 24	○▼▼

Country average vs. International average:

Norway

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	A
Hong Kong, SAR	83	A
Singapore	81	A
Japan	76	A
Latvia	76	A
Chinese Taipei	76	A
Hungary	74	A
Russian Federation	67	A
Lebanon	67	A
Romania	65	
Israel	65	A
Estonia	65	A
Serbia and Montenegro	64	A
Slovak Republic	63	A
Bulgaria	63	A
Malaysia	61	A
Armenia	60	A
Belgium (Flemish)	60	A
Cyprus	58	A
Moldova, Republic of	58	A
Lithuania	57	0
International average	54	
Jordan	54	0
Bahrain	49	•
Bahrain Philippines	49 49	▼
		▼
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 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 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 43	* * * * * * * * * * * * * * * * * * * *
Philippines United States Italy Egypt Slovenia Tunisia Botswana Iran, Islamic Republic of Palestinian Nat'l Auth. Australia Indonesia Morocco	49 49 48 48 47 47 46 46 44 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 49 48 48 47 47 46 46 44 43 43 43	* * * * * * * * * * * * * * * * * * * *
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 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 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 49 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 49 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 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 48 47 47 46 46 44 43 43 42 41 40 39 39 37 37 36	* * * * * * * * * * * * * * * * * * * *

Country average vs. International average:

▲ ○ ▼

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:

C

Overall Percent Correct

Korea, Republic of	82	\blacktriangle
Japan	82	A
Chinese Taipei	79	A
Singapore	79	A
Slovak Republic	76	A
Hong Kong, SAR	74	A
Hungary	74	A
Estonia	72	
Belgium (Flemish)	67	
Latvia	66	A
Israel	65	A
Serbia and Montenegro	62	\blacktriangle
Russian Federation	62	\blacktriangle
Bulgaria	58	\blacktriangle
Romania	58	A
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	
6 1 1	48	^
Scotland	48	0
Scotland United States	48 47	0
United States	47 46 45	0
United States Moldova, Republic of	47 46	0 0
United States Moldova, Republic of Sweden	47 46 45	0 0 0
United States Moldova, Republic of Sweden Egypt	47 46 45 45	0 0 0 0
United States Moldova, Republic of Sweden Egypt Australia	47 46 45 45 45	0 0 0 0
United States Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of	47 46 45 45 45 41	0 0 0 0
United States Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway	47 46 45 45 45 41 41	0 0 0 0
United States Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway Armenia	47 46 45 45 45 41 41	0 0 0 0
United States Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway Armenia Jordan	47 46 45 45 45 41 41 41 38	0 0 0 0
United States Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway Armenia Jordan Philippines	47 46 45 45 45 41 41 41 38 36	0 0 0 0
United States Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway Armenia Jordan Philippines Cyprus	47 46 45 45 45 41 41 41 38 36 35	0 0 0 0
United States Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway Armenia Jordan Philippines Cyprus Palestinian Nat'l Auth.	47 46 45 45 45 41 41 41 38 36 35 33	0 0 0 0
United States Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway Armenia Jordan Philippines Cyprus Palestinian Nat'l Auth. England	47 46 45 45 45 41 41 41 38 36 35 33	0 0 0 0
United States Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway Armenia Jordan Philippines Cyprus Palestinian Nat'l Auth. England New Zealand	47 46 45 45 41 41 41 38 36 35 33 33 33	0 0 0 0
United States Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway Armenia Jordan Philippines Cyprus Palestinian Nat'l Auth. England New Zealand Morocco	47 46 45 45 45 41 41 41 38 36 35 33 33 33 32	0 0 0 0
United States Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway Armenia Jordan Philippines Cyprus Palestinian Nat'l Auth. England New Zealand Morocco Bahrain	47 46 45 45 45 41 41 41 38 36 35 33 33 33 32 27	0 0 0 0 0 0 0 0 0 0 0 0 0
United States Moldova, Republic of Sweden Egypt Australia Macedonia, Republic of Norway Armenia Jordan Philippines Cyprus Palestinian Nat'l Auth. England New Zealand Morocco Bahrain Chile	47 46 45 45 41 41 41 38 36 35 33 33 33 27 25	0 0 0 0 0 0 0 0 0 0 0 0 0
United States 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	47 46 45 45 41 41 41 38 36 35 33 33 32 27 25 25	0 0 0 0 0 0 0 0 0 0 0 0 0
United States 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	47 46 45 45 41 41 41 38 36 35 33 33 32 27 25 25 24	0 0 0 0
United States 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	47 46 45 45 41 41 41 38 36 35 33 33 32 27 25 24 23	0 0 0 0 0 0 0 0 0 0 0 0 0

Country average vs. International average:

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 $a + 2(b + c)$?	
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	64	A
Singapore	58	<u> </u>
Chinese Taipei	57	<u> </u>
Hong Kong, SAR	56	<u> </u>
Russian Federation	53	<u> </u>
Romania	40	_
Hungary	38	<u> </u>
Israel	38	<u> </u>
Japan	37	<u> </u>
Estonia	35	<u> </u>
Latvia	34	<u> </u>
Serbia and Montenegro	34	_
Armenia	33	<u> </u>
Moldova, Republic of	31	_
Bulgaria	30	
Slovak Republic	28	
Belgium (Flemish)	28	
Lithuania	28 26	
Lebanon	26 25	0
International average	23 22	0
Malaysia	20	0
Australia	20	0
United States	20	0
Cyprus	20	0
Macedonia, Republic of	18	V
Scotland	18	0
Italy	16	▼
Netherlands	16	*
England	15	*
New Zealand	14	*
Slovenia	13	*
Sweden	10	*
Egypt	10	*
Jordan	9	
2010011	_	Ė
Indonesia	8	•
Indonesia Tunisia	8 5	V
Tunisia	5	*
Tunisia Palestinian Nat'l Auth.	5 5	*
Tunisia Palestinian Nat'l Auth. Philippines	5 5 5	* * * * * * * * * * * * * * * * * * *
Tunisia Palestinian Nat'l Auth. Philippines Morocco	5 5 5 4	* * * * * * * * * * * * * * * * * * *
Tunisia Palestinian Nat'l Auth. Philippines Morocco Iran, Islamic Republic of	5 5 5 4 3	* * * * * * * * * * * * * * * * * * *
Tunisia Palestinian Nat'l Auth. Philippines Morocco Iran, Islamic Republic of Chile	5 5 5 4 3	* * * * * * * * * * * * * * * * * * * *
Tunisia Palestinian Nat'l Auth. Philippines Morocco Iran, Islamic Republic of Chile Norway	5 5 5 4 3 3	* * * * * * * * * * * * * * * * * * *
Tunisia Palestinian Nat'l Auth. Philippines Morocco Iran, Islamic Republic of Chile Norway South Africa	5 5 5 4 3 3 3	* * * * * * * * * * * * * * * * * * *
Tunisia Palestinian Nat'l Auth. Philippines Morocco Iran, Islamic Republic of Chile Norway South Africa Botswana	5 5 5 4 3 3 3 3	· · · · · · · · · · · · · · · · · · ·
Tunisia Palestinian Nat'l Auth. Philippines Morocco Iran, Islamic Republic of Chile Norway South Africa Botswana Bahrain	5 5 5 4 3 3 3 3 2 2	· · · · · · · · · · · · · · · · · · ·
Tunisia Palestinian Nat'l Auth. Philippines Morocco Iran, Islamic Republic of Chile Norway South Africa Botswana	5 5 5 4 3 3 3 3	* * * * * * * * * * * * * * * * * * *

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: 1

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
- (D) The average of the three even numbers

Item Number: M022002

Correct Response:

٨

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	O
Philippines	25	0
Bahrain	25	0
International average	24	
United States	23	0
Macedonia, Republic of	22	0
tall.	21	0
Italy	21	O
Australia	20	0
•		0
Australia	20	0
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 Cyprus Egypt	20 20 19 19	O
Australia Botswana South Africa Saudi Arabia Lithuania Cyprus	20 20 19 19 19	0
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	0
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	0
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	
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	0
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	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	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 Chile	20 20 19 19 19 19 18 18 16 16 15 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	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:

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:

_

Overall Percent Correct

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

Country average vs. International average:

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?

- $\bigcirc A \quad \frac{x}{3}$
- © 3+x
- \bigcirc 3x

Item Number: M032044

Correct Response:

Overall Percent Correct

Singapore	85	A
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	0
Latvia	46	0
Italy	45	0
International average	45	
New Zealand	43	0
Carbia and Mantanagra	12	\circ

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

Country average vs. International average:

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)

© 36

D 63

Item Number: M012040

Correct Response:

D

Overall Percent Correct

Cinganoro	93	
Singapore Korea, Republic of	93 89	A
Hong Kong, SAR	88	A
Belgium (Flemish)	86	A
Netherlands	85	A
Chinese Taipei	83	A
Malaysia	83	A
United States	80	<u> </u>
Hungary	79	•
Japan	79	<u> </u>
Scotland	79	A
Australia	76	A
England	74	<u> </u>
Slovak Republic	74	<u> </u>
Israel	72	<u> </u>
Slovenia	72	<u> </u>
Estonia	71	<u> </u>
Lebanon	71	<u> </u>
Russian Federation	71	<u> </u>
Latvia	70	
New Zealand	68	0
Iran, Islamic Republic of	66	0
Sweden	66	0
	65	0
Cyprus		
Cyprus Italy	65	0
Italy International average		
Italy	65	
Italy International average	65 64	0
Italy International average Lithuania	65 64 64	0
Italy International average Lithuania Tunisia	65 64 64 64	0 0
Italy International average Lithuania Tunisia Serbia and Montenegro	65 64 64 64 63	0 0 0 0 0
Italy International average Lithuania Tunisia Serbia and Montenegro Moldova, Republic of	65 64 64 64 63 61	0 0 0 0 0
Italy International average Lithuania Tunisia Serbia and Montenegro Moldova, Republic of Romania	65 64 64 63 61 61	0 0 0 0 0
Italy International average Lithuania Tunisia Serbia and Montenegro Moldova, Republic of Romania Bulgaria	65 64 64 64 63 61 61 59	0 0 0 0 0
Italy International average Lithuania Tunisia Serbia and Montenegro Moldova, Republic of Romania Bulgaria Norway	65 64 64 63 61 61 59 59	0 0 0 0 0
Italy International average Lithuania Tunisia Serbia and Montenegro Moldova, Republic of Romania Bulgaria Norway Egypt	65 64 64 63 61 61 59 59 58	0 0 0 0 0
Italy International average Lithuania Tunisia Serbia and Montenegro Moldova, Republic of Romania Bulgaria Norway Egypt Indonesia	65 64 64 63 61 61 59 59 58	0 0 0 0 0 0 V
Italy International average Lithuania Tunisia Serbia and Montenegro Moldova, Republic of Romania Bulgaria Norway Egypt Indonesia Armenia	65 64 64 64 63 61 61 59 59 58 58	0 0 0 0 0 0 V
Italy International average Lithuania Tunisia Serbia and Montenegro Moldova, Republic of Romania Bulgaria Norway Egypt Indonesia Armenia Morocco	65 64 64 63 61 61 59 59 58 54 54	0 0 0 0 0
Italy International average Lithuania Tunisia Serbia and Montenegro Moldova, Republic of Romania Bulgaria Norway Egypt Indonesia Armenia Morocco Jordan	65 64 64 63 61 61 59 58 58 54 54 53	0 0 0 0 0 0 0 0 0
Italy International average Lithuania Tunisia Serbia and Montenegro Moldova, Republic of Romania Bulgaria Norway Egypt Indonesia Armenia Morocco Jordan Palestinian Nat'l Auth.	65 64 64 63 61 61 59 58 58 54 54 53 52	0 0 0 0 0 0 0 0 0
Italy International average Lithuania Tunisia Serbia and Montenegro Moldova, Republic of Romania Bulgaria Norway Egypt Indonesia Armenia Morocco Jordan Palestinian Nat'l Auth. Philippines	65 64 64 63 61 61 59 58 58 54 54 53 52 52	0 0 0 0 0 0 0 0 0 0 0
Italy International average Lithuania Tunisia Serbia and Montenegro Moldova, Republic of Romania Bulgaria Norway Egypt Indonesia Armenia Morocco Jordan Palestinian Nat'l Auth. Philippines Macedonia, Republic of	65 64 64 63 61 61 59 58 58 54 54 53 52 52 50	0 0 0 0 0 0 0 0 0 0 0
Italy International average Lithuania Tunisia Serbia and Montenegro Moldova, Republic of Romania Bulgaria Norway Egypt Indonesia Armenia Morocco Jordan Palestinian Nat'l Auth. Philippines Macedonia, Republic of Bahrain	65 64 64 63 61 61 59 58 54 54 53 52 52 50 44	0 0 0 0 0 0 0 0 0 0 0
International average Lithuania Tunisia Serbia and Montenegro Moldova, Republic of Romania Bulgaria Norway Egypt Indonesia Armenia Morocco Jordan Palestinian Nat'l Auth. Philippines Macedonia, Republic of Bahrain Chile	65 64 64 63 61 61 59 58 54 54 53 52 52 50 44 44	0 0 0 0 0 0 0 0 0
International average Lithuania Tunisia Serbia and Montenegro Moldova, Republic of Romania Bulgaria Norway Egypt Indonesia Armenia Morocco Jordan Palestinian Nat'l Auth. Philippines Macedonia, Republic of Bahrain Chile Botswana	65 64 64 63 61 61 59 58 54 54 53 52 52 50 44 44 41	0 0 0 0 0 0 0 0 0 0 0

Country average vs. International average:

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

Item Number: M022196

Correct Response:

Overall Percent Correct

Singapore	88	A
Korea, Republic of	86	A
Hong Kong, SAR	84	A
Chinese Taipei	82	
Estonia	81	
Russian Federation	79	
Hungary	79	A
Japan	77	A
Belgium (Flemish)	76	A
Slovak Republic	75	A
Latvia	75	A
Serbia and Montenegro	73	A
Lithuania	73	A
Sweden	70	A
Lebanon	69	A
Romania	67	A
Armenia	66	A
Slovenia	66	A
Israel	64	A
Moldova, Republic of	63	A
Bulgaria	63	0
Tunisia	63	A
United States	62	A
Macedonia, Republic of	60	0
Netherlands	59	0
rretirenands		0
International average	58	
International average Morocco	58 57	0
International average Morocco Italy	58 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 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:

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	A
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	A
Bulgaria	59	A
United States	57	A
Israel	57	A
Cyprus	54	_ _
Moldova, Republic of	53	<u> </u>
Lithuania	51	_ _
Australia	50	<u> </u>
Malaysia	46	0
Netherlands	44	0
International average	44	
International average England	44 44	0
International average England New Zealand	44 44 44	0
International average England New Zealand Macedonia, Republic of	44 44 44 37	O O ▼
International average England New Zealand Macedonia, Republic of Italy	44 44 44 37 37	O O ▼
International average England New Zealand Macedonia, Republic of Italy Scotland	44 44 47 37 37 37	O O ▼
International average England New Zealand Macedonia, Republic of Italy Scotland Lebanon	44 44 37 37 37 37	O O ▼
International average England New Zealand Macedonia, Republic of Italy Scotland Lebanon Sweden	44 44 44 37 37 37 31 28	O O ▼
International average England New Zealand Macedonia, Republic of Italy Scotland Lebanon Sweden Tunisia	44 44 44 37 37 37 31 28 26	O O ▼
International average England New Zealand Macedonia, Republic of Italy Scotland Lebanon Sweden Tunisia Jordan	44 44 44 37 37 37 31 28 26 25	O O ▼
International average England New Zealand Macedonia, Republic of Italy Scotland Lebanon Sweden Tunisia Jordan Indonesia	44 44 44 37 37 37 31 28 26 25	O O ▼
International average England New Zealand Macedonia, Republic of Italy Scotland Lebanon Sweden Tunisia Jordan Indonesia Egypt	44 44 44 37 37 37 31 28 26 25 25 23	O O ▼
International average England New Zealand Macedonia, Republic of Italy Scotland Lebanon Sweden Tunisia Jordan Indonesia Egypt Philippines	44 44 47 37 37 31 28 26 25 25 23 22	O O ▼
International average England New Zealand Macedonia, Republic of Italy Scotland Lebanon Sweden Tunisia Jordan Indonesia Egypt Philippines Bahrain	44 44 44 37 37 31 28 26 25 25 23 22 19	0 0 V V V V V V
International average England New Zealand Macedonia, Republic of Italy Scotland Lebanon Sweden Tunisia Jordan Indonesia Egypt Philippines Bahrain Iran, Islamic Republic of	44 44 44 37 37 31 28 26 25 25 23 22 19	0 0 V V V V V
International average England New Zealand Macedonia, Republic of Italy Scotland Lebanon Sweden Tunisia Jordan Indonesia Egypt Philippines Bahrain Iran, Islamic Republic of Palestinian Nat'l Auth.	44 44 44 37 37 31 28 26 25 25 23 22 19 18	0 0 V V V V V
International average England New Zealand Macedonia, Republic of Italy Scotland Lebanon Sweden Tunisia Jordan Indonesia Egypt Philippines Bahrain Iran, Islamic Republic of Palestinian Nat'l Auth. Morocco	44 44 44 37 37 31 28 26 25 25 23 22 19 18 17 16	0 0 V V V V V V V V V V V V V V V V V V
International average England New Zealand Macedonia, Republic of Italy Scotland Lebanon Sweden Tunisia Jordan Indonesia Egypt Philippines Bahrain Iran, Islamic Republic of Palestinian Nat'l Auth. Morocco Norway	44 44 44 37 37 31 28 26 25 25 23 22 19 18 17 16	0 0 V V V V V V V V V V V V V V V V V V
International average England New Zealand Macedonia, Republic of Italy Scotland Lebanon Sweden Tunisia Jordan Indonesia Egypt Philippines Bahrain Iran, Islamic Republic of Palestinian Nat'l Auth. Morocco Norway Chile	44 44 44 37 37 31 28 26 25 25 23 22 19 18 17 16 11 9	0 0 V V V V V V V V V V V V V V V V V V
International average England New Zealand Macedonia, Republic of Italy Scotland Lebanon Sweden Tunisia Jordan Indonesia Egypt Philippines Bahrain Iran, Islamic Republic of Palestinian Nat'l Auth. Morocco Norway Chile Saudi Arabia	44 44 44 37 37 31 28 26 25 25 23 22 19 18 17 16 11 9 6	0 0 V V V V V V V V V V V V V V V V V V
International average England New Zealand Macedonia, Republic of Italy Scotland Lebanon Sweden Tunisia Jordan Indonesia Egypt Philippines Bahrain Iran, Islamic Republic of Palestinian Nat'l Auth. Morocco Norway Chile Saudi Arabia South Africa	44 44 44 37 37 31 28 26 25 25 23 22 19 18 17 16 11 9 6 5	0 0 V V V V V
International average England New Zealand Macedonia, Republic of Italy Scotland Lebanon Sweden Tunisia Jordan Indonesia Egypt Philippines Bahrain Iran, Islamic Republic of Palestinian Nat'l Auth. Morocco Norway Chile Saudi Arabia	44 44 44 37 37 31 28 26 25 25 23 22 19 18 17 16 11 9 6	0 0 V V V V V V V V V V V V V V V V V V
International average England New Zealand Macedonia, Republic of Italy Scotland Lebanon Sweden Tunisia Jordan Indonesia Egypt Philippines Bahrain Iran, Islamic Republic of Palestinian Nat'l Auth. Morocco Norway Chile Saudi Arabia South Africa	44 44 44 37 37 31 28 26 25 25 23 22 19 18 17 16 11 9 6 5	0 0 V V V V V V V V V V V V V V V V V V

Country average vs. International average:

Solve equation for *x* (continued)

Item Number: M022253

Student Responses

Correct Response:

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

Answer: $45 = 80$, then $x = 4(x + 5) = 80$.

Answer: $45 = 80$, then $x = 4(x + 5) = 80$.

Incorrect Response:

If
$$4(x+5) = 80$$
, then $x = \frac{30}{4x+3} = 80$

U(x+5)= 80

U(x+6)= 80

U(x+6)

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	A
Singapore	70	
Chinese Taipei	69	
Japan	61	
Hong Kong, SAR	59	
Scotland	55	
Belgium (Flemish)	53	
Latvia	51	
Estonia	50	
United States	49	
Serbia and Montenegro	49	
England	49	0
Romania	48	O
Hungary	47	O
Slovak Republic	46	O
New Zealand	45	O
Moldova, Republic of	45	O
Bulgaria	45	0
Russian Federation	44	0
Australia	44	O
Israel	44	Ο
Netherlands	43	O
Malaysia	43	0
International average	42	
Lebanon	40	O

Lebanon	40	Ο
Botswana	38	0
Lithuania	37	0
Jordan	37	\blacksquare
Tunisia	36	\blacksquare
Slovenia	36	0
Macedonia, Republic of	36	\blacksquare
Sweden	35	•
Philippines	35	•
Cyprus	34	•
Egypt	34	•
Iran, Islamic Republic of	34	*
Indonesia	33	•
Chile	31	•
Palestinian Nat'l Auth.	31	•
South Africa	31	•
Norway	30	▼
Saudi Arabia	29	•
Armenia	29	•
Italy	28	•
Bahrain	27	•
Morocco	23	•

Country average vs. International average:

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
- ① -7

Item Number: M032208

Correct Response:

В

Overall Percent Correct

Singapore Korea, Republic of Hong Kong, SAR Chinese Taipei Australia Belgium (Flemish) New Zealand Hungary England United States Scotland Japan Malaysia Israel Estonia Serbia and Montenegro Romania Latvia Slovenia Cyprus Norway Sweden Netherlands Lithuania	79 78 77 69 69 67 66 63 61 61 58 58 58 55 55 55 55 53 53	
Russian Federation International average	52 51	0
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 Saudi Arabia	48 47 47 46 45 44 43 39 38 38 38 37 36 33 31 31 30 26 24	O O

Country average vs. International average:

0

▼

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

If a/b equals 70

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

A 35

(B) 68

(c) 72

(D) 140

Item Number: M032210

Correct Response:

Α

Overall Percent Correct

Chinese Taipei	70	
Singapore	69	
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	A
Belgium (Flemish)	52	A
Lithuania	51	
Slovak Republic	47	
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	
International average Netherlands	40	0
Netherlands	40	0
Netherlands Sweden	40 38	0
Netherlands Sweden United States	40 38 38	0
Netherlands Sweden United States England	40 38 38 38	0 0
Netherlands Sweden United States England Lebanon	40 38 38 38 38	0 0 0
Netherlands Sweden United States England Lebanon Slovenia	40 38 38 38 37 37	0 0 0 0
Netherlands Sweden United States England Lebanon Slovenia Australia	40 38 38 38 37 37	0 0 0 0 0
Netherlands Sweden United States England Lebanon Slovenia Australia Malaysia	40 38 38 38 37 37 37 36	0 0 0 0 0 0
Netherlands Sweden United States England Lebanon Slovenia Australia Malaysia New Zealand	40 38 38 38 37 37 37 36 32	0 0 0 0 0 0
Netherlands Sweden United States England Lebanon Slovenia Australia Malaysia New Zealand Scotland	40 38 38 38 37 37 37 36 32 30	0 0 0 0 0 0 0 0
Netherlands Sweden United States England Lebanon Slovenia Australia Malaysia New Zealand Scotland Cyprus	40 38 38 38 37 37 37 36 32 30	0 0 0 0 0 0 0 0
Netherlands Sweden United States England Lebanon Slovenia Australia Malaysia New Zealand Scotland Cyprus Tunisia	40 38 38 38 37 37 37 36 32 30 30	0 0 0 0 0 0 0 0
Netherlands Sweden United States England Lebanon Slovenia Australia Malaysia New Zealand Scotland Cyprus Tunisia Philippines	40 38 38 38 37 37 37 36 32 30 30 30 27	0 0 0 0 0 0 0 0
Netherlands Sweden United States England Lebanon Slovenia Australia Malaysia New Zealand Scotland Cyprus Tunisia Philippines Iran, Islamic Republic of	40 38 38 38 37 37 36 32 30 30 27 27	0 0 0 0 0 0 0 0
Netherlands Sweden United States England Lebanon Slovenia Australia Malaysia New Zealand Scotland Cyprus Tunisia Philippines Iran, Islamic Republic of Egypt	40 38 38 38 37 37 36 32 30 30 27 27 26	0 0 0 0 0 0 0 0
Netherlands Sweden United States England Lebanon Slovenia Australia Malaysia New Zealand Scotland Cyprus Tunisia Philippines Iran, Islamic Republic of Egypt Botswana	40 38 38 37 37 37 36 32 30 30 27 27 26 25	0 0 0 0 0 0 0 0
Netherlands Sweden United States England Lebanon Slovenia Australia Malaysia New Zealand Scotland Cyprus Tunisia Philippines Iran, Islamic Republic of Egypt Botswana Morocco	40 38 38 37 37 37 36 32 30 30 27 27 26 25 24	0 0 0 0 0 0 0 0
Netherlands Sweden United States England Lebanon Slovenia Australia Malaysia New Zealand Scotland Cyprus Tunisia Philippines Iran, Islamic Republic of Egypt Botswana Morocco Jordan	40 38 38 37 37 37 36 32 30 30 27 27 26 25 24 23	0 0 0 0 0 0 0 0
Netherlands Sweden United States England Lebanon Slovenia Australia Malaysia New Zealand Scotland Cyprus Tunisia Philippines Iran, Islamic Republic of Egypt Botswana Morocco Jordan Norway	40 38 38 37 37 37 36 32 30 30 27 27 26 25 24 23 22	0 0 0 0 0 0 0 0
Netherlands Sweden United States England Lebanon Slovenia Australia Malaysia New Zealand Scotland Cyprus Tunisia Philippines Iran, Islamic Republic of Egypt Botswana Morocco Jordan	40 38 38 37 37 37 36 32 30 30 27 27 26 25 24 23	0 0 0 0 0 0

Country average vs. International average:

17

15

South Africa

Saudi Arabia

Bahrain

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

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

Country average vs. International average:

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 2:
$$\sqrt{\frac{43\times}{12}}$$

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.

