

TRENDS IN INTERNATIONAL MATHEMATICS AND SCIENCE STUDY

TIMSS



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International Study Center
Lynch School of Education, Boston College



TIMSS 2011 User Guide
for the International Database

Released Items

Mathematics – Eighth Grade

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TIMSS 2011 User Guide for the International Database

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Item ID	Subject	Grade	Block	Block Seq	Content Domain	Cognitive Domain	Maximum Points	Key
M032166	M	8	M01	1	Number	Knowing	1	B
M032721	M	8	M01	2	Data and Chance	Reasoning	1	B
M032757	M	8	M01	3	Algebra	Reasoning	2	See scoring guide
M032760A	M	8	M01	4	Algebra	Reasoning	2	See scoring guide
M032760B	M	8	M01	4	Algebra	Reasoning	1	See scoring guide
M032760C	M	8	M01	4	Algebra	Reasoning	1	See scoring guide
M032761	M	8	M01	5	Algebra	Reasoning	2	See scoring guide
M032692	M	8	M01	6	Geometry	Reasoning	2	See scoring guide
M032626	M	8	M01	7	Number	Knowing	1	D
M032595	M	8	M01	8	Number	Applying	1	C
M032673	M	8	M01	9	Algebra	Knowing	1	C
M052216	M	8	M02	1	Number	Knowing	1	B
M052231	M	8	M02	2	Number	Knowing	1	See scoring guide
M052061	M	8	M02	3	Number	Applying	1	See scoring guide
M052228	M	8	M02	4	Number	Applying	1	D
M052214	M	8	M02	5	Number	Knowing	1	D
M052173	M	8	M02	6	Algebra	Applying	1	A
M052302	M	8	M02	7	Algebra	Knowing	1	A
M052002	M	8	M02	8	Algebra	Applying	2	See scoring guide
M052362	M	8	M02	9	Geometry	Reasoning	1	See scoring guide
M052408	M	8	M02	10	Geometry	Reasoning	1	See scoring guide
M052084	M	8	M02	11	Geometry	Applying	1	A
M052206	M	8	M02	12	Geometry	Reasoning	1	See scoring guide
M052429	M	8	M02	13	Data and Chance	Reasoning	1	A
M052503A	M	8	M02	14	Data and Chance	Reasoning	1	See scoring guide
M052503B	M	8	M02	14	Data and Chance	Reasoning	1	See scoring guide
M042032	M	8	M03	1	Number	Knowing	1	B
M042031	M	8	M03	2	Number	Applying	1	A
M042186	M	8	M03	3	Number	Reasoning	1	See scoring guide
M042059	M	8	M03	4	Number	Knowing	2	See scoring guide
M042236	M	8	M03	5	Algebra	Knowing	1	C
M042226	M	8	M03	6	Algebra	Knowing	1	See scoring guide
M042103	M	8	M03	7	Algebra	Knowing	1	See scoring guide
M042086	M	8	M03	8	Algebra	Applying	1	See scoring guide
M042228	M	8	M03	9	Algebra	Reasoning	1	See scoring guide
M042245	M	8	M03	10	Algebra	Applying	1	D
M042270	M	8	M03	11	Geometry	Applying	1	See scoring guide
M042201	M	8	M03	12	Geometry	Applying	1	See scoring guide
M042152	M	8	M03	13	Geometry	Knowing	1	D
M042269	M	8	M03	14	Data and Chance	Reasoning	1	C
M042179	M	8	M03	15	Data and Chance	Applying	1	D
M042177	M	8	M03	16	Data and Chance	Applying	1	C
M042207	M	8	M03	17	Data and Chance	Applying	2	See scoring guide
M032094	M	8	M05	1	Number	Knowing	1	A
M032662	M	8	M05	2	Number	Reasoning	1	D
M032064	M	8	M05	3	Number	Applying	1	See scoring guide