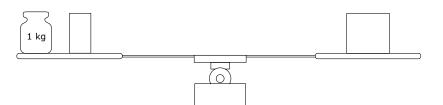
Equation 1: 7x + 4y - Z

Equation 2: 11x +13 1 = 7

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
- ① 3 kg

Item Number: M012002

Correct Response:

C

Overall Percent Correct

Estonia	86	A
Russian Federation	85	
Netherlands	83	A
Japan	82	A
Singapore	82	A
Hong Kong, SAR	81	A
Italy	79	A
Belgium (Flemish)	78	A
Korea, Republic of	78	A
Slovak Republic	78	A
Sweden	78	A
Latvia	77	A
Australia	76	A
Chinese Taipei	76	A
England	76	A
Lithuania	76	A
Hungary	75	A
New Zealand	75	A
Malaysia	74	A
Scotland	74	A
United States	74	A
Bulgaria	73	A
Slovenia	73	A
Moldova, Republic of	68	A
Israel	67	A
Israel Norway	67 66	0
151 4 21	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 63	0 0 0
Norway Romania Serbia and Montenegro Cyprus International average Iran, Islamic Republic of	66 66 65 64 63	0 0 0 0
Norway Romania Serbia and Montenegro Cyprus International average Iran, Islamic Republic of Macedonia, Republic of	66 66 65 64 63 63	0 0 0
Norway Romania Serbia and Montenegro Cyprus International average Iran, Islamic Republic of Macedonia, Republic of Jordan	66 66 65 64 63 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 63 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 63 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 63 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 63 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 63 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 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 Indonesia	66 66 65 64 63 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 63 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:

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:

A

Overall Percent Correct

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

Country average vs. International average:

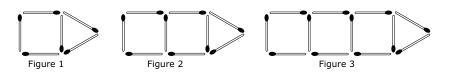
▲ O

▼

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	A
Singapore	73	A
Chinese Taipei	71	A
Japan	67	A
Hong Kong, SAR	66	A
Belgium (Flemish)	64	A
New Zealand	63	A
Australia	62	A
Scotland	61	A
Hungary	61	A
Slovak Republic	60	A
Netherlands	59	A
Russian Federation	59	A
Sweden	59	A
Estonia	58	A
Israel	58	A
Malaysia	57	A
United States	56	A
Slovenia	56	A
Lithuania	56	A
Moldova, Republic of	55	A
Italy	54	A
Bulgaria	53	0
England	52	0
Romania	51	0
Serbia and Montenegro	51	0
Macedonia, Republic of	50	0
Latvia	49	0
Cyprus	49	Ο
International average	48	
Armenia	47	0
Norway	46	0
CL 1	42	▼
Chile	43	
Chile Philippines	41	
Philippines Bahrain		
Philippines	41	
Philippines Bahrain	41 37	
Philippines Bahrain Iran, Islamic Republic of	41 37 34	
Philippines Bahrain Iran, Islamic Republic of Jordan	41 37 34 33	* * * * * * * * * * * * * * * * * * *
Philippines Bahrain Iran, Islamic Republic of Jordan Lebanon	41 37 34 33 32	
Philippines Bahrain Iran, Islamic Republic of Jordan Lebanon Egypt	41 37 34 33 32 30	
Philippines Bahrain Iran, Islamic Republic of Jordan Lebanon Egypt Tunisia	41 37 34 33 32 30 29	
Philippines Bahrain Iran, Islamic Republic of Jordan Lebanon Egypt Tunisia Indonesia	41 37 34 33 32 30 29 29	
Philippines Bahrain Iran, Islamic Republic of Jordan Lebanon Egypt Tunisia Indonesia Palestinian Nat'l Auth.	41 37 34 33 32 30 29 29	
Philippines Bahrain Iran, Islamic Republic of Jordan Lebanon Egypt Tunisia Indonesia Palestinian Nat'l Auth. Botswana	41 37 34 33 32 30 29 29 29	
Philippines Bahrain Iran, Islamic Republic of Jordan Lebanon Egypt Tunisia Indonesia Palestinian Nat'l Auth. Botswana Morocco	41 37 34 33 32 30 29 29 29 27 26	
Philippines Bahrain Iran, Islamic Republic of Jordan Lebanon Egypt Tunisia Indonesia Palestinian Nat'l Auth. Botswana Morocco South Africa	41 37 34 33 32 30 29 29 29 27 26 24	

Country average vs. International average:

0

▼

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:

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	A
Korea, Republic of	51	
Singapore	50	A
Hungary	49	A
Japan	46	A
United States	45	A
Italy	45	A
Belgium (Flemish)	43	A
Slovenia	41	A
Australia	39	A
Hong Kong, SAR	39	A
Slovak Republic	39	A
Chinese Taipei	39	A
Bulgaria	38	A
Estonia	38	A
Netherlands	38	A
Scotland	37	A
Sweden	35	A
Malaysia	35	A
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 0
	31 31	
Israel Cyprus Latvia	31 31 31	0
Israel Cyprus Latvia International average	31 31 31 31	0 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 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 •
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 23 22 20 20 19 18 17 16	0 0 0 V 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 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 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 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 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

1,10,19,28,37,46,55

Incorrect Response:

The numbers in the sequence 3, 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?

nswer: 46

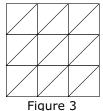
Content Domain	Main Topic	Cognitive Domain
A. ALGEBRA	Patterns	Solving Routine Problems
B. ALGEBRA	Patterns	Solving Routine Problems
C. ALGEBRA	Patterns	Reasoning

Sequence of figures with triangles: fill table

The three figures below are divided into small congruent triangles.







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?

Λ		
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: 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	A
Singapore	74	A
Japan	74	
Hong Kong, SAR	72	
Chinese Taipei	69	A
Netherlands	59	A
Australia	57	A
England	57	A
New Zealand	55	A
Armenia	53	A
Scotland	53	A
Belgium (Flemish)	51	A
Hungary	50	A
United States	50	A
Estonia	50	A
Sweden	49	A
Slovenia	42	A A A A
Malaysia	42	A
Israel	42	A
Russian Federation	41	A
Slovak Republic	40	0
Latvia	38	0
Lithuania	38	0
International average	36	
Italy	35	0
Norway	34	0
Romania	31	0
Moldova, Republic of	31	▼
Serbia and Montenegro	31	▼
Cyprus	30	▼
Bulgaria	30	▼
Macedonia, Republic of	25	▼
Chile	23	▼
Jordan	21	▼
Indonesia	20	* * * * * * *
Palestinian Nat'l Auth.	17	▼
- 1		

Country average vs. International average:

17

16

16

15

15

12

11

6

5

4

Philippines

Iran, Islamic Republic of

Morocco

Bahrain

Egypt Lebanon

Botswana

Tunisia

Ghana

South Africa

Saudi Arabia

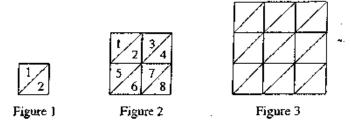
Sequence of figures with triangles: fill table (continued)

Item Number: M022261A

Student Responses

Correct Response:

The three figures below are divided into small congruent triangles.

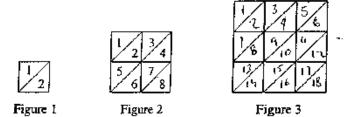


a) Complete the table below. First, fill in how many small triangles make up Figure 3. Then, find the number of small triangles that would be needed for the 4th figure if the sequence of figures is extended.

	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.



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	13
4	25

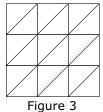
Content Domain	Main Topic	Cognitive Domain
A. ALGEBRA	Patterns	Solving Routine Problems
B. ALGEBRA	Patterns	Solving Routine Problems
C. ALGEBRA	Patterns	Reasoning

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?

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: 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		
Notea, Nepublic Of	60	
Singapore	56	
Chinese Taipei	56	
Hong Kong, SAR	56	
Japan	55	
Armenia	42	
Netherlands	40	
Australia	33	
Scotland	31	A
Hungary	30	
United States	30	
New Zealand	29	
Belgium (Flemish)	28	
Sweden	26	
England	25	O
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	0
Lithuania	19	0
Romania	19	0
Latvia		0
	19	
Serbia and Montenegro	19	○▼
Cyprus	17	Ž
Bulgaria	16	•
and the second s		_
Indonesia	15	V
Norway	14	*
Norway Jordan	14 12	* * *
Norway Jordan Philippines	14 12 11	* * * *
Norway Jordan Philippines Palestinian Nat'l Auth.	14 12 11 11	* * * * * * * * * * * * * * * * * * *
Norway Jordan Philippines Palestinian Nat'l Auth. Macedonia, Republic of	14 12 11 11	* * * * * * * * * * * * * * * * * * *
Norway Jordan Philippines Palestinian Nat'l Auth. Macedonia, Republic of Chile	14 12 11 11 10 9	* * * * * * * * * * * * * * * * * * *
Norway Jordan Philippines Palestinian Nat'l Auth. Macedonia, Republic of Chile Egypt	14 12 11 11 10 9	* * * * * * * * * * * * * * * * * * *
Norway Jordan Philippines Palestinian Nat'l Auth. Macedonia, Republic of Chile Egypt Bahrain	14 12 11 11 10 9 9	* * * * * * * * * * * * * * * * * * *
Norway Jordan Philippines Palestinian Nat'l Auth. Macedonia, Republic of Chile Egypt Bahrain Iran, Islamic Republic of	14 12 11 11 10 9 9 8 7	* * * * * * * * * * * * * * * * * * *
Norway Jordan Philippines Palestinian Nat'l Auth. Macedonia, Republic of Chile Egypt Bahrain Iran, Islamic Republic of Morocco	14 12 11 11 10 9 9 8 7	V
Norway Jordan Philippines Palestinian Nat'l Auth. Macedonia, Republic of Chile Egypt Bahrain Iran, Islamic Republic of	14 12 11 11 10 9 9 8 7 7	V
Norway Jordan Philippines Palestinian Nat'l Auth. Macedonia, Republic of Chile Egypt Bahrain Iran, Islamic Republic of Morocco	14 12 11 11 10 9 9 8 7	V
Norway Jordan Philippines Palestinian Nat'l Auth. Macedonia, Republic of Chile Egypt Bahrain Iran, Islamic Republic of Morocco Lebanon	14 12 11 11 10 9 9 8 7 7	V
Norway Jordan Philippines Palestinian Nat'l Auth. Macedonia, Republic of Chile Egypt Bahrain Iran, Islamic Republic of Morocco Lebanon Botswana	14 12 11 11 10 9 8 7 7 6 5 4	V
Norway Jordan Philippines Palestinian Nat'l Auth. Macedonia, Republic of Chile Egypt Bahrain Iran, Islamic Republic of Morocco Lebanon Botswana South Africa	14 12 11 11 10 9 8 7 7 6 5	* * * * * * * * * * * * * * * * * * *
Norway Jordan Philippines Palestinian Nat'l Auth. Macedonia, Republic of Chile Egypt Bahrain Iran, Islamic Republic of Morocco Lebanon Botswana South Africa Tunisia	14 12 11 11 10 9 8 7 7 6 5 4	V
Norway Jordan Philippines Palestinian Nat'l Auth. Macedonia, Republic of Chile Egypt Bahrain Iran, Islamic Republic of Morocco Lebanon Botswana South Africa Tunisia Ghana	14 12 11 11 10 9 8 7 7 6 5 4 2	V

Country average vs. International average:

Higher	
Not different	0
Lower	

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.

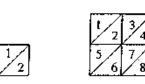


Figure 1

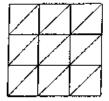


Figure 3

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.

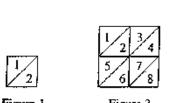


Figure 1

Figure 2

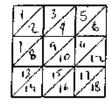


Figure 3

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

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.





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.

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:

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

49	
48	
45	
44	
44	
36	
26	
24	
22	
21	
20	
19	
17	
16	0
15	0
14	0
14	
14	0
13	0
13	0
11	▼
11	\blacksquare
11	0
10	\blacksquare
10	\blacksquare
10	•
9	\blacksquare
9	\blacksquare
8	\blacksquare
7	\blacksquare
6	* * * * * * * * * * * * * * * * * * *
5	\blacksquare
5	\blacksquare
5	▼
4	\blacksquare
4	\blacksquare
4	▼
4	\blacksquare
3	\blacksquare
2	\blacksquare
2	\blacksquare
1	\blacksquare
0	\blacksquare
	48 45 44 44 36 26 24 22 21 20 19 17 16 15 14 14 13 11 10 10 10 9 9 8 7 6 5 5 4 4 4 4 3 2 2 1 1 1 1 1 1 1 1 1 1 1 1 1

Country average vs. International average:

Moldova, Republic of

Higher	
Not different	C
Lower	1

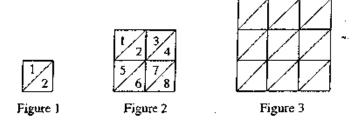
Sequence of figures with triangles/50th figure (continued)

Item Number: M022261C

Student Responses

Correct Response:

The three figures below are divided into small congruent triangles.

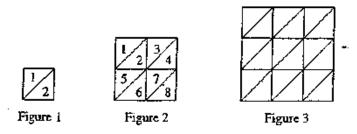


c) The sequence of figures is extended to the 50th figure. Explain a way to find the number of small triangles in the 50th figure that does not involve drawing it and counting the number of triangles.

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.

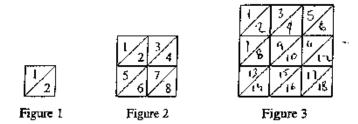
Sequence of figures with triangles/50th figure (continued)

Item Number: M022261C

Student Responses (continued)

Incorrect Response:

The three figures below are divided into small congruent triangles.

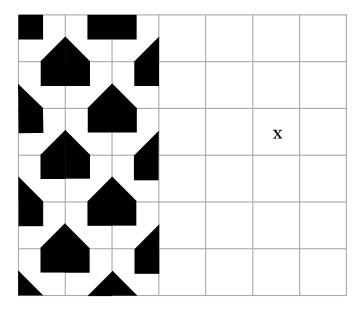


c) The sequence of figures is extended to the 50th figure. Explain a way to find the number of small triangles in the 50th figure that does not involve drawing it and counting the number of triangles.

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	0
Israel	34	0
International average	32	

international average		
Bulgaria	30	0
Romania	29	O
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	
Iran, Islamic Republic of	13	\blacksquare
Macedonia, Republic of	13	* * * *
Indonesia	11	\blacksquare
Lebanon	10	\blacksquare
South Africa	8	
Saudi Arabia	8	▼
Morocco	7	▼
Egypt	7	\blacksquare
Botswana	7	\blacksquare
Armenia	6	▼
Palestinian Nat'l Auth.	3	\blacksquare
Tunisia	2	\blacksquare

Country average vs. International average:

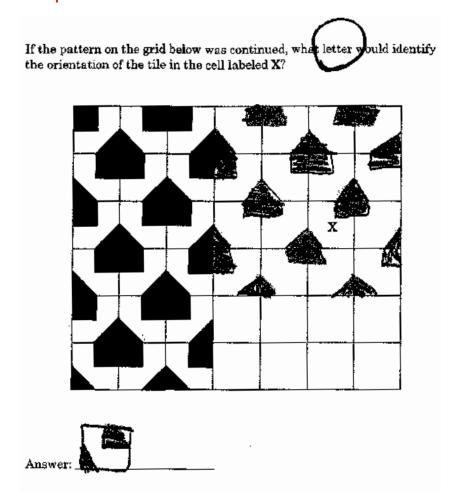
Higher
Not different
Lower

Geometry tiling: identify cell with letter (continued)

Item Number: M032744

Student Responses

Correct Response:



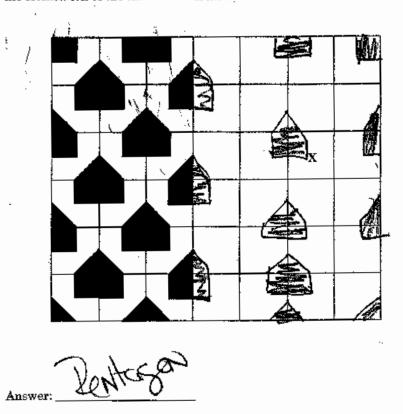
Geometry tiling: identify cell with letter (continued)

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?

- 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:

E

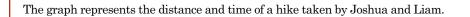
Overall Percent Correct

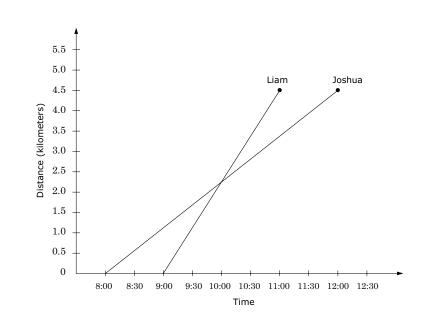
Korea, Republic of	85	A
Japan	76	A
Hungary	75	A
Estonia	74	_
Chinese Taipei	71	A
Singapore	71	A
Hong Kong, SAR	71	A
Latvia	71	A
Australia	70	A
Russian Federation	69	A
Scotland	69	A
United States	68	A
Netherlands	68	A
New Zealand	67	A
England	64	A
Lithuania	64	A
Belgium (Flemish)	62	A
Serbia and Montenegro	58	A
Israel	57	A
Slovak Republic	56	A
Bulgaria	54	0
Slovenia	53	0
Italy	51	0
Malausia	51	0
Malaysia	۱ ر	U
International average	50	
<u> </u>		▼
International average Jordan Sweden	50	▼
International average Jordan	50 46	▼
International average Jordan Sweden	50 46 45	▼
International average Jordan Sweden Macedonia, Republic of Romania Norway	50 46 45 42	▼
International average Jordan Sweden Macedonia, Republic of Romania	50 46 45 42 42	▼
International average Jordan Sweden Macedonia, Republic of Romania Norway	50 46 45 42 42 40	▼
International average Jordan Sweden Macedonia, Republic of Romania Norway Moldova, Republic of	46 45 42 42 40 39	▼
International average Jordan Sweden Macedonia, Republic of Romania Norway Moldova, Republic of Bahrain	46 45 42 42 40 39 38	▼
International average Jordan Sweden Macedonia, Republic of Romania Norway Moldova, Republic of Bahrain Botswana	46 45 42 42 40 39 38 36	▼
International average 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	▼
International average Jordan Sweden Macedonia, Republic of Romania Norway Moldova, Republic of Bahrain Botswana Iran, Islamic Republic of Armenia Egypt Indonesia	50 46 45 42 42 40 39 38 36 35 34	▼
International average 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	* * * * * * * * * * * * * * * * * * *
International average Jordan Sweden Macedonia, Republic of Romania Norway Moldova, Republic of Bahrain Botswana Iran, Islamic Republic of Armenia Egypt Indonesia	46 45 42 42 40 39 38 36 35 34 33	▼
International average 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 42 40 39 38 36 35 34 33 33 33	* * * * * * * * * * * * * * * * * * *
International average Jordan Sweden Macedonia, Republic of Romania Norway Moldova, Republic of Bahrain Botswana Iran, Islamic Republic of Armenia Egypt Indonesia Palestinian Nat'l Auth. Philippines	50 46 45 42 40 39 38 36 35 34 33 33 33	* * * * * * * * * * * * * * * * * * *
International average 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	50 46 45 42 40 39 38 36 35 34 33 33 31 26	* * * * * * * * * * * * * * * * * * *
International average 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	50 46 45 42 40 39 38 36 35 34 33 33 31 26 25	* * * * * * * * * * * * * * * * * * *
International average 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	50 46 45 42 40 39 38 36 35 34 33 33 31 26 25 24	* * * * * * * * * * * * * * * * * * *
International average 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	50 46 45 42 40 39 38 36 35 34 33 33 31 26 25 24 23	* * * * * * * * * * * * * * * * * * *
International average 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	50 46 45 42 40 39 38 36 35 34 33 33 31 26 25 24 23 23	* * * * * * * * * * * * * * * * * * *
International average 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	50 46 45 42 40 39 38 36 35 34 33 33 31 26 25 24 23 23	* * * * * * * * * * * * * * * * * * *

Country average vs. International average:

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

Country average vs. International average:

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:

D

Overall Percent Correct

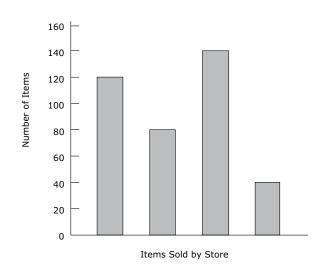
Korea, Republic of	85	
Netherlands	77	<u> </u>
Slovenia	68	<u> </u>
Belgium (Flemish)	67	<u> </u>
Sweden	65	<u> </u>
United States	65	<u> </u>
Scotland	64	_ _
Singapore	63	_ _
Lithuania	61	<u> </u>
Israel	59	A
New Zealand	59	A
England	58	A
Estonia	58	A
Australia	56	A
Hungary	56	A
Serbia and Montenegro	56	A
Norway	55	
Indonesia	53	A
Latvia	53	
Russian Federation	52	0
Bahrain	51	0
Chinese Taipei	51	0
Macedonia, Republic of	51	0
Slovak Republic	49	0
Hong Kong, SAR	48	0
Hong Kong, SAR International average	48 48	0
		0
International average Malaysia Romania	48 47 47	0
International average Malaysia	48 47	0 0
International average Malaysia Romania	48 47 47 46 45	0 0 0
International average Malaysia Romania Jordan Italy Japan	48 47 47 46 45 44	0 0 0
International average Malaysia Romania Jordan Italy Japan Cyprus	48 47 47 46 45 44 42	0 0 0
International average Malaysia Romania Jordan Italy Japan Cyprus Egypt	48 47 47 46 45 44 42 42	0 0 0
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
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
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
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 0 •
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 •
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 35 34	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	48 47 47 46 45 44 42 42 42 39 39 36 35 34 33	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	48 47 47 46 45 44 42 42 42 39 36 35 34 33	0 0 0 0 V V V V V V
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 39 36 35 34 33 33	0 0 0 0 V V V V V V
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 39 36 35 34 33 31 31	0 0 0 0 V V V V V V
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 V V V V V V
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 46 45 44 42 42 42 39 36 35 34 33 31 31 27 26	0 0 0 0 V V V V V V
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 South Africa	48 47 46 45 44 42 42 42 39 36 35 34 33 31 31 27 26 22	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 46 45 44 42 42 42 39 36 35 34 33 31 31 27 26	0 0 0 0 V V V V V V

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	
Norway	78	
England	78	
New Zealand	78	
Lithuania	77	
Cyprus	76	
Australia	76	
Australia	70	_
Israel	70	0
Israel International average	70 67	Ο
Israel International average Bulgaria	70 67 67	0
Israel International average Bulgaria Bahrain	70 67 67 66	0 0
Israel International average Bulgaria Bahrain Serbia and Montenegro	70 67 67 66 63	0 0 0 •
Israel International average Bulgaria Bahrain Serbia and Montenegro Moldova, Republic of	70 67 67 66 63 62	0 0 0 •
Israel International average Bulgaria Bahrain Serbia and Montenegro Moldova, Republic of Iran, Islamic Republic of	70 67 66 63 62 61	○○○▼▼
Israel International average Bulgaria Bahrain Serbia and Montenegro Moldova, Republic of Iran, Islamic Republic of Macedonia, Republic of	70 67 66 63 62 61 59	0 0 • •
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	0 0 •
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	○○○▼▼▼▼
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	○○○▼▼▼▼
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 Armenia Chile	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 67 66 63 62 61 59 59 59 53 51 50 49	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 •
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 •
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 49 48 45	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	70 67 66 63 62 61 59 59 59 53 51 50 49 49 48 45 42	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 •
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	○○○▼▼▼▼
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 Philippines	70 67 66 63 62 61 59 59 59 53 51 50 49 48 45 42 40 37 32	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 Botswana	70 67 66 63 62 61 59 59 59 53 51 50 49 48 45 42 40 37	0 0 0 •

Country average vs. International average:

24

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	
England	45	
Australia	44	
Estonia	44	A
Korea, Republic of	40	
Singapore	40	
Hungary	39	
Belgium (Flemish)	38	
Lithuania	37	A
United States	37	
Scotland	36	
Israel	33	
New Zealand	30	
Netherlands	28	
Hong Kong, SAR	28	
Slovenia	27	
Sweden	27	
Malaysia	27	
Chinese Taipei	27	
Slovak Republic	26	
Italy	23	0
Latvia	22	0
International average	21	
Jordan	20	0
Bahrain	18	0
Norway	18 18	0
Norway Romania	18 18 16	0
Norway Romania Russian Federation	18 18 16 15	0
Norway Romania Russian Federation Egypt	18 18 16 15	0
Norway Romania Russian Federation Egypt Cyprus	18 18 16 15 14	0
Norway Romania Russian Federation Egypt Cyprus Indonesia	18 18 16 15 14 13	0
Norway Romania Russian Federation Egypt Cyprus Indonesia Serbia and Montenegro	18 18 16 15 14 13 12	0
Norway Romania Russian Federation Egypt Cyprus Indonesia Serbia and Montenegro Chile	18 18 16 15 14 13 12 12	0
Norway Romania Russian Federation Egypt Cyprus Indonesia Serbia and Montenegro Chile Bulgaria	18 18 16 15 14 13 12 12 12	0
Norway Romania Russian Federation Egypt Cyprus Indonesia Serbia and Montenegro Chile Bulgaria Lebanon	18 18 16 15 14 13 12 12 12 12	0
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
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
Norway Romania Russian Federation Egypt Cyprus Indonesia Serbia and Montenegro Chile Bulgaria Lebanon Philippines Macedonia, Republic of Saudi Arabia	18 16 15 14 13 12 12 12 11 11 10 8	
Norway Romania Russian Federation Egypt Cyprus Indonesia Serbia and Montenegro Chile Bulgaria Lebanon Philippines Macedonia, Republic of Saudi Arabia Morocco	18 16 15 14 13 12 12 12 11 11 10 8 7	0
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
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	O V
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 4	O V
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 4	O V
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	O V
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	O V
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

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. I he talks for under andhours and it pays the least glds questions for Plans continue. **Partial Response:** Betty talks for less than 2 hours per month. Which plan would be less expensive for her? Less expensive plan 8 Explain your answer in terms of both the monthly fee and free minutes.

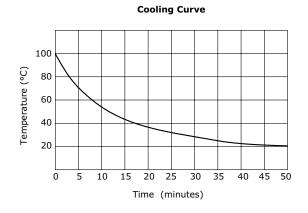
Incorrect Response:

Betty talks for less than 2 hours per month. Which plan would be less expensive for her?
Less expensive plan
Explain your answer in terms of both the monthly fee and free minutes.
Since Beetly coals For zins which is 120 min She will pay less for plan B. Because she will be for free units.
she will get tree units.

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?

- A) 3
- (B) 8
- © 37
- (D) 50

Item Number: M022135

Correct Response:

Λ

Overall Percent Correct

Belgium (Flemish)	70	A
Sweden	62	A
Australia	59	A
Estonia	57	A
Hungary	56	A
Scotland	55	
England	55	
Norway	54	
Singapore	54	
Netherlands	53	
United States	52	
New Zealand	49	
Lithuania	49	
Latvia	47	A
Chinese Taipei	45	A
Lebanon	40	A
Italy	40	A
Slovenia	39	A
Japan	39	
Russian Federation	38	A
Israel	36	0
Indonesia	35	0
Armenia	35	0
Slovak Republic	34	0
		-
Malaysia	33	0
Malaysia International average	33 33	
Malaysia International average Serbia and Montenegro		0
Malaysia International average Serbia and Montenegro Bulgaria	33	0 0
Malaysia International average Serbia and Montenegro Bulgaria Romania	33	0 0 0
Malaysia International average Serbia and Montenegro Bulgaria Romania Moldova, Republic of	33 33 32	0 0 0
Malaysia International average Serbia and Montenegro Bulgaria Romania	33 33 32 30	0 0 0
Malaysia International average Serbia and Montenegro Bulgaria Romania Moldova, Republic of	33 33 32 30 28	0 0 0
Malaysia International average Serbia and Montenegro Bulgaria Romania Moldova, Republic of Hong Kong, SAR Chile Cyprus	33 33 32 30 28 26	0 0 0
Malaysia International average Serbia and Montenegro Bulgaria Romania Moldova, Republic of Hong Kong, SAR Chile Cyprus Jordan	33 33 32 30 28 26 25	0 0 0
Malaysia International average Serbia and Montenegro Bulgaria Romania Moldova, Republic of Hong Kong, SAR Chile Cyprus Jordan Iran, Islamic Republic of	33 32 30 28 26 25 21	0 0 0
Malaysia 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	0 0 0
Malaysia 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 0
Malaysia 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 17 14	0 0 0
Malaysia 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 14 14	0 0
Malaysia 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
Malaysia 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 11	0 0 0
Malaysia 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
Malaysia 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 18 17 14 14 13 12 11	0 0 0
Malaysia 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
Malaysia 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 18 17 14 14 13 12 11 11	0 0 0
Malaysia 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 14 13 12 11 11 10 9 8	0 0 0
Malaysia 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 18 17 14 14 13 12 11 11 10 10 9	0 0 0

Country average vs. International average:

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 the cost him per month? Show your work.	night rate. What would each plan
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	27	
Japan	19	
Chinese Taipei	18	
Hong Kong, SAR	15	
Korea, Republic of	15	
Netherlands	14	
Sweden	12	
Lithuania	11	
Belgium (Flemish)	11	<u> </u>
Estonia	10	<u> </u>
Hungary	10	<u> </u>
England	8	0
United States	8	<u> </u>
New Zealand	7	0
Scotland	7	0
	7	0
Slovak Republic Australia	<i>7</i> 7	0
	-	
Israel	6	0
Malaysia	6	0
International average	6	
Latvia	6	0
Slovenia	5	O
Russian Federation	5	O
Romania	5	0
Norway	5	O
Bulgaria	4	O
Serbia and Montenegro	3	
Italy	3	
Moldova, Republic of	2	\blacksquare
Jordan	1	\blacksquare
Cyprus	1	\blacksquare
Macedonia, Republic of	1	\blacksquare
Indonesia	1	\blacksquare
South Africa	1	\blacksquare
Armenia	1	•
Palestinian Nat'l Auth.	1	•
Philippines	1	•
Chile	0	* * * * * * * * * * * * * * * * * * *
Iran, Islamic Republic of	0	•
Egypt	0	V
Lebanon	0	V
Bahrain	0	_
Ghana	0	•
Tunisia	0	<u> </u>
Morocco	0	*
	0	_
Botswana Saudi Arabia	0	_
Sauul Alabia	U	•

Country average vs. International average:

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 - 2 zed - 120 mis Free

Plan A-3 hours free
120 zeds140 zed

Plan B-2 hover 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	28 22 21 20 19 17 13 12 11 11 9 9 8 8	
International average	7 6	0
Latvia	6	0
Scotland	6	0
Slovenia	5	Ο
Israel	5	0
Romania	5	0
Norway	5	0
Russian Federation	4	•
Malaysia	4	* * * * * * * * * *
Ghana	3	•
Bulgaria	3	V
Italy	3	_
Moldova, Republic of	2	_
Jordan	2 2	_
Cyprus	2	
Serbia and Montenegro	1	Ž
Macedonia, Republic of Indonesia	1	¥
South Africa	1	¥
Bahrain	1	¥
Lebanon	0	¥
Tunisia	0	<u> </u>
Iran, Islamic Republic of	0	▼
Chile	0	▼
Philippines	0	•
Armenia	0	▼
Palestinian Nat'l Auth.	0	▼
Morocco	0	\blacksquare
Botswana	0	\blacksquare
Egypt	0	•
Saudi Arabia	0	▼

Country average vs. International average:

Higher
Not different
Lower

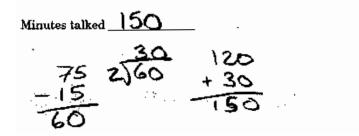
Phone plans: minutes talk by Darlene (continued)

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.



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
$$1325$$
 naturals.

 $15-15 = 65$
 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

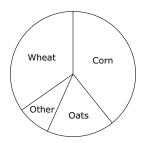
Chinese Taipei Korea, Republic of Singapore Hong Kong, SAR Malaysia Japan Slovak Republic Lithuania Netherlands Latvia Tunisia Slovenia United States Bulgaria Israel Scotland Estonia Hungary Moldova, Republic of Romania Serbia and Montenegro Russian Federation Australia	90 90 88 87 84 81 78 76 75 75 74 73 73 73 72 72 72 72 72 70 69	
Australia Belgium (Flemish) Italy	69 69 69	0
International average	68	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 South Africa Saudi Arabia	68 66 65 64 64 62 61 60 60 58 56 53 52 51 43 43 38	0 0 0 0 0 0 V V V V V V V V V V V V V V

Country average vs. International average:

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.
- © 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	A
Japan	92	A
Netherlands	88	A
Australia	86	A
Belgium (Flemish)	86	A
Sweden	85	A
Hong Kong, SAR	85	A
Chinese Taipei	84	A
Latvia	84	A
Singapore	83	
Slovak Republic	82	
England	82	A
Estonia	82	
Slovenia	82	A
Lithuania	82	A
Hungary	81	\blacktriangle
New Zealand	81	A
United States	81	A
Scotland	81	A
Israel	79	A
Norway	78	A
Russian Federation	78	A
Cyprus	76	A
Italy	74	0
Romania	72	0
International average	71	
Tunisia	71	0
Bulgaria	70	0
Egypt	69	0
Moldova, Republic of	67	0
Morocco	67	0
Jordan		
	66	•
	66 65	▼
Macedonia, Republic of	65	▼
Macedonia, Republic of Serbia and Montenegro		* * * *
Macedonia, Republic of Serbia and Montenegro Iran, Islamic Republic of	65 65	* * * *
Macedonia, Republic of Serbia and Montenegro	65 65 64	* * * * *
Macedonia, Republic of Serbia and Montenegro Iran, Islamic Republic of Malaysia Bahrain	65 65 64 63 63	*
Macedonia, Republic of Serbia and Montenegro Iran, Islamic Republic of Malaysia Bahrain Palestinian Nat'l Auth.	65 65 64 63 63	* * * * * *
Macedonia, Republic of Serbia and Montenegro Iran, Islamic Republic of Malaysia Bahrain	65 65 64 63 63	* * * * * * * *

Country average vs. International average:

Saudi Arabia Botswana Philippines Lebanon

Indonesia

South Africa

Ghana

52

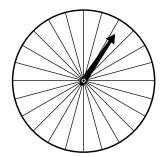
49

45 41

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	A
Chinese Taipei	85	
Netherlands	85	
Japan	82	•
Sweden	81	
Belgium (Flemish)	81	^
, ,	79	A
England		
Singapore	79 79	
Korea, Republic of United States		
	78	<u> </u>
Australia	78	A
Hungary	76	<u> </u>
Scotland	76	<u> </u>
Israel	74	<u> </u>
Slovenia	74	A
Norway	73	A .
Estonia	73	A
Latvia	71	A
New Zealand	71	A
Slovak Republic	69	A
Cyprus	69	A
Lithuania	67	A
Serbia and Montenegro	66	A
	65	
Malaysia	כס	-
Malaysia Bulgaria	60	0
Bulgaria Russian Federation	60 60	
Bulgaria Russian Federation International average	60 60	0
Bulgaria Russian Federation International average Italy	60 60 60 58	0 0
Bulgaria Russian Federation International average Italy Romania	60 60 60 58 57	0 0
Bulgaria Russian Federation International average Italy Romania Macedonia, Republic of	60 60 60 58 57 54	0 0 0 0
Bulgaria Russian Federation International average Italy Romania Macedonia, Republic of Armenia	60 60 58 57 54 47	0 0 0 0
Bulgaria Russian Federation International average Italy Romania Macedonia, Republic of	60 60 60 58 57 54	0 0 0 •
Bulgaria Russian Federation International average Italy Romania Macedonia, Republic of Armenia Moldova, Republic of Jordan	60 60 58 57 54 47	0 0 0 •
Bulgaria Russian Federation International average Italy Romania Macedonia, Republic of Armenia Moldova, Republic of	60 60 60 58 57 54 47 46	0 0 0 •
Bulgaria 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 •
Bulgaria 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 •
Bulgaria Russian Federation International average Italy Romania Macedonia, Republic of Armenia Moldova, Republic of Jordan Philippines Iran, Islamic Republic of	60 60 58 57 54 47 46 46 43 43	0 0 0 •
Bulgaria Russian Federation International average Italy Romania Macedonia, Republic of Armenia Moldova, Republic of Jordan Philippines Iran, Islamic Republic of Egypt	60 60 58 57 54 47 46 46 43 43	0 0 0 •
Bulgaria 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 60 58 57 54 47 46 46 43 43 43 42 41 40	0 0 0 •
Bulgaria 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 60 58 57 54 47 46 46 43 43 43 42 41	0 0 0 •
Bulgaria 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 60 58 57 54 47 46 46 43 43 43 42 41 40	0 0 0 •
Bulgaria 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 60 58 57 54 47 46 46 43 43 43 42 41 40 39	0 0 0 •
Bulgaria 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	60 60 58 57 54 47 46 46 43 43 43 42 41 40 39 38	0 0 0 •
Bulgaria 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 60 58 57 54 47 46 46 43 43 43 42 41 40 39 38 37	0 0 0 •
Bulgaria 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	60 60 58 57 54 47 46 46 43 43 42 41 40 39 38 37 34	0 0 0 •
Bulgaria 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	60 60 58 57 54 47 46 46 43 43 42 41 40 39 38 37 34	0 0 0 •
Bulgaria 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	60 60 58 57 54 47 46 46 43 43 42 41 40 39 38 37 34 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	
	00	
Singapore	80	
Netherlands	78	
Chinese Taipei	77	
Korea, Republic of	75	
Belgium (Flemish)	71	
Japan	66	
Estonia	61	
Sweden	61	<u> </u>
United States	60	
Hungary	56	
Australia	56	
New Zealand	55	_
Lithuania	55	
Italy	55	
Scotland	53	
Russian Federation	52	<u> </u>
Latvia	50	0
Malaysia	49	Ο
England	49	0
Israel	47	0
International average	47	O
Norway	46	Ο
Claval, Danublia	45	0
Slovak Republic	45	U
·		
Serbia and Montenegro	44	0
Serbia and Montenegro Moldova, Republic of	44 44	0
Serbia and Montenegro Moldova, Republic of Slovenia	44 44 44	0 0
Serbia and Montenegro Moldova, Republic of	44 44	0 0 0
Serbia and Montenegro Moldova, Republic of Slovenia Bulgaria	44 44 44	0 0 0
Serbia and Montenegro Moldova, Republic of Slovenia Bulgaria Cyprus	44 44 44 43 43	0 0 0
Serbia and Montenegro Moldova, Republic of Slovenia Bulgaria Cyprus Lebanon	44 44 43 43 41	0 0 0
Serbia and Montenegro Moldova, Republic of Slovenia Bulgaria Cyprus Lebanon Armenia	44 44 43 43 41 39	0 0 0
Serbia and Montenegro Moldova, Republic of Slovenia Bulgaria Cyprus Lebanon	44 44 43 43 41	0 0 0
Serbia and Montenegro Moldova, Republic of Slovenia Bulgaria Cyprus Lebanon Armenia	44 44 43 43 41 39	0 0 0
Serbia and Montenegro Moldova, Republic of Slovenia Bulgaria Cyprus Lebanon Armenia Tunisia	44 44 43 43 41 39 39	0 0 0
Serbia and Montenegro Moldova, Republic of Slovenia Bulgaria Cyprus Lebanon Armenia Tunisia Jordan Romania	44 44 43 43 41 39 39 39	0 0 0
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	0 0 0
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	0 0 0
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	0 0 0
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	0 0 0
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	0 0 0
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	0 0 0
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 32	0 0 0
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	0 0 0
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 32	0 0 0
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 38 36 35 34 32 32 31	0 0 0 0
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 41 39 39 39 38 36 35 34 32 32 31 28 28	0 0 0 0
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 26	0 0 0
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 Bahrain	44 44 43 43 41 39 39 39 38 36 35 34 32 32 31 28 28 26 23	0 0 0
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 Bahrain South Africa	44 44 43 41 39 39 39 38 36 35 34 32 32 31 28 28 26	0 0 0
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 Bahrain	44 44 43 43 41 39 39 39 38 36 35 34 32 32 31 28 28 26 23	0 0 0

Country average vs. International average:

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:

E

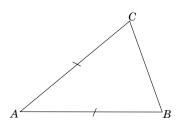
Overall Percent Correct

Korea, Republic of	89	
Singapore	87	A
Chinese Taipei	86	<u> </u>
Japan	86	_ _
Hong Kong, SAR	84	<u> </u>
Netherlands	82	<u> </u>
Belgium (Flemish)	79	<u> </u>
Sweden	71	<u> </u>
Malaysia	69	A
Scotland	66	
England	63	A
Armenia	62	
Australia	60	A
Latvia	59	<u> </u>
United States	58	<u> </u>
Estonia	57	<u> </u>
Italy	56	<u> </u>
Hungary	55	A
Israel	54	A
New Zealand	54	0
Cyprus	53	0
Slovenia	53	0
Lithuania	52	0
Russian Federation	51	0
Norway	50	0
Bulgaria	50	0
Bulgaria International average	50 50	0
Bulgaria International average Slovak Republic	50 50 50	0
Bulgaria International average Slovak Republic Serbia and Montenegro	50 50 50 46	0 0
Bulgaria International average Slovak Republic Serbia and Montenegro Indonesia	50 50 50 46 42	0 0 0
Bulgaria International average Slovak Republic Serbia and Montenegro Indonesia Romania	50 50 50 46	0 0 0
Bulgaria International average Slovak Republic Serbia and Montenegro Indonesia	50 50 50 46 42	0 0 0
Bulgaria International average Slovak Republic Serbia and Montenegro Indonesia Romania	50 50 50 46 42 39	0 0 0
Bulgaria International average Slovak Republic Serbia and Montenegro Indonesia Romania Iran, Islamic Republic of	50 50 50 46 42 39 37	0 0 0
Bulgaria International average Slovak Republic Serbia and Montenegro Indonesia Romania Iran, Islamic Republic of Jordan	50 50 50 46 42 39 37 33	0 0 0
Bulgaria International average Slovak Republic Serbia and Montenegro Indonesia Romania Iran, Islamic Republic of Jordan Egypt	50 50 50 46 42 39 37 33 33	0 0 0
Bulgaria International average Slovak Republic Serbia and Montenegro Indonesia Romania Iran, Islamic Republic of Jordan Egypt Botswana	50 50 46 42 39 37 33 33 32	0 0 0
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 46 42 39 37 33 33 32 32	0 0 0
Bulgaria International average Slovak Republic Serbia and Montenegro Indonesia Romania Iran, Islamic Republic of Jordan Egypt Botswana Macedonia, Republic of Philippines	50 50 46 42 39 37 33 33 32 32 32	0 0
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 46 42 39 37 33 33 32 32 32 31	0 0 0
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 46 42 39 37 33 32 32 32 31 28	0 0 0
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 46 42 39 37 33 32 32 32 31 28 28	0 0 0
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 46 42 39 37 33 32 32 32 31 28 28 28	0 0 0
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 46 42 39 37 33 32 32 32 31 28 28 28 26 24	0 0 0
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 46 42 39 37 33 32 32 32 31 28 28 28 28	0 0 0
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 46 42 39 37 33 32 32 32 32 32 32 28 28 26 24 23 22	0 0 0
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 46 42 39 37 33 32 32 32 31 28 28 28 26 24 23	0 0 0
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 Saudi Arabia	50 50 46 42 39 37 33 32 32 32 32 32 32 32 28 28 28 26 24 23 22 18	0 0 0

Country average vs. International average:

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 Japan Korea, Republic of Hong Kong, SAR Armenia Russian Federation Belgium (Flemish) Chinese Taipei Latvia Lithuania Estonia Israel Bahrain Romania Bulgaria Slovak Republic Netherlands Moldova, Republic of Lebanon Australia United States Slovenia	88 86 84 79 77 73 72 71 71 70 69 66 65 62 61 60 59 56 55 55 54 53	
Tunisia	53	0
Hungary Malaysia	53 52	0
International average	52	
Cyprus	51	0
England	48	0
New Zealand	48	0
Jordan	47	▼
Scotland	47	0
Italy Iran, Islamic Republic of	45 43	V
Norway	42	Ť
Morocco	41	* * * * *
Serbia and Montenegro	40	▼
Egypt	40	▼
Saudi Arabia	39	▼
Palestinian Nat'l Auth.	36	▼
Macedonia, Republic of	35	▼
Indonesia	26	•
Sweden	20	* * * *
Chile	19 14	₹
Botswana Philippines	14	*
South Africa		Ť
	7	▼

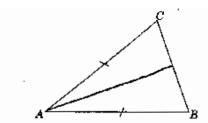
Country average vs. International average:

Draw a line to divide triangle ABC (continued)

Item Number: M032403

Student Responses

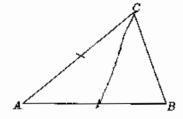
Correct:



The triangle ABC has AB = AC.

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

Incorrect:



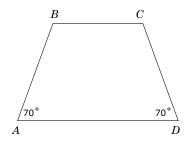
The triangle ABC has AB = AC.

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
- (B) 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:

Α

Overall Percent Correct

Korea, Republic of	86	A
Estonia	84	
Japan	83	A
Hong Kong, SAR	81	A
Singapore	81	A
Chinese Taipei	79	A
Latvia	77	A
Russian Federation	77	A
Lithuania	74	A
Belgium (Flemish)	73	A
Slovak Republic	73	A
Netherlands	69	A
United States	69	A
Hungary	69	A
Slovenia	68	A
Romania	68	A
Italy	67	A
Bulgaria	67	A
Australia	66	A
Israel	66	A
Scotland	64	0
Malaysia	64	0
Moldova, Republic of	63	0
Sweden	62	0
		_
Morocco	62	0
Morocco Tunisia	62 62	0
Tunisia New Zealand	62 61	0
Tunisia New Zealand Cyprus	62 61 61	0
Tunisia New Zealand Cyprus International average	62 61 61	0 0
Tunisia New Zealand Cyprus International average Macedonia, Republic of	62 61 61 60	0 0 0
Tunisia New Zealand Cyprus International average Macedonia, Republic of Armenia	62 61 61 60 60 59	0 0 0
Tunisia New Zealand Cyprus International average Macedonia, Republic of Armenia Norway	62 61 61 60 60 59 58	0 0 0
Tunisia New Zealand Cyprus International average Macedonia, Republic of Armenia Norway England	62 61 61 60 60 59 58 57	0 0 0 0 0 0 0
Tunisia New Zealand Cyprus International average Macedonia, Republic of Armenia Norway England Indonesia	62 61 61 60 60 59 58 57 56	0 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 60 60 59 58 57 56	0 0 0 0
Tunisia New Zealand Cyprus International average Macedonia, Republic of Armenia Norway England Indonesia Serbia and Montenegro Lebanon	62 61 61 60 59 58 57 56 56	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
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 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
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 59 58 57 56 56 55 54 48 45 39	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
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
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 60 60 59 58 57 56 56 55 54 48 45 39 39 37 35	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 60 60 59 58 57 56 56 55 54 48 45 39 39 37 35 34	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 60 60 59 58 57 56 56 55 54 48 45 39 37 35 34 30	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 60 60 59 58 57 56 56 55 54 48 45 39 37 35 34 30 25	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 60 60 59 58 57 56 56 55 54 48 45 39 37 35 34 30	0 0 0 0

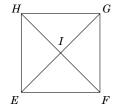
Country average vs. International average:

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) ΔEIF and ΔEIH are congruent.
- (B) ΔGHI and ΔGHF are congruent.
- \bigcirc ΔEFH and ΔEGH are congruent.
- \bigcirc ΔEIF and ΔGIH are congruent.