Item ID	Subject	Grade	Block	Block Seq	Content Domain	Cognitive Domain	Maximum Points	Key
M032419	M	8	M05	4	Algebra	Knowing	1	C
M032477	M	8	M05	5	Algebra	Knowing	1	A
M032538	M	8	M05	6	Algebra	Knowing	1	See scoring guide
M032324	M	8	M05	7	Geometry	Reasoning	1	D
M032116	M	8	M05	8	Geometry	Applying	1	B
M032100	M	8	M05	9	Geometry	Applying	1	D
M032402	M	8	M05	10	Geometry	Reasoning	1	A
M032734	M	8	M05	11	Geometry	Knowing	1	See scoring guide
M032397	M	8	M05	12	Geometry	Knowing	1	B
M032695	M	8	M05	13	Data and Chance	Applying	2	See scoring guide
M032132	M	8	M05	14	Data and Chance	Knowing	1	D
M042041	M	8	M06	1	Number	Applying	1	C
M042024	M	8	M06	2	Number	Knowing	1	B
M042016	M	8	M06	3	Number	Applying	1	A
M042002	M	8	M06	4	Number	Reasoning	1	See scoring guide
M042198A	M	8	M06	5	Algebra	Knowing	1	See scoring guide
M042198B	M	8	M06	5	Algebra	Reasoning	1	See scoring guide
M042198C	M	8	M06	5	Algebra	Reasoning	1	See scoring guide
M042077	M	8	M06	6	Algebra	Knowing	1	C
M042235	M	8	M06	7	Algebra	Knowing	1	D
M042067	M	8	M06	8	Algebra	Applying	1	B
M042150	M	8	M06	9	Geometry	Knowing	1	B
M042300A	M	8	M06	10	Geometry	Applying	1	See scoring guide
M042300B	M	8	M06	10	Geometry	Applying	1	See scoring guide
M042300Z	M	8	M06	10	Geometry	Applying	2	Derived*
M042260	M	8	M06	11	Data and Chance	Knowing	1	B
M042169A	M	8	M06	12	Data and Chance	Knowing	1	See scoring guide
M042169B	M	8	M06	12	Data and Chance	Knowing	1	See scoring guide
M042169C	M	8	M06	12	Data and Chance	Applying	1	See scoring guide
M032352	M	8	M07	1	Algebra	Applying	1	C
M032725	M	8	M07	2	Number	Knowing	1	See scoring guide
M032683	M	8	M07	3	Algebra	Knowing	2	See scoring guide
M032738	M	8	M07	4	Algebra	Knowing	1	D
M032295	M	8	M07	5	Algebra	Knowing	1	A
M032331	M	8	M07	6	Geometry	Applying	1	B
M032623	M	8	M07	7	Geometry	Applying	1	D
M032679	M	8	M07	8	Geometry	Knowing	1	A
M032047	M	8	M07	9	Algebra	Applying	1	B
M032398	M	8	M07	10	Geometry	Reasoning	1	B
M032507	M	8	M07	11	Data and Chance	Applying	1	C
M032424	M	8	M07	12	Algebra	Reasoning	1	C
M032681A	M	8	M07	13	Data and Chance	Knowing	1	See scoring guide
M032681B	M	8	M07	13	Data and Chance	Applying	1	See scoring guide
M032681C	M	8	M07	13	Data and Chance	Applying	1	See scoring guide

* For details about how score points were awarded for each derived item, please see "Reviewing the TIMSS and PIRLS 2011 Achievement Item Statistics" in Methods and Procedures in TIMSS and PIRLS 2011: <http://timssandpirls.bc.edu/methods/t-achievement-scales.html>

Which of these is the BEST estimate of $\frac{7.21 \times 3.86}{10.09}$?

(A) $\frac{7 \times 3}{10}$

(B) $\frac{7 \times 4}{10}$

(C) $\frac{7 \times 3}{11}$

(D) $\frac{7 \times 4}{11}$

M032166

Content Domain

Number

Topic Area

Fractions and Decimals

Cognitive Domain

Knowing

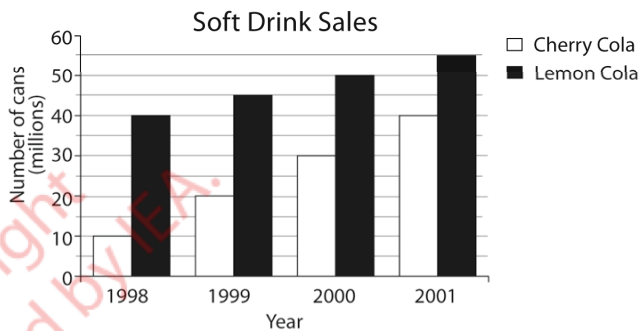
Maximum Points

1

Key

B

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The graph shows the sales of two types of soft drink over 4 years. If the sales trends continue for the next 10 years, determine the year in which the sales of Cherry Cola will be the same as the sales of Lemon Cola.