Item Number: M012005

Correct Response:

В

Overall Percent Correct

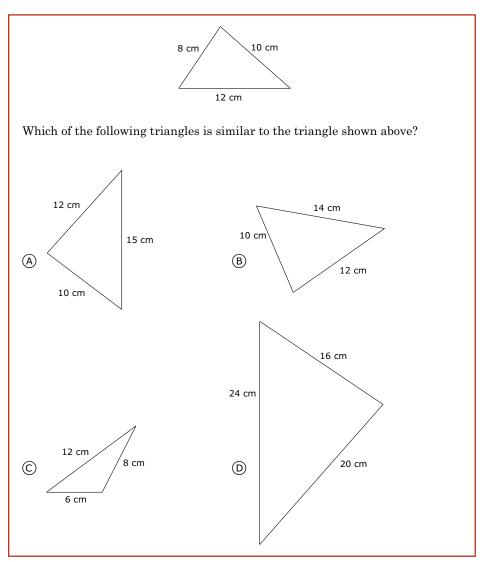
Korea, Republic of	86	A
Japan	85	
Chinese Taipei	82	
Estonia	82	
Hong Kong, SAR	79	
Latvia	78	
Bulgaria	74	
Russian Federation	74	
Lithuania	73	
Netherlands	72	A
Singapore	72	
Cyprus	69	
Belgium (Flemish)	68	
Slovak Republic	68	A
Romania	64	
Armenia	62	
Israel	62	A
Sweden	62	A
Slovenia	61	
Italy	58	0
Morocco	58	0
Bahrain	57	0
International average	56	
Moldova, Republic of	56	0
Indonesia	55	0
United States	55	0
Jordan	54	0
Iran, Islamic Republic of	53	0
Malaysia	50	▼

United States	55	0
Jordan	54	0
Iran, Islamic Republic of	53	0
Malaysia	50	\blacksquare
Tunisia	49	\blacksquare
Egypt	46	▼
Norway	46	\blacksquare
Hungary	45	\blacksquare
Lebanon	45	\blacksquare
Macedonia, Republic of	45	\blacksquare
Palestinian Nat'l Auth.	44	\blacksquare
Scotland	44	•
Australia	43	•
New Zealand	42	•
Serbia and Montenegro	41	\blacksquare
Philippines	39	•
England	35	\blacksquare
Saudi Arabia	35	\blacksquare
Chile	28	\blacksquare
South Africa	26	\blacksquare
Botswana	25	\blacksquare

Country average vs. International average:

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

Identify similar triangles



Item Number: M032261

Correct Response:

D

Overall Percent Correct

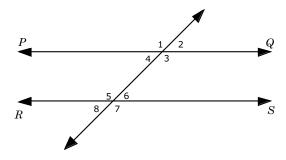
Korea, Republic of	83	
Hong Kong, SAR	76	
Singapore	75	
Japan	70	
Chinese Taipei	68	
Russian Federation	61	_
Netherlands	60	<u> </u>
Belgium (Flemish)	59	<u> </u>
Iran, Islamic Republic of	54	<u> </u>
Hungary	51	<u> </u>
Malaysia	51	<u> </u>
Lithuania	50	
Latvia	49	<u> </u>
Estonia	49	
United States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

Country average vs. International average:

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 \angle 5 and \angle 7
- \bigcirc 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	A
Korea, Republic of	81	<u> </u>
Hong Kong, SAR	79	<u> </u>
Singapore	72	_ _
Chinese Taipei	67	_
Estonia	63	_
Belgium (Flemish)	62	_
Latvia	56	A
Russian Federation	54	A
Australia	49	_ _
Lithuania	49	_
England	48	0
Israel	47	0
Bulgaria	47	0
Moldova, Republic of	47	0
Hungary	47	0
Slovak Republic	46	0
Bahrain	46	0
Netherlands	45	0
New Zealand	45	0
Serbia and Montenegro	43	0
International average	43	
Armenia	43	0
Cyprus	42	0
Cyprus Scotland	42 41	0 0
		0 0
Scotland	41	0
Scotland Slovenia	41 41	0 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 Italy Macedonia, Republic of	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 Palestinian Nat'l Auth. Norway	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 36 35 34 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 32	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 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 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 38 37 36 35 34 34 32 31 29 28	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	41 41 41 38 37 36 35 34 34 32 31 29 28 28	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 32 31 29 28 28 26	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 •
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	0 0 0 •

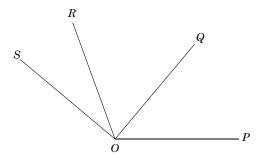
Country average vs. International average:

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	A
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	O
New Zealand	28	Ο
International average	28	

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

Country average vs. International average:

Higher
Not different
Lower

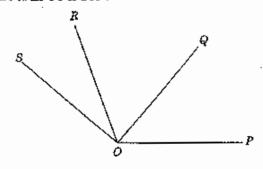
Measure of angle in adjacent angles (continued)

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°.

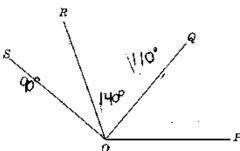


What is the measure of $\angle QOR$?

Answer: (L)

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°.



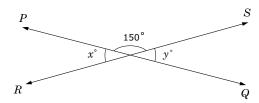
What is the measure of $\angle QOR$?

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:

Overall Percent Correct

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

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

Country average vs. International average:

0

▼

Higher Not different Lower

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)
- (C) (2,4)
- \bigcirc (3,5)
- (4,5)

Item Number: M022016

Correct Response:

D

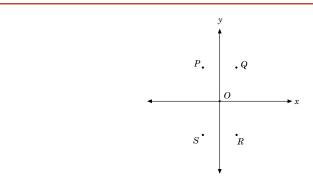
Overall Percent Correct

Netherlands	66	
England	62	
Scotland	56	
Korea, Republic of	56	
Singapore	56	
Chinese Taipei	54	
Sweden	53	
Australia	51	
United States	51	
Japan	50	
Norway	49	
Hong Kong, SAR	47	
Hungary	46	
Lithuania	44	
New Zealand	44	
Belgium (Flemish)	43	
Russian Federation	42	<u> </u>
Estonia	40	
Malaysia	38	0
Latvia	37	0
Cyprus	36	0
International average	35	
Slovenia	35	0
Israel	34	0
isiaci	٥,	_
Serbia and Montenegro	31	0
Serbia and Montenegro Indonesia	31 31	O V
Indonesia	31	\blacksquare
Indonesia Slovak Republic	31 30	\blacksquare
Indonesia Slovak Republic Chile	31 30 29	\blacksquare
Indonesia Slovak Republic Chile Egypt	31 30 29 28	\blacksquare
Indonesia Slovak Republic Chile Egypt Morocco	31 30 29 28 28	\blacksquare
Indonesia Slovak Republic Chile Egypt Morocco Romania	31 30 29 28 28 28	\blacksquare
Indonesia Slovak Republic Chile Egypt Morocco Romania Macedonia, Republic of	31 30 29 28 28 28 27	\blacksquare
Indonesia Slovak Republic Chile Egypt Morocco Romania Macedonia, Republic of Italy	31 30 29 28 28 28 27 26	\blacksquare
Indonesia Slovak Republic Chile Egypt Morocco Romania Macedonia, Republic of Italy Jordan	31 30 29 28 28 28 27 26 26	\blacksquare
Indonesia Slovak Republic Chile Egypt Morocco Romania Macedonia, Republic of Italy Jordan Moldova, Republic of	31 30 29 28 28 28 27 26 26 25	\blacksquare
Indonesia Slovak Republic Chile Egypt Morocco Romania Macedonia, Republic of Italy Jordan Moldova, Republic of Bulgaria	31 30 29 28 28 28 27 26 26 25 24	\blacksquare
Indonesia Slovak Republic Chile Egypt Morocco Romania Macedonia, Republic of Italy Jordan Moldova, Republic of Bulgaria Armenia	31 30 29 28 28 28 27 26 26 25 24 23	\blacksquare
Indonesia Slovak Republic Chile Egypt Morocco Romania Macedonia, Republic of Italy Jordan Moldova, Republic of Bulgaria Armenia Lebanon	31 30 29 28 28 28 27 26 26 25 24 23 23	
Indonesia Slovak Republic Chile Egypt Morocco Romania Macedonia, Republic of Italy Jordan Moldova, Republic of Bulgaria Armenia Lebanon Botswana	31 30 29 28 28 27 26 26 25 24 23 23 22	\blacksquare
Indonesia Slovak Republic Chile Egypt Morocco Romania Macedonia, Republic of Italy Jordan Moldova, Republic of Bulgaria Armenia Lebanon Botswana Philippines	31 30 29 28 28 28 27 26 26 25 24 23 23 22 22	\blacksquare
Indonesia Slovak Republic Chile Egypt Morocco Romania Macedonia, Republic of Italy Jordan Moldova, Republic of Bulgaria Armenia Lebanon Botswana Philippines Palestinian Nat'l Auth.	31 30 29 28 28 28 27 26 26 25 24 23 23 22 22 21	* * * * * * * * * * * * * * * * * * *
Indonesia Slovak Republic Chile Egypt Morocco Romania Macedonia, Republic of Italy Jordan Moldova, Republic of Bulgaria Armenia Lebanon Botswana Philippines Palestinian Nat'l Auth. Bahrain	31 30 29 28 28 27 26 26 25 24 23 23 22 22 21	* * * * * * * * * * * * * * * * * * *
Indonesia Slovak Republic Chile Egypt Morocco Romania Macedonia, Republic of Italy Jordan Moldova, Republic of Bulgaria Armenia Lebanon Botswana Philippines Palestinian Nat'l Auth. Bahrain Iran, Islamic Republic of	31 30 29 28 28 27 26 26 25 24 23 23 22 21 21 20	* * * * * * * * * * * * * * * * * * *
Indonesia Slovak Republic Chile Egypt Morocco Romania Macedonia, Republic of Italy Jordan Moldova, Republic of Bulgaria Armenia Lebanon Botswana Philippines Palestinian Nat'l Auth. Bahrain Iran, Islamic Republic of Ghana	31 30 29 28 28 28 27 26 26 25 24 23 23 22 21 21 20	* * * * * * * * * * * * * * * * * * *
Indonesia Slovak Republic Chile Egypt Morocco Romania Macedonia, Republic of Italy Jordan Moldova, Republic of Bulgaria Armenia Lebanon Botswana Philippines Palestinian Nat'l Auth. Bahrain Iran, Islamic Republic of Ghana Saudi Arabia	31 30 29 28 28 27 26 26 25 24 23 23 22 21 21 20 19	* * * * * * * * * * * * * * * * * * *
Indonesia Slovak Republic Chile Egypt Morocco Romania Macedonia, Republic of Italy Jordan Moldova, Republic of Bulgaria Armenia Lebanon Botswana Philippines Palestinian Nat'l Auth. Bahrain Iran, Islamic Republic of Ghana Saudi Arabia South Africa	31 30 29 28 28 27 26 26 25 24 23 22 21 21 20 19 19	\blacksquare
Indonesia Slovak Republic Chile Egypt Morocco Romania Macedonia, Republic of Italy Jordan Moldova, Republic of Bulgaria Armenia Lebanon Botswana Philippines Palestinian Nat'l Auth. Bahrain Iran, Islamic Republic of Ghana Saudi Arabia	31 30 29 28 28 27 26 26 25 24 23 23 22 21 21 20 19	* * * * * * * * * * * * * * * * * * *

Country average vs. International average:

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 \bigcirc \bigcirc \bigcirc
- \bigcirc R
- \bigcirc S

Item Number: M032588

Correct Response:

0

Overall Percent Correct

Chinese Taipei	87	\blacktriangle
Japan	86	A
Korea, Republic of	83	\blacktriangle
Estonia	81	A
Russian Federation	79	A
Singapore	77	A
Netherlands	75	A
Hong Kong, SAR	74	A
Hungary	74	A
Lithuania	73	A
Latvia	72	A
United States	72	A
Malaysia	71	A
Iran, Islamic Republic of	69	A
Belgium (Flemish)	68	A
England	67	A
Lebanon	66	A
Scotland	65	A
Israel	62	A
Serbia and Montenegro	61	A
Bulgaria	60	0
Romania	59	0
Slovenia	58	0
Macedonia, Republic of	58	0
NI 7 1 1	Ε0	0
New Zealand	58	
New Zealand Australia	58	0
Australia Italy	58 57	
Australia Italy International average	58 57 56	0
Australia Italy International average Jordan	58 57 56 55	0
Australia Italy International average Jordan Armenia	58 57 56 55 53	0 0
Australia Italy International average Jordan Armenia Moldova, Republic of	58 57 56 55 53 53	0 0 0 0 0
Australia Italy International average Jordan Armenia Moldova, Republic of Indonesia	58 57 56 55 53 53	0 0 0 0 0 0
Australia Italy International average Jordan Armenia Moldova, Republic of Indonesia Egypt	58 57 56 55 53 53 47	0 0 0
Australia Italy International average Jordan Armenia Moldova, Republic of Indonesia Egypt Sweden	58 57 56 55 53 53 53 47 45	0 0 0 0 0
Australia Italy International average Jordan Armenia Moldova, Republic of Indonesia Egypt Sweden Slovak Republic	58 57 56 55 53 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	58 57 56 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 56 55 53 53 53 47 45 43 43	0 0 0 0 0
Australia Italy International average Jordan Armenia Moldova, Republic of Indonesia Egypt Sweden Slovak Republic Norway Philippines Bahrain	58 57 56 55 53 53 47 45 43 43 41 38	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 56 55 53 53 47 45 43 41 38 34	0 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	0 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	58 57 56 55 53 53 53 47 45 43 41 38 34 32 31	0 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	58 57 56 55 53 53 53 47 45 43 41 38 34 32 31 30	0 0 0 0 0 0 0 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	58 57 56 55 53 53 53 47 45 43 41 38 34 32 31 30 28	0 0 0 0 0 0 0 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	58 57 56 55 53 53 53 47 45 43 41 38 34 32 31 30 28 28	0 0 0 0 0 0 0 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	0 0 0 0 0 0 0 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 Chile	58 57 56 55 53 53 53 47 45 43 41 38 34 32 31 30 28 28 26 25	0 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	0 0 0 0 0 0 0 0 0 0 0

Country average vs. International average:

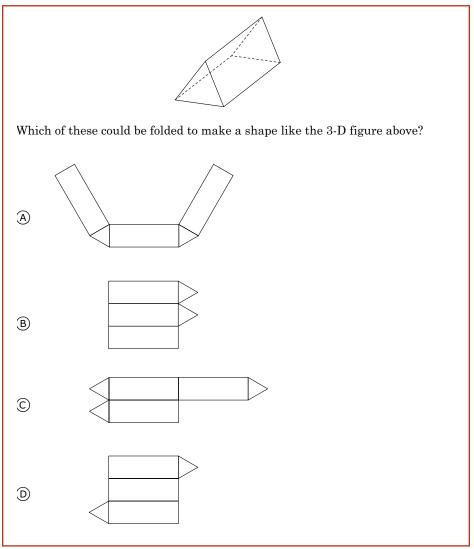
0

▼

Higher Not different Lower

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

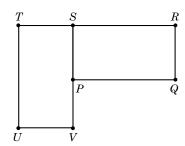
Country average vs. International average:

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
- $\ \ \boxdot \ \ V$

Item Number: M022154

Correct Response:

0

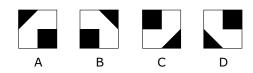
Overall Percent Correct

1	70	
Japan Chinana Tainai	79	<u> </u>
Chinese Taipei	76 75	A
Korea, Republic of	73	
Hong Kong, SAR Slovenia	73 71	•
Estonia	7 I 71	
Netherlands	65	A
	64	
Singapore	63	
Hungary England	63	•
Belgium (Flemish)	62	
Latvia	61	
Sweden	60	
New Zealand	59	
Lithuania	58	
Italy	58	
Slovak Republic	54	•
Australia	54 54	
Israel	54	•
Malaysia	54	A
Russian Federation	52	
Serbia and Montenegro	50	0
Norway	49	0
United States	49	0
International average		
International average Bulgaria	47	0
Bulgaria	47	0
	47 47	-
Bulgaria Moldova, Republic of	47 47 46	0
Bulgaria Moldova, Republic of Romania	47 47 46 46	0 0
Bulgaria Moldova, Republic of Romania Scotland	47 46 46 46 45	0 0 0
Bulgaria Moldova, Republic of Romania Scotland Jordan Armenia	47 46 46 45 44	0 0 0
Bulgaria Moldova, Republic of Romania Scotland Jordan	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 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	47 46 46 45 44 40 39 37 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	47 46 46 45 44 40 39 37 34 34 32 31 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	47 46 46 45 44 40 39 37 34 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 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	47 46 46 45 44 40 39 37 34 32 31 29 29 28 28	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	47 46 46 45 44 40 39 37 34 32 31 29 28 28 28	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 28 28 28 28	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
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

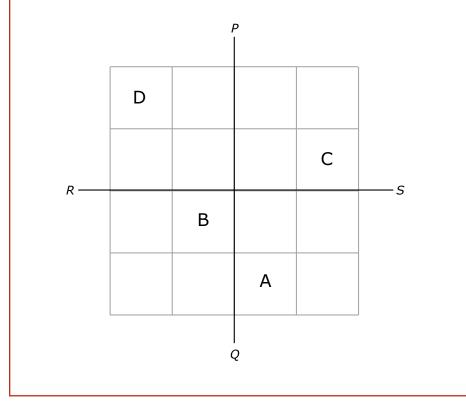
Country average vs. International average:

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	
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	_
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	V
Romania	2	\blacksquare
Israel	2	•
Bulgaria	2	
Italy	1	* * * * * * * * * * * * * * * * * * *
Armenia	1	•
Lebanon	1	•
Macedonia, Republic of	1	•
South Africa	1	•
Egypt	1	•
Chile	1	•
Philippines	1	•
Iran, Islamic Republic of	1	
Iran, Islamic Republic of Botswana	1 1	▼
· ·	•	▼ ▼
Botswana	•	* * * * * * * * * * * * * * * * * * *
Botswana Jordan	1 1	* * * * * * * * * * * * * * * * * * *
Botswana Jordan Bahrain Cyprus	1 1 1	* * * * * * * * * * * * * * * * * * *
Botswana Jordan Bahrain	1 1 1 0	* * * * * * * * * * * * * * * * * * *
Botswana Jordan Bahrain Cyprus Serbia and Montenegro	1 1 1 0 0	* * * * * * * * * * * * * * * * * * *
Botswana Jordan Bahrain Cyprus Serbia and Montenegro Tunisia	1 1 1 0 0	* * * * * * * * * * * * * * * * * * *
Botswana Jordan Bahrain Cyprus Serbia and Montenegro Tunisia	1 1 1 0 0	* * * * * * * * * * * * * * * * * * *

Country average vs. International average:

Higher
Not different
Lower

Geometry tiling: produce a pattern using letters (continued)

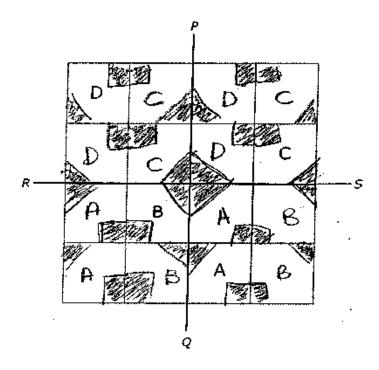
Item Number: M032745

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)

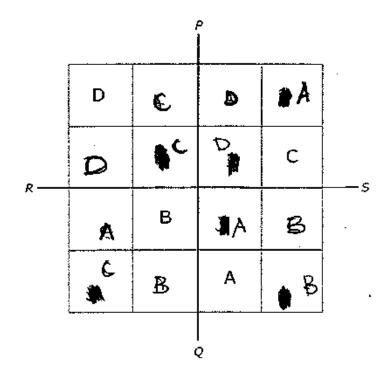
Item Number: M032745

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)

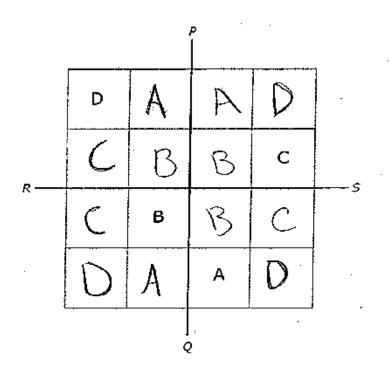
Item Number: M032745

Student Responses (Continued)

Incorrect Response:



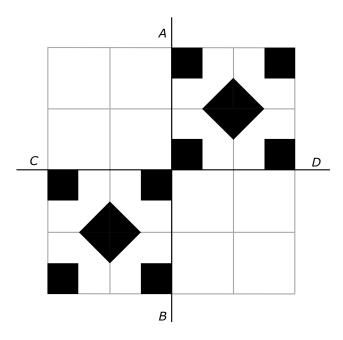
Continue to identify the tiles as shown above. On the grid below, write the letters A, B, C, or D to make a symmetrical pattern where PQ and RS would be lines of symmetry. Arrange the tiles to make a pattern.



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	
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	
Slovak Republic	54	O
Russian Federation	53	O
Cyprus	51	O
Estonia	50	0
Italy	50	0
International average	49	
Bulgaria	48	0

iliterilational average	49	
Bulgaria	48	0
Norway	46	0
Sweden	46	0
Romania	44	0
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	▼
Chile	13	\blacksquare
Moldova, Republic of	1	\blacksquare

Country average vs. International average:

Higher
Not different
Lower

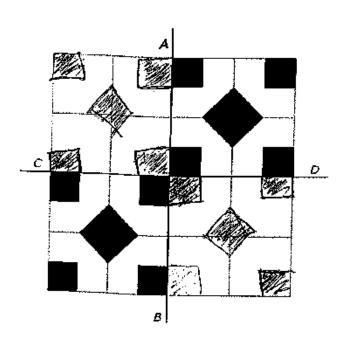
Geometry tiling: makes a symmetrical pattern (continued)

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.

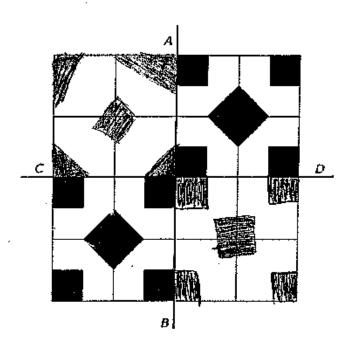
Geometry tiling: makes a symmetrical pattern (continued)

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.

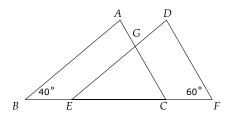


Shade in all the remaining squares on the grid so that the resulting pattern is symmetrical about line AB, and also is symmetrical about line CD.

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°
- (E) 100°

Item Number: M012026

Correct Response:

П

Overall Percent Correct

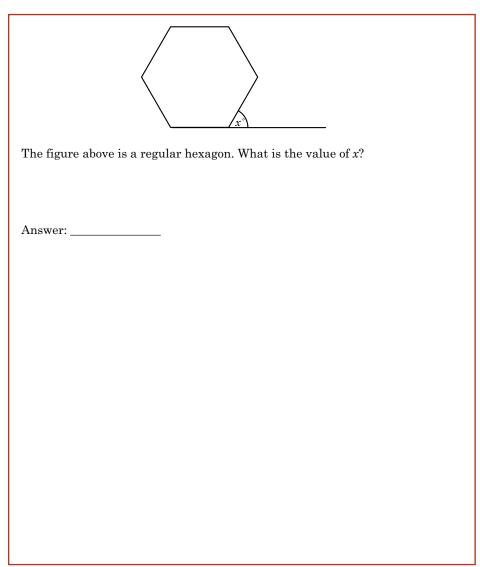
Kanaa Banulalia af	0.4	
Korea, Republic of	84	
Hong Kong, SAR	81	
Japan	80	
Singapore	79	
Chinese Taipei	73	
Estonia	67	
Belgium (Flemish)	66	
Latvia	63	
Bulgaria	60	
Israel	57	
Russian Federation	55	
Lebanon	55	
Scotland	54	
Slovak Republic	54	
Lithuania	51	
Hungary	50	0
Australia	47	0
England	47	0
Egypt	47	0
Malaysia	47	O
International average	45	

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	▼
Bahrain	41	▼
Sweden	40	* * * * * * * * * * * * * * * * * * * *
Palestinian Nat'l Auth.	39	▼
Iran, Islamic Republic of	37	▼
Slovenia	37	▼
United States	36	▼
Macedonia, Republic of	33	▼
Norway	32	▼
Indonesia	31	▼
Morocco	31	▼
Chile	30	▼
Saudi Arabia	26	▼
South Africa	21	▼
Ghana	20	▼
Botswana	20	▼
Romania	18	▼
Philippines	15	▼

Country average vs. International average:

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 73 A Chinese Taipei 70 A Korea, Republic of 68 A Hong Kong, SAR 64 A Singapore 62 A Hungary 59 A Slovenia 52 A Norway 50 A Serbia and Montenegro 46 A Romania 45 A Belgium (Flemish) 45 A Slovak Republic 43 A Armenia 42 A Russian Federation 42 A Netherlands 40 A Macedonia, Republic of 39 A Moldova, Republic of 39 A Estonia 37 O Latvia 33 O Malaysia 33 O International average 33 Italy 32 O Bulgaria 32 O Lithuania 31 O England 30 O Tunisia 29 V Lebanon 28 V New Zealand 27 V Australia 27 V Australia 27 V Australia 27 V Israel 26 V Sweden 24 V Iran, Islamic Republic of 24 V Iran, Islamic Republic of 24 V Jordan 23 V Bahrain 22 V Scotland 23 V Scotland 23 V Bahrain 22 V Sudi Arabia 21 V United States 20 C Cyprus 19 Indonesia 17 V Ghana 16 V Botswana 14 V Chile 9 V			
Chinese Taipei 70 Korea, Republic of 68 Hong Kong, SAR 64 Singapore 62 Hungary 59 Slovenia 52 Norway 50 Serbia and Montenegro 46 Romania 45 Belgium (Flemish) 45 Slovak Republic 43 Armenia 42 Russian Federation 42 Netherlands 40 Macedonia, Republic of 39 Moldova, Republic of 39 Latvia 33 Malaysia 33 Italy 32 Bulgaria 32 Lithuania 31 England 30 Tunisia 29 Lebanon 28 New Zealand 27 Australia 27 Israel 26 Sweden 24 Iran, Islamic Republic of 24 Jordan 23	Japan	73	
Korea, Republic of Hong Kong, SAR Singapore Hungary Slovenia Norway So Serbia and Montenegro Romania Belgium (Flemish) Slovak Republic Armenia Armenia Armenia Armenia Armenia Acedonia, Republic of Bestonia Latvia Malaysia International average Lithuania England Tunisia Lebanon New Zealand New Zealand Australia Iran, Islamic Republic of Sweden Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Egypt Saudi Arabia United States Cyprus Indonesia FS 68 A A A A A A A A A A A A A A A A A A	Chinese Taipei	70	
Hong Kong, SAR Singapore Hungary Slovenia Slovenia Serbia and Montenegro Romania Belgium (Flemish) Slovak Republic Armenia Armenia Armenia Acedonia, Republic of Bestonia Latvia Malaysia International average Ithuania England Tunisia Lebanon New Zealand New Zealand Australia Srael Sweden Iran, Islamic Republic of Sweden Iran, Islamic Republic of Jordan Palestinian Nat'l Auth Egypt Saudi Arabia United States Cyprus Indonesia 52	Korea, Republic of	68	
Singapore 62 A Hungary 59 A Slovenia 52 A Norway 50 A Serbia and Montenegro 46 A Romania 45 A Belgium (Flemish) 45 A Slovak Republic 43 A Armenia 42 A Russian Federation 42 A Netherlands 40 A Macedonia, Republic of 39 A Moldova, Republic of 39 A Estonia 37 O Latvia 33 O International average 33 Italy 32 O Bulgaria 32 O Lithuania 31 O England 30 O Tunisia 29 V Lebanon 28 V New Zealand 27 V Australia 27 V Australia 27 V Iran, Islamic Republic of 24 V Jordan Palestinian Nat'l Auth 23 Egypt 23 V Scotland 23 V Bahrain 22 V Saudi Arabia 21 V Indonesia 17 V	·	64	
Hungary 59 A Slovenia 52 A Norway 50 A Serbia and Montenegro 46 A Romania 45 A Belgium (Flemish) 45 A Slovak Republic 43 A Armenia 42 A Russian Federation 42 A Netherlands 40 A Macedonia, Republic of 39 A Estonia 37 O Latvia 33 O Estonia 37 O Latvia 33 O Italy 32 O Bulgaria 32 O Lithuania 31 O England 30 O Tunisia 29 Y Lebanon 28 Y New Zealand 27 Y Australia 27 Y Israel 26 Y </td <td></td> <td>62</td> <td></td>		62	
Slovenia 52 A Norway 50 A Serbia and Montenegro 46 A Romania 45 A Belgium (Flemish) 45 A Slovak Republic 43 A Armenia 42 A Russian Federation 42 A Netherlands 40 A Macedonia, Republic of 39 A Estonia 37 O Latvia 33 O Estonia 37 O Latvia 33 O Italy 32 O Bulgaria 32 O Lithuania 31 O England 30 O Tunisia 29 Y Lebanon 28 Y New Zealand 27 Y Australia 27 Y Israel 26 Y Sweden 24 Y <td>J ,</td> <td>59</td> <td></td>	J ,	59	
Norway 50 A Serbia and Montenegro 46 A Romania 45 A Belgium (Flemish) 45 A Slovak Republic 43 A Armenia 42 A Russian Federation 42 A Macedonia, Republic of 39 A Moldova, Republic of 39 A Estonia 37 O Latvia 33 O International average 33 Italy 32 O Bulgaria 32 O Lithuania 31 O England 30 O Tunisia 29 V Lebanon 28 V New Zealand 27 V Australia 27 V Israel 26 V Sweden 24 V Iran, Islamic Republic of 24 V Jordan 23 V Scotland 23 V Bahrain 22 V Saudi Arabia 21 V Indonesia 17 V	• •	52	
Serbia and Montenegro			
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Saudi Arabia 21 ▼ United States 20 ▼ Cyprus 19 ▼ Indonesia 17 ▼	England Tunisia Lebanon New Zealand Australia Israel Sweden Iran, Islamic Republic of Jordan	30 29 28 27 27 26 24 24 23	O ▼
Saudi Arabia 21 ▼ United States 20 ▼ Cyprus 19 ▼ Indonesia 17 ▼	England Tunisia Lebanon New Zealand Australia Israel Sweden Iran, Islamic Republic of Jordan Palestinian Nat'l Auth.	30 29 28 27 27 26 24 24 23 23	O ▼
Saudi Arabia 21 ▼ United States 20 ▼ Cyprus 19 ▼ Indonesia 17 ▼	England Tunisia Lebanon New Zealand Australia Israel Sweden Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Egypt	30 29 28 27 27 26 24 24 23 23 23	O ▼
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	England Tunisia Lebanon New Zealand Australia Israel Sweden Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Egypt Scotland Bahrain Saudi Arabia United States	30 29 28 27 27 26 24 24 23 23 23 23 22 21 20	O ▼
Botswana 14 V Chile 9 V	England Tunisia Lebanon New Zealand Australia Israel Sweden Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Egypt Scotland Bahrain Saudi Arabia United States Cyprus	30 29 28 27 27 26 24 24 23 23 23 23 22 21 20	O ▼
Chile 9	England Tunisia Lebanon New Zealand Australia Israel Sweden Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Egypt Scotland Bahrain Saudi Arabia United States Cyprus Indonesia	30 29 28 27 27 26 24 24 23 23 23 23 22 21 20 19	· · · · · · · · · · · · · · · · · · ·
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	England Tunisia Lebanon New Zealand Australia Israel Sweden Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Egypt Scotland Bahrain Saudi Arabia United States Cyprus Indonesia Ghana Botswana	30 29 28 27 27 26 24 24 23 23 23 23 22 21 20 19 17 16	· · · · · · · · · · · · · · · · · · ·
Philippines 6	England Tunisia Lebanon New Zealand Australia Israel Sweden Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Egypt Scotland Bahrain Saudi Arabia United States Cyprus Indonesia Ghana Botswana Chile	30 29 28 27 27 26 24 24 23 23 23 23 22 21 20 19 17 16 14 9	· · · · · · · · · · · · · · · · · · ·
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South Africa 5	England Tunisia Lebanon New Zealand Australia Israel Sweden Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Egypt Scotland Bahrain Saudi Arabia United States Cyprus Indonesia Ghana Botswana Chile Morocco Philippines	30 29 28 27 27 26 24 24 23 23 23 23 22 21 20 19 17 16 14 9	O ▼

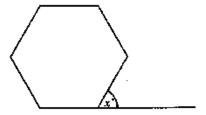
Country average vs. International average:

The angle by a regular hexagon (continued)

Item Number: M032693

Student Responses

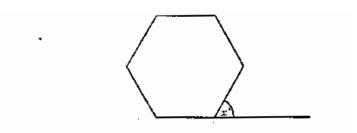
Correct Response:



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

Answer: 00

Incorrect Response:

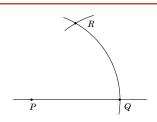


The figure above is a regular hexagon. What is the value of x?

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	
Chinese Taipei	70	
Hungary	69	
Tunisia	66	
Japan	64	
Malaysia	62	
Hong Kong, SAR	59	
Norway	58	A
Slovak Republic	58	
Lebanon	58	
Serbia and Montenegro	58	
Estonia	56	
Belgium (Flemish)	54	
Slovenia	52	
Russian Federation	51	0
Romania	51	0
Macedonia, Republic of	50	0
Singapore	49	A
Bulgaria	48	0
Latvia	46	0
International average	46	
New Zealand	45	0
Moldova Republic of	44	\cap
Moldova, Republic of	44 44	0
Netherlands	44	0
Netherlands Saudi Arabia	44 43	0
Netherlands Saudi Arabia Lithuania	44 43 43	0 0
Netherlands Saudi Arabia Lithuania Palestinian Nat'l Auth.	44 43 43 42	0 0 0
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 0 0 0 0 0 0 0 0 0 0 0 0 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 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 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 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 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 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 0 V V V V V V V V V V V V V V V
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 0 V V V V V V V V V V V V V V V
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 0 V V V V V V V V V V V V V V V
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 0 V V V V V V V V V V V V V V V
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 0 V V V V V V V V V V V V V V V
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 37 37 36 35 35 35 34 34 34	0 0 0 0 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 0 V V V V V V V V V V V V V V V

Country average vs. International average:

South Africa

Philippines

29

Higher Not different 0 Lower \blacksquare

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	
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	
Russian Federation	46	A
Slovak Republic	44	
Japan	44	
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	Ω
Cyprus Scotland	41 40	0
,,		
Scotland	40	0
Scotland Bulgaria	40 39	0
Scotland Bulgaria International average	40 39 39	0 0
Scotland Bulgaria International average Serbia and Montenegro	40 39 39 38	0 0
Scotland Bulgaria International average Serbia and Montenegro Israel	40 39 39 38 38	0 0 0 0
Scotland Bulgaria International average Serbia and Montenegro Israel United States	40 39 39 38 38 38	0 0 0 0
Scotland Bulgaria International average Serbia and Montenegro Israel United States Philippines	40 39 39 38 38 38 33 32	0 0 0 0
Scotland Bulgaria International average Serbia and Montenegro Israel United States Philippines Indonesia	40 39 39 38 38 38 33 32 32	0 0 0 0
Scotland Bulgaria International average Serbia and Montenegro Israel United States Philippines Indonesia South Africa	40 39 39 38 38 33 32 32 31	0 0 0 0
Scotland Bulgaria International average Serbia and Montenegro Israel United States Philippines Indonesia South Africa Palestinian Nat'l Auth.	40 39 39 38 38 33 32 32 31 30	0 0 0 0
Scotland Bulgaria International average Serbia and Montenegro Israel United States Philippines Indonesia South Africa Palestinian Nat'l Auth. Lebanon	40 39 38 38 38 32 32 31 30 30	0 0 0 0
Scotland Bulgaria International average Serbia and Montenegro Israel United States Philippines Indonesia South Africa Palestinian Nat'l Auth. Lebanon Chile	40 39 38 38 38 32 32 31 30 30 29	0 0
Scotland Bulgaria International average Serbia and Montenegro Israel United States Philippines Indonesia South Africa Palestinian Nat'l Auth. Lebanon Chile Jordan	40 39 38 38 38 33 32 32 31 30 30 29 29	0 0 0 0
Scotland Bulgaria International average Serbia and Montenegro Israel United States Philippines Indonesia South Africa Palestinian Nat'l Auth. Lebanon Chile Jordan Macedonia, Republic of	40 39 38 38 38 32 32 31 30 30 29 29	0 0 0 0
Scotland Bulgaria International average Serbia and Montenegro Israel United States Philippines Indonesia South Africa Palestinian Nat'l Auth. Lebanon Chile Jordan Macedonia, Republic of Egypt	40 39 38 38 38 32 32 31 30 30 29 29 29 29	0 0 0 0
Scotland Bulgaria International average Serbia and Montenegro Israel United States Philippines Indonesia South Africa Palestinian Nat'l Auth. Lebanon Chile Jordan Macedonia, Republic of Egypt Iran, Islamic Republic of	40 39 38 38 38 32 32 31 30 30 29 29 29 29 29	0 0 0 V V V V V V V
Scotland Bulgaria International average Serbia and Montenegro Israel United States Philippines Indonesia South Africa Palestinian Nat'l Auth. Lebanon Chile Jordan Macedonia, Republic of Egypt Iran, Islamic Republic of Tunisia	40 39 38 38 38 32 32 31 30 30 29 29 29 29 28 27	0 0 0 V V V V V V V
Scotland Bulgaria International average Serbia and Montenegro Israel United States Philippines Indonesia South Africa Palestinian Nat'l Auth. Lebanon Chile Jordan Macedonia, Republic of Egypt Iran, Islamic Republic of Tunisia Bahrain	40 39 38 38 38 32 32 31 30 30 29 29 29 29 28 27 27	0 0 0 V V V V V V V
Scotland Bulgaria International average Serbia and Montenegro Israel United States Philippines Indonesia South Africa Palestinian Nat'l Auth. Lebanon Chile Jordan Macedonia, Republic of Egypt Iran, Islamic Republic of Tunisia Bahrain Botswana	40 39 38 38 38 32 32 31 30 30 29 29 29 29 29 28 27 27 25	0 0 0 V V V V V V V
Scotland Bulgaria International average Serbia and Montenegro Israel United States Philippines Indonesia South Africa Palestinian Nat'l Auth. Lebanon Chile Jordan Macedonia, Republic of Egypt Iran, Islamic Republic of Tunisia Bahrain Botswana Saudi Arabia	40 39 38 38 38 32 32 31 30 30 29 29 29 29 27 27 25 25	0 0 0 0
Scotland Bulgaria International average Serbia and Montenegro Israel United States Philippines Indonesia South Africa Palestinian Nat'l Auth. Lebanon Chile Jordan Macedonia, Republic of Egypt Iran, Islamic Republic of Tunisia Bahrain Botswana Saudi Arabia Morocco	39 38 38 38 32 32 31 30 30 29 29 29 29 27 27 25 25 22	0 0 0 V V V V V V V

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
- \bigcirc 90,000 seconds

Item Number: M022188

Correct Response:

В

Overall Percent Correct

Chinese Taipei Korea, Republic of Hungary	66 63 63	A
Singapore	60	
Belgium (Flemish)	59	
Japan	54	
Hong Kong, SAR	54	
Slovenia	54	
Slovak Republic	52	
Netherlands	52	
Latvia	51	_
Armenia	50	<u> </u>
Serbia and Montenegro	49	<u> </u>
Estonia	48	A
Macedonia, Republic of	48	A
Russian Federation	47	<u> </u>
United States	47	A
Malaysia	47	0
Moldova, Republic of	45	0
Italy	45	0
Bulgaria	44	0
Sweden	44	0
International average	43	þ
Romania Lithuania	43 42	0
Israel	42	0
Tunisia	41	0
Australia	41	0
Lebanon	40	0
Cyprus	39	▼
England	39	0
Norway	39	V
Jordan	38	*
Scotland	38	Ť
Palestinian Nat'l Auth.	37	Ť
New Zealand	36	▼
Trett Ecalaria		•
Favot	36	_
Egypt Chile	36 35	V
Chile	36 35 35	▼
Chile Saudi Arabia	35 35	* * * * * * * * * * * * * * * * * * *
Chile Saudi Arabia Philippines	35 35 35	* * * * * * * * * * * * * * * * * * *
Chile Saudi Arabia	35 35	* * * * * * * * * * * * * * * * * * *
Chile Saudi Arabia Philippines Iran, Islamic Republic of	35 35 35 35	* * * * * * * * * * * * * * * * * * *
Chile Saudi Arabia Philippines Iran, Islamic Republic of South Africa	35 35 35 35 35	* * * * * * * * * * * * * * * * * * *
Chile Saudi Arabia Philippines Iran, Islamic Republic of South Africa Bahrain	35 35 35 35 35 32 32	* * * * * * * * * * * * * * * * * * *
Chile Saudi Arabia Philippines Iran, Islamic Republic of South Africa Bahrain Morocco	35 35 35 35 32 32 32	* * * * * * * * * * * * * * * * * * *

Country average vs. International average:

0

▼

Higher Not different Lower

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:

C

Overall Percent Correct

Estonia	90	A
Sweden	89	A
New Zealand	89	A
Italy	88	A
Singapore	88	A
Hungary	88	A
Australia	87	A
Slovak Republic	87	A
Chile	87	A
Belgium (Flemish)	86	A
Netherlands	86	A
Latvia	86	A
Romania	86	A
Lithuania	84	A
Serbia and Montenegro	84	A
Bulgaria	84	A
Russian Federation	83	A
Hong Kong, SAR	82	A
Chinese Taipei	82	
Japan	82	A
England	82	A
Moldova, Republic of	82	A
Scotland	81	A
Norway	80	A
Malaysia	77	0
United States	77 76	0 0
United States Macedonia, Republic of	76 76	
United States Macedonia, Republic of International average	76 76 75	0
United States Macedonia, Republic of International average Korea, Republic of	76 76 75 74	0 0
United States Macedonia, Republic of International average Korea, Republic of Slovenia	76 76 75 74 74	0 0 0
United States Macedonia, Republic of International average Korea, Republic of Slovenia Israel	76 76 75 74 74 73	0 0 0 0 0
United States Macedonia, Republic of International average Korea, Republic of Slovenia Israel Armenia	76 76 75 74 74 73 71	0 0 0 0
United States Macedonia, Republic of International average Korea, Republic of Slovenia Israel Armenia Cyprus	76 76 75 74 74 73 71 69	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
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
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
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
United States Macedonia, Republic of International average Korea, Republic of Slovenia Israel Armenia Cyprus Tunisia Indonesia Bahrain Morocco Jordan	76 75 74 74 73 71 69 68 66 66 64 64	0 0 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 64 64 62 61	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
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 0 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 0 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 62 61 60 58 56	0 0 0 0 0 0 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 76 75 74 74 73 71 69 68 66 64 64 62 61 60 58 56 55	0 0 0 0 0 0 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
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 76 75 74 74 73 71 69 68 66 64 64 62 61 60 58 56 55	0 0 0 0 0 0 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 2 cm
- B 3 m
- \bigcirc 5 cm²
- \bigcirc 8 m³

Item Number: M032732

Correct Response:

C

Overall Percent Correct

Singapore 81		0.4	
Estonia 78 A Chinese Taipei 76 A Belgium (Flemish) 75 A Russian Federation 75 A Hong Kong, SAR 73 A Slovenia 71 A Sweden 70 A Netherlands 70 A Lithuania 70 A Korea, Republic of 69 A Hungary 68 A Slovak Republic 67 A Serbia and Montenegro 67 A Italy 67 A Malaysia 64 A Romania 62 A Romania 62 A New Zealand 57 O Moldova, Republic of 56 O International average 55 D Lebanon 55 O Norway 54 O Bulgaria 52 O Macedonia,	· '		
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• •	Morocco	30	\blacksquare
Iran, Islamic Republic of 22 ▼	Philippines	27	\blacksquare
	Iran, Islamic Republic of	22	\blacksquare

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

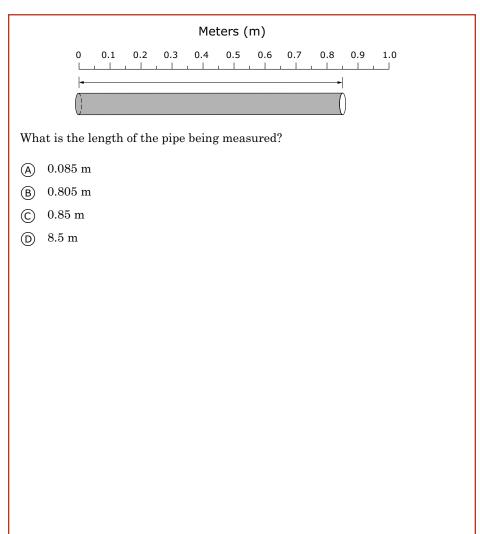
Overall Percent Correct

Korea, Republic of Hungary Netherlands Hong Kong, SAR Singapore Belgium (Flemish) Slovak Republic Chinese Taipei Sweden Scotland England Australia Russian Federation Latvia Estonia United States New Zealand Israel	90 89 88 87 82 81 80 80 76 75 73 73 70 67 67 65 64	
Japan Malaysia Norway Romania Serbia and Montenegro Slovenia Italy	64 62 61 58 55 53 52	A A O O
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 Morocco Tunisia	45 42 42 39 38 37 33 30 28 23 21 20 15 13 8 8 7	*************************************

Country average vs. International average:

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:

C

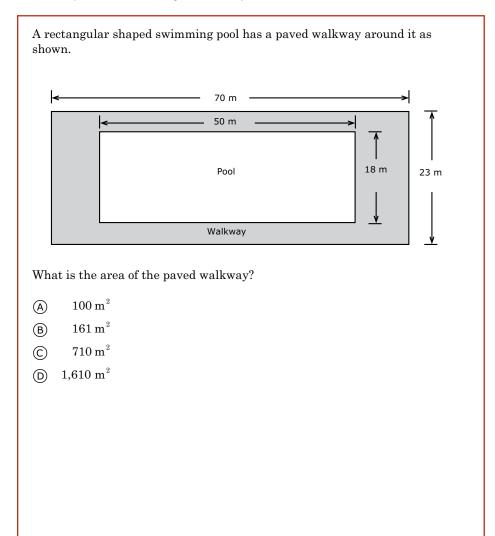
Overall Percent Correct

Singapore	95	A
Hong Kong, SAR	94	A
Japan 	93	A
Estonia	91	A
Chinese Taipei	90	A
Korea, Republic of	89	A
Netherlands	89	A
Belgium (Flemish)	87	A
Hungary	86	
Malaysia	86	A
Sweden	86	
Latvia	83	
Russian Federation	82	
Lithuania	81	
Scotland	81	A
England	80	
New Zealand	79	
Slovak Republic	79	
Slovenia	79	
Australia	78	
Italy	74	A
Norway	74	<u> </u>
United States	73	A
Bulgaria	72	<u> </u>
Israel	72	
Serbia and Montenegro	72	
Macedonia, Republic of	70	0
International average	67	
Lebanon	64	0
		0
	64	U
Moldova, Republic of	64 64	
Moldova, Republic of Romania	64	0
Moldova, Republic of Romania Botswana	64 61	0
Moldova, Republic of Romania Botswana Cyprus	64 61 61	0
Moldova, Republic of Romania Botswana Cyprus Chile	64 61 61 58	0
Moldova, Republic of Romania Botswana Cyprus Chile Armenia	64 61 61 58 54	0
Moldova, Republic of Romania Botswana Cyprus Chile Armenia Indonesia	64 61 61 58 54 54	0
Moldova, Republic of Romania Botswana Cyprus Chile Armenia Indonesia Morocco	64 61 61 58 54 54 50	0
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Moldova, Republic of Romania Botswana Cyprus Chile Armenia Indonesia Morocco Tunisia Iran, Islamic Republic of Philippines South Africa Ghana Jordan Palestinian Nat'l Auth.	64 61 61 58 54 50 49 48 42 40 39 38 34	O V
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	64 61 58 54 54 50 49 48 42 40 39 38 34	0
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 Egypt	64 61 58 54 54 50 49 48 42 40 39 38 34 32 31	O V
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	64 61 58 54 54 50 49 48 42 40 39 38 34	O V

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



Item Number: M022021

Correct Response:

C

Overall Percent Correct

Singapore	86	
Hong Kong, SAR	82	
Korea, Republic of	77	
Chinese Taipei	77	
Japan	76	
Malaysia	60	
Netherlands	57	
Estonia	53	
Belgium (Flemish)	51	
Slovak Republic	50	
Sweden	48	
Australia	46	
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	0
International average	38	
Serbia and Montenegro	38	0
Latvia	38	O
Latvia Bulgaria	38 38	0
Bulgaria	38	0
Bulgaria Russian Federation	38 38	0
Bulgaria Russian Federation Israel	38 38 37	○○○▼
Bulgaria Russian Federation Israel Egypt	38 38 37 33	○○○▼
Bulgaria Russian Federation Israel Egypt Moldova, Republic of	38 38 37 33 33	○○○▼
Bulgaria Russian Federation Israel Egypt Moldova, Republic of Norway	38 38 37 33 33 32	○○○▼
Bulgaria Russian Federation Israel Egypt Moldova, Republic of Norway Romania	38 38 37 33 33 32 30	○○○▼
Bulgaria Russian Federation Israel Egypt Moldova, Republic of Norway Romania Iran, Islamic Republic of	38 38 37 33 33 32 30 28	○○○▼
Bulgaria Russian Federation Israel Egypt Moldova, Republic of Norway Romania Iran, Islamic Republic of Armenia	38 38 37 33 33 32 30 28 28	○○○▼
Bulgaria Russian Federation Israel Egypt Moldova, Republic of Norway Romania Iran, Islamic Republic of Armenia Jordan	38 38 37 33 33 32 30 28 28 26	○○○▼
Bulgaria Russian Federation Israel Egypt Moldova, Republic of Norway Romania Iran, Islamic Republic of Armenia Jordan Indonesia	38 38 37 33 33 32 30 28 28 26 25	0 0
Bulgaria Russian Federation Israel Egypt Moldova, Republic of Norway Romania Iran, Islamic Republic of Armenia Jordan Indonesia Bahrain	38 38 37 33 33 32 30 28 28 26 25 23	○○○▼
Bulgaria Russian Federation Israel Egypt Moldova, Republic of Norway Romania Iran, Islamic Republic of Armenia Jordan Indonesia Bahrain Palestinian Nat'l Auth.	38 38 37 33 32 30 28 28 26 25 23 22	0 0 0 V V V V
Bulgaria Russian Federation Israel Egypt Moldova, Republic of Norway Romania Iran, Islamic Republic of Armenia Jordan Indonesia Bahrain Palestinian Nat'l Auth. Macedonia, Republic of	38 38 37 33 33 32 30 28 28 26 25 23 22 20	0 0 0 V V V V
Bulgaria Russian Federation Israel Egypt Moldova, Republic of Norway Romania Iran, Islamic Republic of Armenia Jordan Indonesia Bahrain Palestinian Nat'l Auth. Macedonia, Republic of Lebanon	38 38 37 33 33 32 30 28 28 26 25 23 22 20	0 0 0 V V V V
Bulgaria Russian Federation Israel Egypt Moldova, Republic of Norway Romania Iran, Islamic Republic of Armenia Jordan Indonesia Bahrain Palestinian Nat'l Auth. Macedonia, Republic of Lebanon Chile	38 38 37 33 32 30 28 28 26 25 23 22 20 19	0 0 0 0 V V V V V V V V V V V V V V V V
Bulgaria Russian Federation Israel Egypt Moldova, Republic of Norway Romania Iran, Islamic Republic of Armenia Jordan Indonesia Bahrain Palestinian Nat'l Auth. Macedonia, Republic of Lebanon Chile Tunisia	38 38 37 33 32 30 28 28 26 25 23 22 20 19 19	0 0 0 0 V V V V V V V V V V V V V V V V
Bulgaria Russian Federation Israel Egypt Moldova, Republic of Norway Romania Iran, Islamic Republic of Armenia Jordan Indonesia Bahrain Palestinian Nat'l Auth. Macedonia, Republic of Lebanon Chile Tunisia Morocco	38 38 37 33 32 30 28 28 26 25 23 22 20 19 18 18	0 0 0 0 V V V V V V V V V V V V V V V V
Bulgaria Russian Federation Israel Egypt Moldova, Republic of Norway Romania Iran, Islamic Republic of Armenia Jordan Indonesia Bahrain Palestinian Nat'l Auth. Macedonia, Republic of Lebanon Chile Tunisia Morocco Saudi Arabia	38 38 37 33 32 30 28 28 26 25 23 22 20 19 18 18 18	0 0 0 0 V V V V V V V V V V V V V V V V
Bulgaria Russian Federation Israel Egypt Moldova, Republic of Norway Romania Iran, Islamic Republic of Armenia Jordan Indonesia Bahrain Palestinian Nat'l Auth. Macedonia, Republic of Lebanon Chile Tunisia Morocco Saudi Arabia Botswana	38 38 37 33 32 30 28 28 26 25 23 22 20 19 18 18 18 17	0 0 0 0 V V V V V V V V V V V V V V V V
Bulgaria Russian Federation Israel Egypt Moldova, Republic of Norway Romania Iran, Islamic Republic of Armenia Jordan Indonesia Bahrain Palestinian Nat'l Auth. Macedonia, Republic of Lebanon Chile Tunisia Morocco Saudi Arabia Botswana Philippines	38 38 37 33 32 30 28 28 26 25 23 22 20 19 19 18 18 17 16	0 0 0 V V V V

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 cm, and the boxes are 60 cm long, 36 cm wide, and 24 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

Japan	62	
Netherlands	61	
Sweden	57	
Singapore	57	
Belgium (Flemish)	56	
Australia	56	
England	55	
Korea, Republic of	55	A
Chinese Taipei	55	
Hungary	55	
Latvia	54	A
Scotland	53	A
Russian Federation	53	A
Estonia	53	
Hong Kong, SAR	51	A
Slovenia	51	A
Slovak Republic	51	
New Zealand	51	
Lithuania	50	
United States	50	A
Norway	48	
		_
Bulgaria	46	0
Italy	45	0
Italy International average	45 44	0
Italy International average Serbia and Montenegro	45 44 43	0
International average Serbia and Montenegro Cyprus	45 44 43 42	0 0
International average Serbia and Montenegro Cyprus Moldova, Republic of	45 44 43 42 42	0 0 0
International average Serbia and Montenegro Cyprus Moldova, Republic of Macedonia, Republic of	45 44 43 42 42 41	0 0 0 0
International average Serbia and Montenegro Cyprus Moldova, Republic of Macedonia, Republic of Chile	45 44 43 42 42 41 40	0 0 0 0
International average Serbia and Montenegro Cyprus Moldova, Republic of Macedonia, Republic of Chile Israel	45 44 43 42 42 41 40 39	0 0 0 0
Italy International average Serbia and Montenegro Cyprus Moldova, Republic of Macedonia, Republic of Chile Israel Botswana	45 44 43 42 42 41 40 39 37	0 0 0 0
Italy International average Serbia and Montenegro Cyprus Moldova, Republic of Macedonia, Republic of Chile Israel Botswana Malaysia	45 44 43 42 42 41 40 39 37 37	0 0 0 0
International average Serbia and Montenegro Cyprus Moldova, Republic of Macedonia, Republic of Chile Israel Botswana Malaysia Romania	45 44 43 42 42 41 40 39 37 37 36	0 0 0 0
Italy International average Serbia and Montenegro Cyprus Moldova, Republic of Macedonia, Republic of Chile Israel Botswana Malaysia Romania Morocco	45 44 43 42 42 41 40 39 37 37 36 35	0 0 0 0
Italy International average Serbia and Montenegro Cyprus Moldova, Republic of Macedonia, Republic of Chile Israel Botswana Malaysia Romania Morocco Philippines	45 44 43 42 42 41 40 39 37 37 36 35 35	0 0 0 0
Italy International average Serbia and Montenegro Cyprus Moldova, Republic of Macedonia, Republic of Chile Israel Botswana Malaysia Romania Morocco Philippines Lebanon	45 44 43 42 42 41 40 39 37 37 36 35 35 34	0 0 0 0
Italy International average Serbia and Montenegro Cyprus Moldova, Republic of Macedonia, Republic of Chile Israel Botswana Malaysia Romania Morocco Philippines Lebanon Bahrain	45 44 43 42 42 41 40 39 37 37 36 35 35 34 32	0 0 0 0
Italy International average Serbia and Montenegro Cyprus Moldova, Republic of Macedonia, Republic of Chile Israel Botswana Malaysia Romania Morocco Philippines Lebanon Bahrain Egypt	45 44 43 42 42 41 40 39 37 37 36 35 35 34 32 32	0 0 0 0
International average Serbia and Montenegro Cyprus Moldova, Republic of Macedonia, Republic of Chile Israel Botswana Malaysia Romania Morocco Philippines Lebanon Bahrain Egypt Tunisia	45 44 43 42 41 40 39 37 36 35 35 34 32 32 31	0 0 0 0
International average Serbia and Montenegro Cyprus Moldova, Republic of Macedonia, Republic of Chile Israel Botswana Malaysia Romania Morocco Philippines Lebanon Bahrain Egypt Tunisia Indonesia	45 44 43 42 41 40 39 37 36 35 35 34 32 32 31 31	0 0 0 0
International average Serbia and Montenegro Cyprus Moldova, Republic of Macedonia, Republic of Chile Israel Botswana Malaysia Romania Morocco Philippines Lebanon Bahrain Egypt Tunisia Indonesia Iran, Islamic Republic of	45 44 43 42 41 40 39 37 36 35 35 34 32 32 31 31 31	0 0 0 0
International average Serbia and Montenegro Cyprus Moldova, Republic of Macedonia, Republic of Chile Israel Botswana Malaysia Romania Morocco Philippines Lebanon Bahrain Egypt Tunisia Indonesia	45 44 43 42 41 40 39 37 36 35 35 34 32 32 31 31	0 0 0 0

Country average vs. International average:

31

29 29

28

28

Armenia

Jordan

Ghana

Saudi Arabia

Palestinian Nat'l Auth.

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:

В

Overall Percent Correct

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

Country average vs. International average:

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:

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	
Belgium (Flemish)	85	
Hungary	84	
England	80	A
Sweden	78	
Singapore	78	
Scotland	76	
Australia	72	
Norway	71	A
New Zealand	68	
Hong Kong, SAR	67	A
Slovenia	67	
Italy	65	
Romania	63	
Japan	63	A
Israel	63	
Slovak Republic	59	
Chinese Taipei	59	A
Estonia	58	<u> </u>
Cyprus	58	<u> </u>
Korea, Republic of	57	<u> </u>
United States	55	<u> </u>
Malaysia	51	<u> </u>
Latvia	46	0
International average	45	
International average Lebanon	45	0
Lebanon	45	0
Lebanon Moldova, Republic of	45 42	Ο
Lebanon Moldova, Republic of Russian Federation	45 42 41	O O
Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro	45 42 41 36	O O
Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro Bulgaria	45 42 41 36 36	O O
Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro Bulgaria Armenia	45 42 41 36	O O
Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro Bulgaria Armenia Lithuania	45 42 41 36 36 35 34	○▼▼▼
Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro Bulgaria Armenia Lithuania Chile	45 42 41 36 36 35 34 29	○▼▼▼
Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro Bulgaria Armenia Lithuania Chile Tunisia	45 42 41 36 36 35 34 29	○▼▼▼
Lebanon Moldova, Republic of Russian Federation Serbia and Montenegro Bulgaria Armenia Lithuania Chile Tunisia Egypt	45 42 41 36 36 35 34 29 20	○▼▼▼
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	○▼▼▼
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 19	○▼▼▼
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 19 18	O O
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	○▼▼▼
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	○▼▼▼
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 35 34 29 20 19 18 18 16 15	○▼▼▼
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 20 19 18 18 16 15	○▼▼▼
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	○▼▼▼
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 20 19 18 16 15 15 14 11 9	○▼▼▼
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 35 34 29 20 19 18 16 15 15 14 11 9	○▼▼▼
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 35 34 29 20 19 18 16 15 15 14 11 9 8	○▼▼▼
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 35 34 29 20 19 18 16 15 15 14 11 9	○▼▼▼

Country average vs. International average:

Higher	
Not different	0
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?

Answer: 7, 25

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 cm². A. Find the area of one square. Answer: _____ cm² 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	A
Hong Kong, SAR	88	_
Korea, Republic of	87	A
Japan	86	
Armenia	84	A
Chinese Taipei	83	
Estonia	69	A
Netherlands	69	A
Russian Federation	68	A
Belgium (Flemish)	67	A
Slovenia	66	
Scotland	63	A
United States	60	A
Malaysia	60	A
Hungary	60	A
Bulgaria	59	<u> </u>
Romania	58	<u> </u>
Tunisia	57	_ _
Moldova, Republic of	57	<u> </u>
Italy	57	<u> </u>
Slovak Republic	57	<u> </u>
Lithuania	57	<u> </u>
Australia	56	0
International average	51	
international average		
Lebanon	49	0
		0
Lebanon	49	-
Lebanon Sweden	49 48	0
Lebanon Sweden England	49 48 47	0
Lebanon Sweden England Serbia and Montenegro	49 48 47 47	0
Lebanon Sweden England Serbia and Montenegro Israel	49 48 47 47	○○▼
Lebanon Sweden England Serbia and Montenegro Israel Egypt	49 48 47 47 47 46	○○▼▼▼
Lebanon Sweden England Serbia and Montenegro Israel Egypt New Zealand	49 48 47 47 47 46 45	○→→→→
Lebanon Sweden England Serbia and Montenegro Israel Egypt New Zealand Jordan	49 48 47 47 47 46 45 45	○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○<
Lebanon Sweden England Serbia and Montenegro Israel Egypt New Zealand Jordan Cyprus	49 48 47 47 47 46 45 45	○○▼▼▼
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Lebanon Sweden England Serbia and Montenegro Israel Egypt New Zealand Jordan Cyprus Macedonia, Republic of Iran, Islamic Republic of	49 48 47 47 46 45 45 43 41 38	○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○<
Lebanon Sweden England Serbia and Montenegro Israel Egypt New Zealand Jordan Cyprus Macedonia, Republic of Iran, Islamic Republic of Bahrain	49 48 47 47 47 46 45 43 41 38 37	○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○<
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Lebanon Sweden England Serbia and Montenegro Israel Egypt New Zealand Jordan Cyprus Macedonia, Republic of Iran, Islamic Republic of Bahrain Indonesia Philippines	49 48 47 47 46 45 45 43 41 38 37 33 32 32	OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO<l< td=""></l<>
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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	49 48 47 47 46 45 45 43 41 38 37 33 32 32 31 30 28	OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO<l< td=""></l<>
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	49 48 47 47 46 45 45 43 41 38 37 33 32 31 30 28 24	OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO<l< td=""></l<>
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	49 48 47 47 46 45 45 43 41 38 37 33 32 31 30 28 24 15	OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO<l< td=""></l<>
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	49 48 47 47 46 45 45 43 41 38 37 33 32 31 30 28 24 15	OOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOOO<l< td=""></l<>

Country average vs. International average:

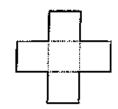
5 squares: area of one square (continued)

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{1}{2}45 \cdot \text{cm}^2\$.



245

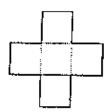
Find the area of one square.

Answer:

Incorrect Response:

55. The figure consists of 5 squares of equal area. The area of the whole figure is





a. Find the area of one square.

Answer: ______cm²

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 cm². A. Find the area of one square. Answer: _____ cm² 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 A Hong Kong, SAR 78 A Korea, Republic of 70 A Chinese Taipei 65 A Armenia 62
Hong Kong, SAR 78 ▲ Korea, Republic of 70 ▲ Chinese Taipei 65 ▲
Chinese Taipei 65
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
Lithuania 33
Bulgaria 32 O
United States 29 O
'
Slovenia 29 O
International average 28
International average 28 Scotland 27 O
International average28Scotland27OAustralia26O
International average 28 Scotland 27 O Australia 26 O England 23 O
International average 28 Scotland 27 0 Australia 26 0 England 23 0 Sweden 23 V
International average 28 Scotland 27 0 Australia 26 0 England 23 0 Sweden 23 V
International average 28 Scotland 27 0 Australia 26 0 England 23 0 Sweden 23 V
International average 28 Scotland 27 0 Australia 26 0 England 23 0 Sweden 23 V
International average 28 Scotland 27 0 Australia 26 0 England 23 0 Sweden 23 V
International average 28 Scotland 27 0 Australia 26 0 England 23 0 Sweden 23 V
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International average 28 Scotland 27 0 Australia 26 0 England 23 0 Sweden 23 V
International average 28 Scotland 27 0 Australia 26 0 England 23 0 Sweden 23 V
International average 28 Scotland 27 0 Australia 26 0 England 23 0 Sweden 23 V
International average 28 Scotland 27 0 Australia 26 0 England 23 0 Sweden 23 V
International average Scotland Australia England Sweden New Zealand Cyprus Israel Macedonia, Republic of Egypt Lebanon Latvia Jordan Palestinian Nat'l Auth. Indonesia 27 O 27 O C 28 V V C C C C C C C C C C C
International average Scotland Australia England Sweden New Zealand Cyprus Israel Macedonia, Republic of Egypt Lebanon Latvia Jordan Palestinian Nat'l Auth. Indonesia Bahrain 27 O O O O O O O O O O O O O O O O O O
International average Scotland Australia England Sweden S
International average Scotland Australia England Sweden New Zealand Cyprus Israel Macedonia, Republic of Egypt Lebanon Latvia Jordan Palestinian Nat'l Auth. Indonesia Bahrain Norway Iscotland 27 O O O Cyprus 21 V V V Indonesia 15 Indonesia Bahrain Indonesia
International average Scotland Australia England 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 27 O W C Egypt Lebanon 18 W T V T T T T T T T T T T T
International average Scotland Australia England 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 27 O W C Egypt Lebanon 18 W T V T T T T T T T T T T T
International average Scotland Australia England 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 27 O W C Egypt Lebanon 18 W T V T T T T T T T T T T T
International average Scotland Australia England 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 27 O W C Egypt Lebanon 18 W T V T T T T T T T T T T T
International average Scotland Australia England 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 27 O W C Egypt Lebanon 18 W T V T T T T T T T T T T T
International average Scotland Australia England Sweden Some Zealand Sweden

Country average vs. International average:

Higher
Not different
Lower

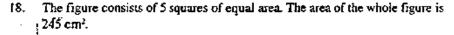
Not different

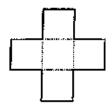
5 squares: length of one side (continued)

Item Number: M022227B

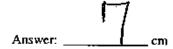
Student Responses

Correct Response:



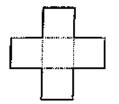


b. Find the length of one side of one square.

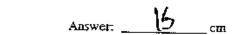


Incorrect Response:

18. The figure consists of 5 squares of equal area. The area of the whole figure is $\frac{1}{2}$ 245 cm².



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



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 cm². A. Find the area of one square. Answer: _____ cm² 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	72	
Hong Kong, SAR	58	
Korea, Republic of	53	
Chinese Taipei	51	
Japan	47	A
Armenia	42	A
Malaysia	38	A
Netherlands	38	_
Australia	30	<u> </u>
Scotland	27	<u> </u>
England	27	<u> </u>
Estonia	26	A
Belgium (Flemish)	25	<u> </u>
Hungary	24	<u> </u>
Slovenia	24	•
Slovak Republic	24	
·		0
New Zealand	23	0
Russian Federation	23	-
United States	23	0
Italy	22	0
Lithuania	22	0
Sweden	21	0
International average	20	
Serbia and Montenegro	18	0
· · · · · · · · · · · · · · · · · · ·		0
Latvia	17	0
9		-
Latvia	17	0 0
Latvia Cyprus	17 17	0 0 0
Latvia Cyprus Norway	17 17 16	0 0 0
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Latvia Cyprus Norway Moldova, Republic of Romania Bulgaria Israel Macedonia, Republic of Tunisia	17 17 16 16 16 14 12 8 7	0 0 0 0 •
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Latvia Cyprus Norway Moldova, Republic of Romania Bulgaria Israel Macedonia, Republic of Tunisia Indonesia Chile Egypt Jordan Bahrain Palestinian Nat'l Auth. Botswana Lebanon Morocco Iran, Islamic Republic of	17 17 16 16 16 14 12 8 7 5 5 5 4 4 3 3 2 2	• • • • • • • • • • • • • • • • • • •
Latvia Cyprus Norway Moldova, Republic of Romania Bulgaria Israel Macedonia, Republic of Tunisia Indonesia Chile Egypt Jordan Bahrain Palestinian Nat'l Auth. Botswana Lebanon Morocco Iran, Islamic Republic of South Africa	17 17 16 16 16 14 12 8 7 5 5 5 4 4 3 3 2 2	• • • • • • • • • • • • • • • • • • •
Latvia Cyprus Norway Moldova, Republic of Romania Bulgaria Israel Macedonia, Republic of Tunisia Indonesia Chile Egypt Jordan Bahrain Palestinian Nat'l Auth. Botswana Lebanon Morocco Iran, Islamic Republic of South Africa Philippines	17 17 16 16 16 14 12 8 7 5 5 5 4 4 3 3 2 2 2	O O
Latvia Cyprus Norway Moldova, Republic of Romania Bulgaria Israel Macedonia, Republic of Tunisia Indonesia Chile Egypt Jordan Bahrain Palestinian Nat'l Auth. Botswana Lebanon Morocco Iran, Islamic Republic of South Africa Philippines Saudi Arabia	17 17 16 16 16 14 12 8 7 5 5 5 4 4 3 3 2 2 2 2	○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○○<
Latvia Cyprus Norway Moldova, Republic of Romania Bulgaria Israel Macedonia, Republic of Tunisia Indonesia Chile Egypt Jordan Bahrain Palestinian Nat'l Auth. Botswana Lebanon Morocco Iran, Islamic Republic of South Africa Philippines	17 17 16 16 16 14 12 8 7 5 5 5 4 4 3 3 2 2 2	O O

Country average vs. International average:

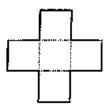
5 squares: perimeter whole figure (continued)

Item Number: M022227C

Student Responses

Correct Response:

18. The figure consists of 5 squares of equal area. The area of the whole figure is 245 cm².

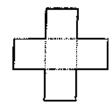


Find the perimeter of the whole figure in centimeters.

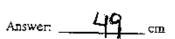


Incorrect Response:

18. The figure consists of 5 squares of equal area. The area of the whole figure is 245 cm².



Find the perimeter of the whole figure in centimeters.



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

Singapore	78	A
Hong Kong, SAR	76	A
Netherlands	70	A
Russian Federation	67	A
Armenia	65	A
Estonia	64	A
Chinese Taipei	59	A
Japan	59	A
Hungary	59	A
Lithuania	56	A
United States	55	A
Belgium (Flemish)	54	A
Latvia	50	A
Slovak Republic	49	A
Sweden	45	A
Korea, Republic of	43	A
Scotland	43	A
Italy	42	A
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	35 34	0
International average Serbia and Montenegro Slovenia	35 34 33	0
International average Serbia and Montenegro Slovenia Malaysia	35 34 33 29	0
International average Serbia and Montenegro Slovenia Malaysia Romania	35 34 33 29 29	0
International average Serbia and Montenegro Slovenia Malaysia Romania Bulgaria	35 34 33 29 29 28	0
International average Serbia and Montenegro Slovenia Malaysia Romania Bulgaria Tunisia	35 34 33 29 29 28 27	0
International average Serbia and Montenegro Slovenia Malaysia Romania Bulgaria Tunisia Macedonia, Republic of	35 34 33 29 29 28 27 26	0
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International average 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	35 34 33 29 28 27 26 24 22 21 18 16 15 15 14 12 8 7	0
International average 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	35 34 33 29 28 27 26 24 22 21 18 16 15 15 14 12 8 7 6	0
International average 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	35 34 33 29 28 27 26 24 22 21 18 16 15 15 14 12 8 7 6 2	0
International average 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	35 34 33 29 28 27 26 24 22 21 18 16 15 15 14 12 8 7 6	0

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 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.

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	
Netherlands 50	
Hong Kong, SAR 47	
Chinese Taipei 39	
Estonia 35	
Russian Federation 34	
Hungary 33	
Belgium (Flemish) 30	
Lithuania 27	
Korea, Republic of 27	
Latvia 24	
United States 24	
Scotland 23	
England 22	
Australia 22	
Slovak Republic 21	
New Zealand 19	
Norway 19 (International average 18	
Israel 17 C	
Moldova, Republic of 17)
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Moldova, Republic of Bulgaria 17 Slovenia 16 Italy 15 Romania 13 Serbia and Montenegro 10 Macedonia, Republic of 8 Malaysia 7 Cyprus 6 Jordan 6 Iran, Islamic Republic of 5 Tunisia 5 Chile 5 Egypt 4 Botswana 4 Bahrain 4 Indonesia 4 Palestinian Nat'l Auth. 4	
Moldova, Republic of Bulgaria 17 Slovenia 16 Italy 15 Romania 13 Serbia and Montenegro 10 Macedonia, Republic of 8 Malaysia 7 Cyprus 6 Jordan 6 Iran, Islamic Republic of 5 Tunisia 5 Chile 5 Egypt 4 Botswana 4 Bahrain 4 Indonesia 4 Palestinian Nat'l Auth. 4	
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Moldova, Republic of Bulgaria 17 Slovenia 16 Italy 15 Romania 13 Serbia and Montenegro 10 Macedonia, Republic of 8 Malaysia 7 Cyprus 6 Jordan 6 Iran, Islamic Republic of 5 Tunisia 5 Chile 5 Egypt 4 Botswana 4 Bahrain 4 Indonesia 4 Palestinian Nat'l Auth. 4	

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 Lilometers

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

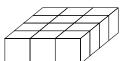
Volumes of stacks of blocks

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

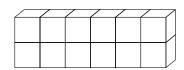


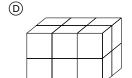












Item Number: M012013

Correct Response:

Λ

Overall Percent Correct

Korea, Republic of	88	•
Singapore	86	<u> </u>
Hong Kong, SAR	83	_
Japan	81	_
Chinese Taipei	81	<u> </u>
Netherlands	78	<u> </u>
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	A
Italy	55	_
United States	50	0
International average	50	

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

Country average vs. International average:

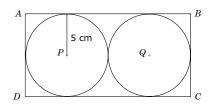
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▼

Higher Not different Lower

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 cm²
- (B) 60 cm²
- \bigcirc 100 cm²
- 200 cm²

Item Number: M032678

Correct Response:

D

Overall Percent Correct

Singapore	82	A
Hong Kong, SAR	82	A
Korea, Republic of	75	A
Chinese Taipei	74	A
Japan	73	A
Netherlands	65	A
Belgium (Flemish)	61	A
Estonia	53	A
Russian Federation	51	A
Italy	51	
Slovak Republic	51	A
Hungary	48	
Malaysia	48	
Latvia	46	
Lithuania	45	
Sweden	45	
Scotland	44	
England	43	0
Serbia and Montenegro	43	0
Australia	42	0
New Zealand	41	0
Classacia	4.1	_
Slovenia	41	0
Romania	41 39	0
Romania	39	
Romania International average	39 39	0
Romania International average United States	39 39 39	0
Romania International average United States Bulgaria	39 39 39 38	0 0
Romania International average United States Bulgaria Cyprus	39 39 39 38 37	0 0 0 0 0
Romania International average United States Bulgaria Cyprus Armenia	39 39 39 38 37 36	0 0 0 0 0
Romania International average United States Bulgaria Cyprus Armenia Lebanon	39 39 39 38 37 36 35	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
Romania International average United States Bulgaria Cyprus Armenia Lebanon Norway	39 39 39 38 37 36 35 35 34	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	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 30 30	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 30 27	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	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	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 24	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
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 20 19	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 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 Palestinian Nat'l Auth.	39 39 39 38 37 36 35 35 34 33 30 27 25 24 21 20 19 18	0 0 0 0

Country average vs. International average:

15

10

10

10

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?