- (A) 2003
- (B) 2004
- (C) 2005
- (D) 2006

Content Domain

Data and Chance

Topic Area

Data Interpretation

Cognitive Domain

Reasoning

Maximum Points

1

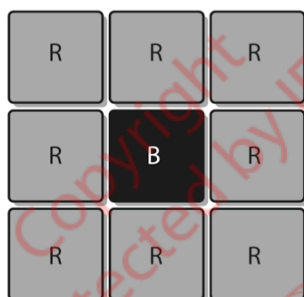
Key

B

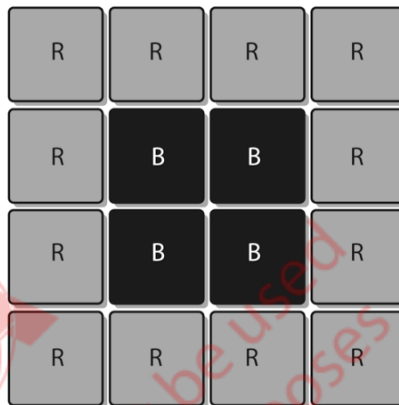
SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.

Pat has red tiles and black tiles. Pat uses the tiles to make square shapes.

The 3×3 shape has 1 black tile and 8 red tiles.



The 4×4 shape has 4 black tiles and 12 red tiles.



The table below shows the number of tiles for the first three shapes Pat made. Pat continued making shapes using this pattern. Complete the table for the 6×6 and 7×7 shapes.

Shape	Number of Black Tiles	Number of Red Tiles	Total Number of Tiles
3×3	1	8	9
4×4	4	12	16
5×5	9	16	25
6×6	16		
7×7	25		

Questions for Red and Black Tiles continue. ➡

Content Domain

Algebra

Topic Area

Patterns

Cognitive Domain

Reasoning

Maximum Points

2

Key

See scoring guide

Note: Consider correctness of rows before considering columns since code 10 takes precedence over code 70.

Code	Response	Item: M032757
	Correct Response	
20	Both rows completely correct Shape 6×6 : 20, 36 Shape 7×7 : 24, 49	
	Partially Correct Response	
10	Entries for one row correct but not both	
	Incorrect Response	
70	Entries for one column correct but not both Red Tiles: 20, 24 OR Total Tiles: 36, 49	
79	Other incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

Use the patterns in the previous table to answer the following questions.

- A. Pat made a shape with a **total** of 64 tiles, how many were black and how many were red?

Answer: _____ black tiles _____ red tiles

- B. Pat made a shape that used 49 **black** tiles.
How many **red** tiles did Pat use in that shape?

Answer: _____ red tiles

- C. Next, Pat made a shape using 44 of the **red** tiles. How many black tiles would Pat need to complete the black part of the shape?

Answer: _____ black tiles

Content Domain

Algebra

Topic Area

Patterns

Cognitive Domain

Reasoning

Maximum Points

2

Key

See scoring guide

M032760

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Code	Response	Item: M032760A
	Correct Response	
20	36 black and 28 red	
	Partially Correct Response	
10	36 black, red incorrect	
11	28 red, black incorrect	
	Incorrect Response	
79	Incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

Use the patterns in the previous table to answer the following questions.

- A. Pat made a shape with a **total** of 64 tiles, how many were black and how many were red?

Answer: _____ black tiles _____ red tiles

- B. Pat made a shape that used 49 **black** tiles.
How many **red** tiles did Pat use in that shape?