- $\widehat{\mathsf{A}}$ 1 and 2
- \bigcirc $\frac{5}{2}$ and $\frac{11}{4}$

Item Number: M012016

Correct Response:

D

Overall Percent Correct

Korea, Republic of	77	
Singapore	71	_
Belgium (Flemish)	63	<u> </u>
Lithuania	61	<u> </u>
Hong Kong, SAR	61	<u> </u>
Chinese Taipei	60	<u> </u>
Russian Federation	58	
		<u> </u>
Hungary	58	A
Estonia	57	•
Israel	57	A
Slovak Republic	55	
Japan	55	
Sweden	55	O
United States	54	
Serbia and Montenegro	54	O
Slovenia	53	0
Romania	52	O
Italy	52	0
Australia	52	0
Latvia	52	0
Philippines	52	0
Netherlands	51	0
Scotland	51	0
Norway	51	0
	I	
•		
Cyprus	51	0
Cyprus International average	51 50	0
Cyprus International average Bulgaria	51 50 50	0
Cyprus International average Bulgaria Malaysia	51 50 50 50	0 0
Cyprus International average Bulgaria Malaysia England	51 50 50 50 50	0 0 0 0
Cyprus International average Bulgaria Malaysia England Moldova, Republic of	51 50 50 50 50 48	0 0 0 0 0
Cyprus International average Bulgaria Malaysia England Moldova, Republic of New Zealand	51 50 50 50 50 48 47	0 0 0 0 0 0
Cyprus International average Bulgaria Malaysia England Moldova, Republic of New Zealand Botswana	51 50 50 50 50 48 47 46	0 0 0 0 0
Cyprus International average Bulgaria Malaysia England Moldova, Republic of New Zealand Botswana Armenia	51 50 50 50 50 48 47 46 46	0 0 0 0 0
Cyprus International average Bulgaria Malaysia England Moldova, Republic of New Zealand Botswana Armenia Saudi Arabia	51 50 50 50 50 48 47 46 46 46	0 0 0 0 0
Cyprus International average Bulgaria Malaysia England Moldova, Republic of New Zealand Botswana Armenia Saudi Arabia Lebanon	51 50 50 50 50 48 47 46 46 46 45	0 0 0 0 0
Cyprus International average Bulgaria Malaysia England Moldova, Republic of New Zealand Botswana Armenia Saudi Arabia Lebanon Ghana	51 50 50 50 50 48 47 46 46 46 45 44	0 0 0 0 0
Cyprus International average Bulgaria Malaysia England Moldova, Republic of New Zealand Botswana Armenia Saudi Arabia Lebanon Ghana Macedonia, Republic of	51 50 50 50 50 48 47 46 46 46 45 44	0 0 0 0 0
Cyprus International average Bulgaria Malaysia England Moldova, Republic of New Zealand Botswana Armenia Saudi Arabia Lebanon Ghana Macedonia, Republic of Tunisia	51 50 50 50 50 48 47 46 46 46 45 44 44 43	0 0 0 0 0
Cyprus International average Bulgaria Malaysia England Moldova, Republic of New Zealand Botswana Armenia Saudi Arabia Lebanon Ghana Macedonia, Republic of	51 50 50 50 50 48 47 46 46 46 45 44 44 43 41	0 0 0 0 0
Cyprus International average Bulgaria Malaysia England Moldova, Republic of New Zealand Botswana Armenia Saudi Arabia Lebanon Ghana Macedonia, Republic of Tunisia	51 50 50 50 50 48 47 46 46 46 45 44 44 43	0 0 0 0 0
Cyprus International average Bulgaria Malaysia England Moldova, Republic of New Zealand Botswana Armenia Saudi Arabia Lebanon Ghana Macedonia, Republic of Tunisia Morocco	51 50 50 50 50 48 47 46 46 46 45 44 44 43 41	0 0 0 0 0
Cyprus International average Bulgaria Malaysia England Moldova, Republic of New Zealand Botswana Armenia Saudi Arabia Lebanon Ghana Macedonia, Republic of Tunisia Morocco Egypt	51 50 50 50 50 48 47 46 46 46 45 44 44 43 41 40	0 0 0 0 0
Cyprus International average Bulgaria Malaysia England Moldova, Republic of New Zealand Botswana Armenia Saudi Arabia Lebanon Ghana Macedonia, Republic of Tunisia Morocco Egypt Bahrain	51 50 50 50 50 48 47 46 46 46 45 44 44 43 41 40 40	0 0 0 0 0
Cyprus International average 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 50 50 48 47 46 46 46 45 44 44 43 41 40 40 39	0 0 0 0 0
Cyprus International average 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 50 50 48 47 46 46 46 45 44 43 41 40 40 39 39	0 0 0 0 0
Cyprus International average 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 50 50 48 47 46 46 46 45 44 43 41 40 40 39 39 39	0 0 0 0 0
Cyprus International average 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. Jordan	50 50 50 50 48 47 46 46 46 45 44 43 41 40 40 39 39 39 38	0 0 0 0 0

Country average vs. International average:

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	
Belgium (Flemish)	62	A
Sweden	60	
Australia	53	<u> </u>
United States	52	_
Scotland	51	_
Estonia	51	<u> </u>
Latvia	51	<u> </u>
Hungary	51	<u> </u>
England	50	_
Russian Federation	49	_
Israel	48	
Malaysia	47	
New Zealand	46	
Slovenia	46	
Armenia	45	
Lithuania	43	
Slovak Republic	43	
'	43 39	0
Norway		
Romania	39	0
Serbia and Montenegro	38	0
Serbia and Montenegro Bulgaria	38 38	
Serbia and Montenegro Bulgaria International average	38 38 38	0
Serbia and Montenegro Bulgaria International average Cyprus	38 38 38 37	0 0
Serbia and Montenegro Bulgaria International average Cyprus Moldova, Republic of	38 38 38 37 37	0 0
Serbia and Montenegro Bulgaria International average Cyprus Moldova, Republic of Italy	38 38 38 37 37 37 34	0 0 0 0 0
Serbia and Montenegro Bulgaria International average Cyprus Moldova, Republic of Italy Indonesia	38 38 37 37 37 34 26	0 0 0 0 0
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 0 0
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 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
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 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
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 V
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	0 0 0 0 0 V
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	0 0 0 0 0 0 V
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 V
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 V
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 13	0 0 0 0 0 V
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 11	0 0 0 0 0 V
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 V
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 13 11 11 10 8	0 0 0 0 0 V
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 7	0 0 0 0 0 0 V
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 13 11 11 10 8	0 0 0 0 0 0 V

Country average vs. International average:

Higher	
Not different	O
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 560005

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?

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

Addition/multiplication with fractions

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

- $\bigcirc \quad \frac{3}{51}$
- \bigcirc $\frac{1}{6}$
- $\bigcirc \quad \frac{6}{25}$

Item Number: M022199

Correct Response:

Ε

Overall Percent Correct

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

Country average vs. International average:

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?

- (A) There would then be more men than women at the meeting.
- (B) 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.
- © From the information given, you cannot tell whether there would be more women or men.

Item Number: M022191

Correct Response:

Λ

Overall Percent Correct

Korea, Republic of	89	A
Japan	87	
Netherlands	86	
Belgium (Flemish)	83	
Singapore	81	A
Sweden	79	A
Norway	77	A
Chinese Taipei	77	
Malaysia	74	A
Hong Kong, SAR	73	
Hungary	71	A
Italy	70	A
Slovenia	68	A
Slovak Republic	68	A
Estonia	67	
Scotland	67	A
England	67	_
Bulgaria	67	_ _
Australia	66	<u> </u>
Israel	65	<u> </u>
Cyprus	64	<u> </u>
Serbia and Montenegro	63	<u> </u>
New Zealand	63	0
Latvia	62	0
Lithuania	60	Ω
Lithuania International average	60 59	0
Lithuania International average Russian Federation	59 57	0
International average Russian Federation	59	
International average Russian Federation Moldova, Republic of	59 57 56	0
International average Russian Federation Moldova, Republic of Iran, Islamic Republic of	59 57	0 0
International average Russian Federation Moldova, Republic of	59 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 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	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 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 Palestinian Nat'l Auth.	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 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 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 Botswana	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	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	59 57 56 56 52 51 51 50 48 46 46 46 46 45 42 40	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	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	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	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 Lebanon	59 57 56 56 52 51 50 48 46 46 46 45 42 40 40 37 31 27 24	0 0 0 * * * *

Country average vs. International average:

O ▼

Higher Not different Lower

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.?

- $\bigcirc A \quad \frac{1}{5}$
- \bigcirc $\frac{1}{2}$
- $\bigcirc \quad \frac{2}{3}$
- \bigcirc $\frac{3}{4}$

Item Number: M012027

Correct Response:

В

Overall Percent Correct

Singapore	85	A
Hong Kong, SAR	80	
Korea, Republic of	77	
Chinese Taipei	77	
Sweden	73	
England	68	
Netherlands	67	
Japan	67	
Belgium (Flemish)	66	
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	
Bulgaria	56	
Cyprus	56	
	56 55	0
Cyprus		
Cyprus Estonia	55	Ο
Cyprus Estonia Russian Federation	55 53	Ο
Cyprus Estonia Russian Federation International average	55 53 52	0
Cyprus Estonia Russian Federation International average Moldova, Republic of	55 53 52 52	0 0
Cyprus Estonia Russian Federation International average Moldova, Republic of Armenia	55 53 52 52 50	0 0
Cyprus Estonia Russian Federation International average Moldova, Republic of Armenia Lithuania	55 53 52 52 50 50	0 0 0 0 0 0
Cyprus Estonia Russian Federation International average Moldova, Republic of Armenia Lithuania Serbia and Montenegro	55 53 52 52 50 50 48	0 0 0 0 0
Cyprus Estonia Russian Federation International average Moldova, Republic of Armenia Lithuania Serbia and Montenegro Jordan	55 53 52 52 50 50 48 46	0 0 0 0 0
Cyprus Estonia Russian Federation International average Moldova, Republic of Armenia Lithuania Serbia and Montenegro Jordan Romania	55 53 52 52 50 50 48 46 43	0 0 0 0 0
Cyprus Estonia Russian Federation International average Moldova, Republic of Armenia Lithuania Serbia and Montenegro Jordan Romania Palestinian Nat'l Auth.	55 53 52 52 50 50 48 46 43 43	0 0 0 0 0
Cyprus Estonia Russian Federation International average Moldova, Republic of Armenia Lithuania Serbia and Montenegro Jordan Romania Palestinian Nat'l Auth. Egypt	55 53 52 52 50 50 48 46 43 43 43	0 0 0 0 0
Cyprus Estonia Russian Federation International average Moldova, Republic of Armenia Lithuania Serbia and Montenegro Jordan Romania Palestinian Nat'l Auth. Egypt Italy	55 53 52 52 50 50 48 46 43 43 43 41	0 0 0 0 0
Cyprus Estonia Russian Federation International average Moldova, Republic of Armenia Lithuania Serbia and Montenegro Jordan Romania Palestinian Nat'l Auth. Egypt Italy Lebanon	55 53 52 52 50 50 48 46 43 43 43 41 40	0 0 0 0 0
Cyprus Estonia Russian Federation International average Moldova, Republic of Armenia Lithuania Serbia and Montenegro Jordan Romania Palestinian Nat'l Auth. Egypt Italy Lebanon Philippines	55 53 52 52 50 50 48 46 43 43 43 41 40 40	0 0 0 0 0
Cyprus Estonia Russian Federation International average Moldova, Republic of Armenia Lithuania Serbia and Montenegro Jordan Romania Palestinian Nat'l Auth. Egypt Italy Lebanon Philippines Macedonia, Republic of	55 53 52 52 50 50 48 46 43 43 43 41 40 40 40	0 0 0 0 0
Cyprus Estonia Russian Federation International average Moldova, Republic of Armenia Lithuania Serbia and Montenegro Jordan Romania Palestinian Nat'l Auth. Egypt Italy Lebanon Philippines Macedonia, Republic of Bahrain	55 53 52 52 50 50 48 46 43 43 43 41 40 40 40	0 0 0 0 0 0
Cyprus Estonia Russian Federation 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	55 53 52 52 50 50 48 46 43 43 41 40 40 40 40 38	0 0 0 0 0

Country average vs. International average:

Botswana Chile

South Africa

Morocco

Ghana

Tunisia

29

28

27

26 24

20

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?

- $\bigcirc \quad \frac{14}{30}$
- © $\frac{16}{14}$
- \bigcirc $\frac{16}{30}$

Item Number: M012041

Correct Response:

D

Overall Percent Correct

Korea, Republic of Singapore Hong Kong, SAR Netherlands Chinese Taipei Belgium (Flemish) Sweden England Malaysia Israel United States Norway Australia New Zealand Scotland Japan Estonia Slovenia Cyprus Hungary Italy Latvia Lithuania Russian Federation	90 90 86 82 79 76 75 74 72 71 69 69 68 62 60 59 58 57 57 57 57	
Slovak Republic	54	0
International average	52	
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 South Africa Ghana Saudi Arabia	46 43 41 40 38 37 36 35 33 31 31 31 30 28 27 21 21 20 15	* * * * * * * * * * * * * * * * * * *

Country average vs. International average:

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?

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

Item Number: M022004

Correct Response:

0

Overall Percent Correct

Singapore	85	A
Korea, Republic of	80	A
Hong Kong, SAR	78	A
Chinese Taipei	78	A
Malaysia	69	A
Netherlands	68	A
Japan	66	A
Sweden	65	A
Belgium (Flemish)	63	A
Scotland	61	A
Hungary	60	A
England	57	A
Latvia	57	A
Slovenia	57	A
Italy	56	A
Estonia	54	
Romania	53	A
Australia	53	A
Slovak Republic	52	0
Israel	52	0
Cyprus	51	0
Lithuania	50	0
New Zealand	50	0
United States	50	0
Bulgaria	49	0
Bulgaria Serbia and Montenegro	49 48	0
3		
Serbia and Montenegro	48	
Serbia and Montenegro International average	48 48	0 0
Serbia and Montenegro International average Russian Federation	48 48 45	0 0
Serbia and Montenegro International average Russian Federation Moldova, Republic of	48 48 45 44	0 0
Serbia and Montenegro International average Russian Federation Moldova, Republic of Norway	48 48 45 44 43	0 0
Serbia and Montenegro International average Russian Federation Moldova, Republic of Norway Macedonia, Republic of	48 48 45 44 43 38	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
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
Serbia and Montenegro International average Russian Federation Moldova, Republic of Norway Macedonia, Republic of Armenia Iran, Islamic Republic of Egypt	48 48 45 44 43 38 38 38 37	0 0
Serbia and Montenegro International average Russian Federation Moldova, Republic of Norway Macedonia, Republic of Armenia Iran, Islamic Republic of Egypt Philippines	48 48 45 44 43 38 38 38 37 35	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
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
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	48 45 44 43 38 38 38 37 35 35 34 33	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	48 45 44 43 38 38 37 35 35 34 33 33	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	48 45 44 43 38 38 38 37 35 35 34 33 33 33	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	48 45 44 43 38 38 38 37 35 35 34 33 33 33 28	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	48 45 44 43 38 38 38 37 35 35 34 33 33 28 27	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
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	48 45 44 43 38 38 37 35 35 34 33 33 33 28 27 27 25	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 35 34 33 33 33 28 27 27 25 25	0 0

Country average vs. International average:

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
- \bigcirc 2.54 seconds
- \bigcirc 3.56 seconds
- \bigcirc 3.76 seconds

Item Number: M022010

Correct Response:

Overall Percent Correct

Singapore	88	
Korea, Republic of	87	A
Malaysia	81	A
Netherlands	81	
Hungary	80	A
Chinese Taipei	80	
Japan	78	
Russian Federation	76	A
Hong Kong, SAR	75	A
Slovak Republic	74	A
United States	74	A
Slovenia	73	A
Estonia	72	A
Belgium (Flemish)	71	A
Scotland	71	A
Moldova, Republic of	69	A
Serbia and Montenegro	68	A
Latvia	67	A
Bulgaria	66	
Lithuania	65	A
Romania	64	0
Tunisia	63	0
Australia	63	0
Sweden	63	0
Italy	62	0
ltaly Botswana	62 61	0
Botswana Lebanon	61 61	- 1
Botswana Lebanon International average	61 61 61	0
Botswana Lebanon International average Armenia	61 61 61	0 0
Botswana Lebanon International average Armenia Macedonia, Republic of	61 61 61 60 59	0 0
Botswana Lebanon International average Armenia Macedonia, Republic of Cyprus	61 61 61 60 59 59	0 0
Botswana Lebanon International average Armenia Macedonia, Republic of Cyprus Egypt	61 61 60 59 59 58	0 0 0 0 0 0
Botswana Lebanon International average Armenia Macedonia, Republic of Cyprus Egypt Israel	61 61 61 60 59 59 58 58	0 0 0 0 0 0 0
Botswana Lebanon International average Armenia Macedonia, Republic of Cyprus Egypt Israel Indonesia	61 61 60 59 59 58 58	0 0 0 0 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 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 0 0 0 0
Botswana Lebanon International average Armenia Macedonia, Republic of Cyprus Egypt Israel Indonesia England New Zealand Jordan	61 61 60 59 59 58 58 55 54 53 46	0 0 0 0 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 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 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 58 58 55 54 53 46 46 45 45	0 0 0 0 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 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 58 58 55 54 53 46 46 45 45 45	0 0 0 0 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 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 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 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 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 0 0 0 0

Country average vs. International average:

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
- \bigcirc 24.75 L
- (D) 29.75 L

Item Number: M022127

Correct Response:

Overall Percent Correct

Singapore 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	56 50 43 43 38 38 34 33 32 31 30 30 29 28 27 26	
International average	26	
Slovenia	26	0
Macedonia, Republic of	25	0
United States	25	0
Slovak Republic	24	0
New Zealand	24	0
Indonesia	23	0
Sweden	23	0
Jordan	23	Ο
Bulgaria	23	Ο
Cyprus	22	•
Saudi Arabia	22	Ο
Israel	22	▼
Serbia and Montenegro	22	_
Italy	21	▼
Egypt	21	•
Botswana	20	* * * * * * * * * * * * * * * * * * *
Chile	20	•
Ghana	20	•
England	20	•
Scotland	19	•
Morocco	19	•
Tunisia	19	•
South Africa	18	•
Iran, Islamic Republic of	18	•
Palestinian Nat'l Auth.	17	•
Philippines	17	•
Bahrain	16	•
Norway	16	•
Lebanon	12	•

Country average vs. International average:

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
- (D) 4.5

Item Number: M032079

Correct Response:

В

Overall Percent Correct

Singapore	58	
Belgium (Flemish)	58	<u> </u>
Estonia	56	<u> </u>
Japan	56	
Hong Kong, SAR	56	<u> </u>
Korea, Republic of	52	<u> </u>
Russian Federation	51	<u> </u>
Hungary	51	<u> </u>
Netherlands	51	_
Chinese Taipei	46	•
Slovak Republic	45	
Lithuania	43	
Israel	41	
Sweden	41	
Latvia	37	0
New Zealand		0
	36	
Australia	35	0
Scotland	35	0
International average	34	
Italy	34	0
England	34	O
Cyprus	33	0
Slovenia	32	O
United States	32	O
Moldova, Republic of	32	O
Serbia and Montenegro	32	O
Norway	31	O
Romania	29	•
Armenia	28	•
Egypt	27	\blacksquare
Malaysia	27	\blacksquare
Saudi Arabia	26	\blacksquare
Lebanon	26	\blacksquare
Macedonia, Republic of	23	\blacksquare
Bahrain	23	\blacksquare
Philippines	23	\blacksquare
Morocco	23	* * * * * * * * * * * * * * * * * * *
Chile	23	\blacksquare
Iran, Islamic Republic of	22	\blacksquare
Ghana	22	•
Bulgaria	22	•
Indonesia	21	•
Palestinian Nat'l Auth.	21	•
South Africa	20	V
Tunisia	18	*
Botswana	16	*
55 Divana	.0	*

Country average vs. International average:

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?

- (A) 5
- (B) 4
- (C) 3
- D 2
- E 1

Item Number: M012001

Correct Response:

Overall Percent Correct

Singapore	88	A
Hong Kong, SAR	87	A
Belgium (Flemish)	84	A
Korea, Republic of	82	A
Netherlands	80	A
Japan	79	A
Chinese Taipei	78	A
Sweden	71	
Malaysia	67	A
Israel	67	
Hungary	66	A
Australia	66	
Scotland	63	A
Norway	62	A
England	62	
United States	61	A
New Zealand	60	A
Slovenia	59	A
Estonia	59	A
Cyprus	56	
Latvia	56	
Russian Federation	52	0
Slovak Republic	52	0
Moldova, Republic of	50	0
Italy	50	0
Italy International average	50 49	0
International average Lithuania		0
International average	49	0
International average Lithuania Bulgaria Romania	49 47	0 0 0
International average Lithuania Bulgaria Romania Armenia	49 47 46	0 0 0
International average Lithuania Bulgaria Romania Armenia Serbia and Montenegro	49 47 46 45	0 0 0
International average Lithuania Bulgaria Romania Armenia Serbia and Montenegro Iran, Islamic Republic of	49 47 46 45 42	0 0 0
International average Lithuania Bulgaria Romania Armenia Serbia and Montenegro	49 47 46 45 42 42 41 37	0 0 0
International average Lithuania Bulgaria Romania Armenia Serbia and Montenegro Iran, Islamic Republic of	49 47 46 45 42 42 41	0 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 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 0
International average Lithuania Bulgaria Romania Armenia Serbia and Montenegro Iran, Islamic Republic of Macedonia, Republic of Jordan Egypt	49 47 46 45 42 41 37 32 30 29 26	0 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	0 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	49 47 46 45 42 41 37 32 30 29 26 25 23	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	49 47 46 45 42 41 37 32 30 29 26 25 23 22	0 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	0 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	0 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 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 22	0 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	0 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 16	0 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 0

Country average vs. International average:

0

▼

Higher Not different Lower

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	A
L NOTEAL REDUDING OF	84 81	A
· ·	81	A
Japan		_
Hong Kong, SAR	79	A
Chinese Taipei	77	
Israel	74	A
Hungary	72	A
Armenia	72	A
Australia	71	A
Sweden	70	
United States	69	
Netherlands	69	
England	68	
Slovak Republic	66	
New Zealand	64	
Norway	64	
Slovenia	64	
Estonia	63	
Belgium (Flemish)	62	
Russian Federation	62	
Scotland	60	
Cyprus	60	
International average	54	
Romania	54	0
Bulgaria	54	0
	ΓO	_
Serbia and Montenegro	52	0
Serbia and Montenegro Egypt	52 52	0
Egypt	52	0
Egypt Latvia	52 52	0
Egypt Latvia Lithuania	52 52 50	0 0
Egypt Latvia Lithuania Palestinian Nat'l Auth.	52 52 50 50	0
Egypt Latvia Lithuania Palestinian Nat'l Auth. Botswana	52 52 50 50 49	0 0 0 •
Egypt Latvia Lithuania Palestinian Nat'l Auth. Botswana Italy	52 52 50 50 49 48	0 0 0 •
Egypt Latvia Lithuania Palestinian Nat'l Auth. Botswana Italy Jordan	52 52 50 50 49 48 48	0 0 0 •
Egypt Latvia Lithuania Palestinian Nat'l Auth. Botswana Italy Jordan Tunisia	52 52 50 50 49 48 48 47	0 0 0 •
Egypt Latvia Lithuania Palestinian Nat'l Auth. Botswana Italy Jordan Tunisia Iran, Islamic Republic of	52 52 50 50 49 48 48 47	0 0 0 •
Egypt Latvia Lithuania Palestinian Nat'l Auth. Botswana Italy Jordan Tunisia Iran, Islamic Republic of Malaysia	52 52 50 50 49 48 48 47 47	0 0 0 •
Egypt Latvia Lithuania Palestinian Nat'l Auth. Botswana Italy Jordan Tunisia Iran, Islamic Republic of Malaysia Bahrain	52 52 50 50 49 48 48 47 47 43 41	○ ○ ○ ▼ ▼ ▼
Egypt Latvia Lithuania Palestinian Nat'l Auth. Botswana Italy Jordan Tunisia Iran, Islamic Republic of Malaysia Bahrain Moldova, Republic of	52 52 50 50 49 48 48 47 47 43 41 40	0 0 0 •
Egypt Latvia Lithuania Palestinian Nat'l Auth. Botswana Italy Jordan Tunisia Iran, Islamic Republic of Malaysia Bahrain Moldova, Republic of Saudi Arabia	52 52 50 50 49 48 48 47 47 43 41 40 39	0 0 0 •
Egypt Latvia Lithuania Palestinian Nat'l Auth. Botswana Italy Jordan Tunisia Iran, Islamic Republic of Malaysia Bahrain Moldova, Republic of Saudi Arabia Chile	52 52 50 50 49 48 48 47 47 43 41 40 39 36	· · · · · · · · · · · · · · · · · · ·
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	52 52 50 50 49 48 48 47 47 43 41 40 39 36 35	· · · · · · · · · · · · · · · · · · ·
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	52 52 50 50 49 48 48 47 47 43 41 40 39 36 35 30	· · · · · · · · · · · · · · · · · · ·
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	52 52 50 50 49 48 48 47 47 43 41 40 39 36 35 30 28	· · · · · · · · · · · · · · · · · · ·
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	52 52 50 50 49 48 48 47 47 43 41 40 39 36 35 30 28 26	· · · · · · · · · · · · · · · · · · ·
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	52 52 50 50 49 48 48 47 47 43 41 40 39 36 35 30 28 26 25	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 $\frac{4}{9}$.

Answer:

Incorrect Response:

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

Answer: $\frac{2}{3}$

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
- B 80
- © 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	
Belgium (Flemish)	66	<u> </u>
United States	66	<u> </u>
Estonia	62	<u> </u>
Moldova, Republic of	55	<u> </u>
Sweden	55	<u> </u>
Singapore	54	
Italy	54	<u> </u>
•	54	
Japan Latvia	54	
	54 54	A
Netherlands		
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	•
Philippines	38	•
Bulgaria	38	•
Iran, Islamic Republic of	37	•
Morocco	37	V
Saudi Arabia	36	_
Romania	35	·
Norway	33	•
Bahrain	32	<u> </u>
Macedonia, Republic of	32	Ť
•		_
Chile	30	_
Armenia	29	-
Ghana	29	▼
	29	▼
Hong Kong, SAR		_
Botswana	28	* * * *
3 3.		▼
Botswana	28	▼

Country average vs. International average:

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?

- $(B) \quad 0.3, \ 0.32, \ 0.332, \ 0.233$
- \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	
Belgium (Flemish)	74	
Hong Kong, SAR	72	
Netherlands	66	
Chinese Taipei	63	
Estonia	62	
Malaysia	62	
Korea, Republic of	59	A
Sweden	59	A
Latvia	58	
Japan	53	
Australia	53	
Slovak Republic	52	
Lithuania	49	A
Russian Federation	49	
Scotland	48	Ο
United States	48	A
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	44 42	0
International average Armenia Lebanon	44 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 Morocco Chile	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 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 38 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 39 38 35 35 35 34 33 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

▼

Higher Not different Lower

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

The number closest to 10

Use the patterns in the previous table to answer the following questions.			
Pat made a shape with a total of 64 tiles. How many were black a how many were red?	and		
Answer: black tiles red ti	les		
Pat made a shape that used 49 black tiles. How many red tiles did Pat use in that shape?			
Answer: red tiles			
Next, Pat made a shape using 44 of the red tiles. How many blac would Pat need to complete the black part of the shape?	k tiles		
Answer: black tiles			

Item Number: M032670

Correct Response:

В

Overall Percent Correct

Netherlands	97	
Sweden	96	
Estonia	96	
Singapore	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	86	
Bulgaria	85	
England	82	
Moldova, Republic of	82	
Israel	81	
Romania	79	O
Macedonia, Republic of	78	Ο
International average	76	
Tunisia	76	0
Morocco	75	O
Indonesia	74	O
Iran, Islamic Republic of	69	\blacksquare
Chile	67	\blacksquare
Lebanon	67	\blacksquare
Armenia	66	\blacksquare
Jordan	55	\blacksquare
Palestinian Nat'l Auth.	50	\blacksquare
Bahrain	49	\blacksquare
Egypt	48	\blacksquare
Philippines	42	\blacksquare
Botswana	40	* * * * * * * * * * * * * * * * * * *
Saudi Arabia	35	\blacksquare
South Africa	30	\blacksquare
Ghana	24	_
Gilalia	24	•

Country average vs. International average:

▲ ○ ▼

Higher Not different Lower

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
- D -9

Item Number: M032612

Correct Response: A

Overall Percent Correct

Japan	74	A
Singapore	70	
Hong Kong, SAR	67	A
Chinese Taipei	66	A
Netherlands	61	A
Belgium (Flemish)	55	A
Korea, Republic of	54	A
Slovak Republic	52	A
Estonia	52	A
Israel	52	A
Romania	49	A
New Zealand	48	A
Russian Federation	46	A
Bulgaria	46	
Australia	45	A
Armenia	44	A
Latvia	42	A
Hungary	42	A
Lebanon	42	A
Malaysia	39	0
Botswana	39	0
Lithuania	38	0
United States	38	0
l+al.	37	0
Italy	57	-
Egypt	37	0
Egypt Slovenia	37 36	
Egypt Slovenia International average	37 36 35	0
Egypt Slovenia International average Serbia and Montenegro	37 36 35 33	0 0
Egypt Slovenia International average Serbia and Montenegro Moldova, Republic of	37 36 35 33 33	0 0
Egypt Slovenia International average Serbia and Montenegro Moldova, Republic of Macedonia, Republic of	37 36 35 33 33 32	0 0 0 0 0
Egypt Slovenia International average Serbia and Montenegro Moldova, Republic of Macedonia, Republic of England	37 36 35 33 33 32 25	0 0 0 0 0
Egypt Slovenia International average Serbia and Montenegro Moldova, Republic of Macedonia, Republic of England Tunisia	37 36 35 33 33 32 25 24	0 0 0 0 0
Egypt Slovenia International average Serbia and Montenegro Moldova, Republic of Macedonia, Republic of England Tunisia Cyprus	37 36 35 33 33 32 25 24 23	0 0 0 0 0
Egypt Slovenia International average Serbia and Montenegro Moldova, Republic of Macedonia, Republic of England Tunisia Cyprus Philippines	37 36 35 33 33 32 25 24 23 21	0 0 0 0 0
Egypt Slovenia International average Serbia and Montenegro Moldova, Republic of Macedonia, Republic of England Tunisia Cyprus Philippines Jordan	37 36 35 33 33 32 25 24 23 21 19	0 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.	37 36 35 33 32 25 24 23 21 19	0 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	37 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	37 36 35 33 32 25 24 23 21 19 19 18	0 0 0 0 V
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	37 36 35 33 32 25 24 23 21 19 19 18 17 15	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	37 36 35 33 32 25 24 23 21 19 19 18 17 15	0 0 0 0 V
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	37 36 35 33 32 25 24 23 21 19 19 18 17 15 12	0 0 0 0 V
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	37 36 35 33 32 25 24 23 21 19 19 18 17 15 12 12	0 0 0 0 V
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	37 36 35 33 32 25 24 23 21 19 19 18 17 15 12 12 10	0 0 0 0 V
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	37 36 35 33 32 25 24 23 21 19 19 18 17 15 12 12 10 10	0 0 0 0 V
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	37 36 35 33 32 25 24 23 21 19 19 18 17 15 12 12 10 10 10 6	0 0 0 0 V
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	37 36 35 33 32 25 24 23 21 19 19 18 17 15 12 12 10 10	0 0 0 0 V
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	37 36 35 33 32 25 24 23 21 19 19 18 17 15 12 12 10 10 10 6	0 0 0 0 V

Country average vs. International average:

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) $3 \times n$
- \bigcirc 3 n
- \bigcirc 3 ÷ n

Item Number: M032643

Correct Response:

C

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	78 74 69 68 67 58 53 51 49 48 48 47 46 46 44 42 41	
Lebanon	41	0
Lithuania	40	0
Malaysia	40	0
International average Moldova, Republic of	40 39	0
Slovenia Egypt Australia Cyprus Italy Iran, Islamic Republic of Philippines Macedonia, Republic of New Zealand Jordan Palestinian Nat'l Auth. Sweden Scotland Indonesia England South Africa Norway Morocco Saudi Arabia Bahrain Tunisia Botswana Chile	38 37 36 34 32 32 32 31 29 28 27 26 25 25 25 22 22 18	

Country average vs. International average:

Higher Not different Lower

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?

- A 4%
- (B) 5%
- (c) 20%
- (D) 25%

Item Number: M022139

Correct Response:

0

Overall Percent Correct

Singapore	70	A
Netherlands	62	
Hong Kong, SAR	61	A
Malaysia	48	A
Sweden	47	A
Australia	46	A
Korea, Republic of	45	A
Scotland	42	A
England	42	A
Hungary	40	A
Chinese Taipei	40	A
New Zealand	40	A
Japan	39	A
Slovak Republic	38	A
Israel	38	A
Slovenia	38	A
Belgium (Flemish)	38	A
Estonia	37	A
Latvia	37	A
United States	35	A
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	31 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	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	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 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 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 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 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 20 20 19 19 19 18 18 18 17 17 17	0

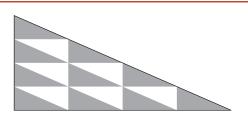
Country average vs. International average:

O ▼

Higher Not different 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?

- A 5:3
- B 8:5
- © 5:8
- (D) 3:5

Item Number: M032447

Correct Response:

Α

Overall Percent Correct

Singapore	87	A
Chinese Taipei	81	
Korea, Republic of	80	
Hong Kong, SAR	74	
Malaysia	72	
Japan	71	
Slovak Republic	56	
Australia	55	
Scotland	54	
Latvia	52	<u> </u>
England	52	_
Hungary	52	A
Netherlands	51	
United States	50	
Lithuania	50	
Slovenia	48	
Serbia and Montenegro	48	
Russian Federation	47	
Indonesia	45	0
Bulgaria	44	O
Belgium (Flemish)	43	O
Estonia	42	0
International average	41	
New Zealand	39	0
Israel	38	0
Cyprus	37	Ο
Romania	37	Ο
Philippines	37	Ο
Moldova, Republic of	37	Ο
Italy	35	
Macedonia, Republic of	35	▼ ▼ ▼
Sweden	31	•
Armenia	28	•
Palestinian Nat'l Auth.	27	▼
Iran, Islamic Republic of	26	•

Country average vs. International average:

26

26

23

21

20

19 17

16

16

16 14

O ▼

Higher Not different Lower

Egypt Saudi Arabia

Norway

Jordan

Bahrain

Botswana South Africa

Morocco

Lebanon

Tunisia

Chile

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

- 50%
- Other incorrect (including crossed out/erased, stray marks, illegible or off task).

Overall Percent Correct

Singapore	64	
Korea, Republic of	44	
Chinese Taipei	41	
Hong Kong, SAR	29	
Hungary	28	
Malaysia	23	A A
Belgium (Flemish)	21	
Sweden	21	
Slovak Republic	19	
Estonia	19	
Netherlands	18	
Lithuania	18	
Japan	16	
England	16	0
Scotland	14	0
United States	14	O
Australia	13	0
Slovenia	13	O
Israel	13	0
New Zealand	12	0
International average	12	
Latvia	9	O
Serbia and Montenegro	9	0
Armenia	8	0
Romania	7	V
Russian Federation	6	V
Russian Federation Italy	6 6	* * *
Russian Federation Italy Bulgaria	6 6 6	* * * *
Russian Federation Italy Bulgaria Cyprus	6 6 6 4	* * * * * * * * * * * * * * * * * * *
Russian Federation Italy Bulgaria Cyprus Norway	6 6 6 4 3	* * * * * * * * * * * * * * * * * * *
Russian Federation Italy Bulgaria Cyprus Norway Chile	6 6 6 4 3	* * * * * * * * * * * * * * * * * * *
Russian Federation Italy Bulgaria Cyprus Norway Chile Indonesia	6 6 6 4 3 3	* * * * * * * * * * * * * * * * * * *
Russian Federation Italy Bulgaria Cyprus Norway Chile Indonesia Lebanon	6 6 6 4 3 3 3	* * * * * * * * * * * * * * * * * * *
Russian Federation Italy Bulgaria Cyprus Norway Chile Indonesia Lebanon Philippines	6 6 6 4 3 3 3 3	* * * * * * * * * * * * * * * * * * *
Russian Federation Italy Bulgaria Cyprus Norway Chile Indonesia Lebanon Philippines South Africa	6 6 6 4 3 3 3 3 2 2	* * * * * * * * * * * * * * * * * * *
Russian Federation Italy Bulgaria Cyprus Norway Chile Indonesia Lebanon Philippines South Africa Iran, Islamic Republic of	6 6 6 4 3 3 3 2 2	* * * * * * * * * * * * * * * * * * *
Russian Federation Italy Bulgaria Cyprus Norway Chile Indonesia Lebanon Philippines South Africa Iran, Islamic Republic of Jordan	6 6 6 4 3 3 3 3 2 2 2	* * * * * * * * * * * * * * * * * * *
Russian Federation Italy Bulgaria Cyprus Norway Chile Indonesia Lebanon Philippines South Africa Iran, Islamic Republic of Jordan Palestinian Nat'l Auth.	6 6 6 4 3 3 3 3 2 2 2 2	* * * * * * * * * * * * * * * * * * *
Russian Federation Italy Bulgaria Cyprus Norway Chile Indonesia Lebanon Philippines South Africa Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Egypt	6 6 6 4 3 3 3 2 2 2 2 2 2	* * * * * * * * * * * * * * * * * * *
Russian Federation Italy Bulgaria Cyprus Norway Chile Indonesia Lebanon Philippines South Africa Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Egypt Morocco	6 6 6 4 3 3 3 2 2 2 2 2 2	* * * * * * * * * * * * * * * * * * *
Russian Federation Italy Bulgaria Cyprus Norway Chile Indonesia Lebanon Philippines South Africa Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Egypt Morocco Botswana	6 6 6 4 3 3 3 2 2 2 2 2 2 1	* * * * * * * * * * * * * * * * * * *
Russian Federation Italy Bulgaria Cyprus Norway Chile Indonesia Lebanon Philippines South Africa Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Egypt Morocco Botswana Tunisia	6 6 6 4 3 3 3 2 2 2 2 2 2 1 1	* * * * * * * * * * * * * * * * * * *
Russian Federation Italy Bulgaria Cyprus Norway Chile Indonesia Lebanon Philippines South Africa Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Egypt Morocco Botswana Tunisia Moldova, Republic of	6 6 6 4 3 3 3 2 2 2 2 2 2 1 1	* * * * * * * * * * * * * * * * * * *
Russian Federation Italy Bulgaria Cyprus Norway Chile Indonesia Lebanon Philippines South Africa Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Egypt Morocco Botswana Tunisia Moldova, Republic of Macedonia, Republic of	6 6 6 4 3 3 3 2 2 2 2 2 2 1 1 1	* * * * * * * * * * * * * * * * * * *
Russian Federation Italy Bulgaria Cyprus Norway Chile Indonesia Lebanon Philippines South Africa Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Egypt Morocco Botswana Tunisia Moldova, Republic of Macedonia, Republic of Bahrain	6 6 6 4 3 3 3 2 2 2 2 2 2 1 1 1 1	* * * * * * * * * * * * * * * * * * *
Russian Federation Italy Bulgaria Cyprus Norway Chile Indonesia Lebanon Philippines South Africa Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Egypt Morocco Botswana Tunisia Moldova, Republic of Macedonia, Republic of	6 6 6 4 3 3 3 2 2 2 2 2 2 1 1 1	* * * * * * * * * * * * * * * * * * *
Russian Federation Italy Bulgaria Cyprus Norway Chile Indonesia Lebanon Philippines South Africa Iran, Islamic Republic of Jordan Palestinian Nat'l Auth. Egypt Morocco Botswana Tunisia Moldova, Republic of Macedonia, Republic of Bahrain	6 6 6 4 3 3 3 2 2 2 2 2 2 1 1 1 1	<pre></pre>

Country average vs. International average:

Higher	
Not different	C
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.

40.60% = 24 40.60% = 24 50 members 24 girls 26 boys 24/50

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.

Answer: UPS 96 24 150 2

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.

Answer: 50%

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?

- A 9
- B 11
- © 13
- (D) 16

Item Number: M012004

Correct Response:

D

Overall Percent Correct

Singapore	75	
Belgium (Flemish)	69	
Japan	68	
Chinese Taipei	66	
Netherlands	66	
Sweden	62	
Hong Kong, SAR	61	
Slovak Republic	59	
Latvia	55	
Lithuania	55	<u> </u>
Russian Federation	54	<u> </u>
Israel	53	_
Australia	52	0
Norway	52	▲
Estonia	51	
Korea, Republic of	51	
Iran, Islamic Republic of	48	0
United States		0
	48	
Ghana	47	0
International average	47	
Serbia and Montenegro	47	0
South Africa	47	O
Cyprus	46	O
Lebanon	46	O
New Zealand	46	O
Slovenia	46	O
England	45	O
Scotland	45	0
Hungary	43	•
Malaysia	43	0
Palestinian Nat'l Auth.	43	\blacksquare
Armenia	42	\blacksquare
Philippines	42	\blacksquare
Tunisia	42	\blacksquare
Jordan	41	\blacksquare
Egypt	40	\blacksquare
Moldova, Republic of	40	* * * * * * * * * * * * * * * * * * *
Botswana	39	\blacksquare
Romania	37	•
Bulgaria	36	•
Macedonia, Republic of	36	•
Italy	35	•
Saudi Arabia	35	V
Indonesia	34	_
Morocco	33	*
Chile	32	*
CITIC		¥
		•
Bahrain	29	•

Country average vs. International average:

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?

- \bigcirc 640 zeds
- \bigcirc 900 zeds
- © 960 zeds
- ① 1,000 zeds

Item Number: M032228

Correct Response:

0

Overall Percent Correct

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

Country average vs. International average:

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	
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 Serbia and Montenegro	47 45	0
		0
Serbia and Montenegro	45	
Serbia and Montenegro Italy	45 44	0
Serbia and Montenegro Italy Norway	45 44 44	0
Serbia and Montenegro Italy Norway Moldova, Republic of	45 44 44 44	0 0
Serbia and Montenegro Italy Norway Moldova, Republic of Cyprus	45 44 44 44 44	0 0 0
Serbia and Montenegro Italy Norway Moldova, Republic of Cyprus Bulgaria	45 44 44 44 44 43	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 0 0
Serbia and Montenegro Italy Norway Moldova, Republic of Cyprus Bulgaria New Zealand Armenia	45 44 44 44 43 42 41	0 0 0 0 0 0 0 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	45 44 44 44 43 42 41 40	0 0 0 0 0 0 0 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	45 44 44 44 43 42 41 40 38	0 0 0 0 0 0 0 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	45 44 44 44 43 42 41 40 38 34	0 0 0 0 0 0 0 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	45 44 44 44 43 42 41 40 38 34 31	0 0 0 0 0 0 0 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	45 44 44 44 43 42 41 40 38 34 31	0 0 0 0 0 0 0 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.	45 44 44 44 43 42 41 40 38 34 31 31	0 0 0 0 0 0 0 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	45 44 44 44 43 42 41 40 38 34 31 31 31	0 0 0 0 0 0 0 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	45 44 44 44 43 42 41 40 38 34 31 31 31 30 29	0 0 0 0 0 0 0 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	0 0 0 0 0 0 0 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	45 44 44 44 43 42 41 40 38 34 31 31 31 30 29 27 27	
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	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 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 31 30 29 27 27 23 23	

Country average vs. International average:

Higher Not different Lower

Ghana

17

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?

- (A) 5,000
- (B) 10,000
- (c) 15,000
- D 20,000

Item Number: M032727

Correct Response:

D

Overall Percent Correct

Singapore	85	lack
Hong Kong, SAR	73	<u> </u>
Korea, Republic of	71	<u> </u>
Chinese Taipei	68	<u> </u>
Sweden	67	\blacktriangle
Hungary	67	A
Estonia	67	<u> </u>
Netherlands	66	A
Slovak Republic	65	A
Belgium (Flemish)	63	A
Japan	60	A
Malaysia	57	lack
England	55	A
Australia	55	\blacktriangle
Romania	53	lack
Israel	52	A
Russian Federation	52	A
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	45 42	0
International average Cyprus Chile	45 42 41	0
International average Cyprus Chile Moldova, Republic of	45 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 32	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:

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%
- (c) 0.3%
- (D) 0.12%

Item Number: M032570

Correct Response:

Λ

Overall Percent Correct

Singapore	96	A
Hong Kong, SAR	90	
Belgium (Flemish)	87	
Malaysia	84	
Netherlands	79	
Chinese Taipei	77	
Korea, Republic of	76	
England	71	
United States	70	
Botswana	70	
New Zealand	67	
Australia	67	
Latvia	65	
Cyprus	64	
Scotland	63	
Israel	63	
Slovenia	61	
Sweden	61	
Japan	60	
Lithuania	59	0
Estonia	57	0
Slovak Republic	56	0
Hungary	55	0
International average	55	
Russian Federation	52	0

international average	22	
Russian Federation	52	0
Indonesia	51	0
Bulgaria	50	0
Norway	50	▼
Romania	49	•
Italy	47	•
Serbia and Montenegro	45	▼
Egypt	44	▼
Armenia	42	▼
Macedonia, Republic of	42	▼
Philippines	42	▼
Moldova, Republic of	42	▼
Ghana	41	•
Iran, Islamic Republic of	39	▼
Palestinian Nat'l Auth.	39	▼
Jordan	39	▼
Chile	39	▼
Bahrain	36	•
Lebanon	34	•
South Africa	33	▼
Tunisia	30	•
Morocco	29	▼
Saudi Arabia	25	•

Country average vs. International average:

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
- D 120 + 80

Item Number: M032609

Correct Response:

D

Overall Percent Correct

Hong Kong, SAR	88	A
Latvia	88	A
Hungary	85	
Russian Federation	84	A
United States	82	
Slovak Republic	82	
Estonia	81	
Slovenia	81	
Lebanon	80	
Belgium (Flemish)	80	A
Korea, Republic of	80	A
Malaysia	80	
Chinese Taipei	80	
Romania	80	
Singapore	80	
Serbia and Montenegro	79	A
Italy	79	A
Lithuania	77	
Cyprus	74	A
Australia	73	A
Netherlands	69	A
Macedonia, Republic of	68	A
Bulgaria	67	A
Indonesia	65	0
England	64	0
England Armenia	64 64	0
Armenia Israel	64 63	- 1
Armenia Israel International average	64 63 61	0
Armenia Israel International average Scotland	64 63 61 59	0 0
Armenia Israel International average Scotland New Zealand	64 63 61 59 56	0 0
Armenia Israel International average Scotland New Zealand Tunisia	64 63 61 59 56 53	0 0
Armenia Israel International average Scotland New Zealand Tunisia Japan	64 63 61 59 56 53 50	0 0 0
Armenia Israel International average Scotland New Zealand Tunisia Japan Jordan	64 63 61 59 56 53 50 49	0 0 0
Armenia Israel International average Scotland New Zealand Tunisia Japan Jordan Palestinian Nat'l Auth.	64 63 61 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 61 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 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
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
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

Country average vs. International average:

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) 372×998
- \bigcirc 740 × 998
- $\bigcirc \hspace{0.3cm} 370 \times 998 \times 2$

Item Number: M032690

Correct Response:

Α

Overall Percent Correct

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

Country average vs. International average:

18

17

Indonesia

Iran, Islamic Republic of

Jordan

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

Arrangements of 4-digit whole numbers

9 1 5

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?

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

Item Number: M012028

Correct Response:

Overall Percent Correct

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

Country average vs. International average:

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?

(A) 8,400

B 35,000

© 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	A
Hungary	66	
Japan	66	
Sweden	63	
New Zealand	62	
Estonia	62	
England	61	
Slovenia	60	
Slovak Republic	59	
United States	58	
Malaysia	58	A
Russian Federation	58	
Scotland	58	
Norway	58	
Lithuania	57	
Latvia	57	
Bulgaria	56	
Israel	54	
Italy	53	
Italy Serbia and Montenegro	53 50	0
•		
Serbia and Montenegro	50	
Serbia and Montenegro International average	50 49	0 0
Serbia and Montenegro International average Romania	50 49 47	0 0 0 0
Serbia and Montenegro International average Romania Cyprus	50 49 47 47	0 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 Morocco Bahrain	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 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 Egypt	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 Jordan	50 49 47 47 44 42 39 38 37 36 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 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

Country average vs. International average:

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	A
Singapore	57	
Hong Kong, SAR	53	
Belgium (Flemish)	46	
Japan	44	
Chinese Taipei	44	
Korea, Republic of	43	A
United States	36	
Hungary	35	A
Slovak Republic	33	
Scotland	32	
Estonia	32	
Sweden	30	
New Zealand	29	
Russian Federation	29	
Lithuania	29	
Australia	28	A
England	27	0
Slovenia	24	0
Latvia	22	0
International average	21	
Italy	21	0
Distancia	20	0
Bulgaria	20	U
Israel	20	0
•		
Israel	20	0
Israel Norway	20 20	0
Israel Norway Cyprus Romania	20 20 18	0
lsrael Norway Cyprus	20 20 18 14	0
Israel Norway Cyprus Romania Serbia and Montenegro	20 20 18 14 13	0
Israel Norway Cyprus Romania Serbia and Montenegro Macedonia, Republic of	20 20 18 14 13	0
Israel Norway Cyprus Romania Serbia and Montenegro Macedonia, Republic of Moldova, Republic of	20 20 18 14 13 11	0
Israel Norway Cyprus Romania Serbia and Montenegro Macedonia, Republic of Moldova, Republic of Malaysia	20 20 18 14 13 11 10 8	0
Israel Norway Cyprus Romania Serbia and Montenegro Macedonia, Republic of Moldova, Republic of Malaysia Chile	20 20 18 14 13 11 10 8	0
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	0
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	0
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 3 3	0
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	0
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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 8 4 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	20 20 18 14 13 11 10 8 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 Iran, Islamic Republic of Bahrain	20 20 18 14 13 11 10 8 8 8 4 4 3 3 3 3	O O
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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.	20 20 18 14 13 11 10 8 8 4 4 3 3 3 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 Iran, Islamic Republic of Bahrain Egypt Palestinian Nat'l Auth. Morocco	20 20 18 14 13 11 10 8 8 8 4 4 3 3 3 3 3 3 2	0
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

Country average vs. International average:

Higher	
Not different	C
Lower	•

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 parks of 900

X 2 1 1 0

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

Country average vs. International average:

Higher
Not different
Lower

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: 400

Incorrect Response:

A garden has $\frac{1}{4}$ 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: 40

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