Answer: _____ red tiles

- C. Next, Pat made a shape using 44 of the **red** tiles. How many black tiles would Pat need to complete the black part of the shape?

Answer: _____ black tiles

Content Domain

Algebra

Topic Area

Patterns

Cognitive Domain

Reasoning

Maximum Points

1

Key

See scoring guide

M032760

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
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Code	Response	Item: M032760B
	Correct Response	
10	32	
	Incorrect Response	
79	Incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

Use the patterns in the previous table to answer the following questions.

- A. Pat made a shape with a **total** of 64 tiles, how many were black and how many were red?

Answer: _____ black tiles _____ red tiles

- B. Pat made a shape that used 49 **black** tiles.
How many **red** tiles did Pat use in that shape?

Answer: _____ red tiles

- C. Next, Pat made a shape using 44 of the **red** tiles. How many black tiles would Pat need to complete the black part of the shape?

Answer: _____ black tiles

Content Domain

Algebra

Topic Area

Patterns

Cognitive Domain

Reasoning

Maximum Points

1

Key

See scoring guide

M032760

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Code	Response	Item: M032760C
	Correct Response	
10	100	
	Incorrect Response	
79	Incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

Pat wanted to add a line to the table showing how to find the number of tiles needed to make a square of any size. Use the patterns in the table on the opposite page to help you complete the line for shape $n \times n$ in the table below.

Shape	Number of Black Tiles	Number of Red Tiles	Total Number of Tiles
$n \times n$	$(n - 2)^2$		

End of Red and Black Tiles section.

Content Domain

Algebra

Topic Area

Algebraic Expressions

Cognitive Domain

Reasoning

Maximum Points

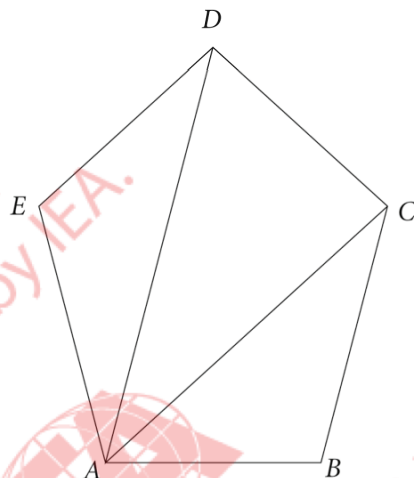
2

Key

See scoring guide

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Code	Response	Item: M032761
	Correct Response	
20	Both expressions correct in simplified form Red tiles: $4(n - 1)$; $4n - 4$; or correct verbal expression Total tiles: n^2 ; $n \times n$; or correct verbal expression, such as “square the number” or “multiply by itself”	
21	Both expressions correct with expression for red tiles in the form of total number of tiles minus number of black tiles e.g., $n^2 - (n - 2)^2$ or equivalent.	
	Partially Correct Response	
10	Expression for red tiles correct as in 20 but not expression for total tiles	
11	Expression for total tiles correct as in 20 but not expression for red tiles	
	Incorrect Response	
70	Incorrect expression including n for red tiles or total or both (includes incorrect attempts to express red tiles as difference from total tiles)	
79	Other incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	



What is the sum of all the interior angles of pentagon $ABCDE$?
Show your work.

Answer: _____

Content Domain

Geometry

Topic Area

Geometric Shapes

Cognitive Domain

Reasoning

Maximum Points

2

Key

See scoring guide

M032692

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Note: Units not required provided correct units implied by the work shown

Code	Response	Item: M032692
	Correct Response	
20	540 degrees with work shown Examples: $3 \text{ (triangles)} \times 180^\circ = 540^\circ$ $6 \text{ (right angles)} \times 90^\circ = 540^\circ$	
	Partially Correct Response	
10	540 degrees with no work shown	
	Incorrect Response	
79	Incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

Which of these shows how 36 can be expressed as a product of prime factors?

- (A) 6×6
- (B) 4×9
- (C) $4 \times 3 \times 3$
- (D) $2 \times 2 \times 3 \times 3$

M032626

Content Domain

Number

Topic Area

Whole Numbers

Cognitive Domain

Knowing

Maximum Points

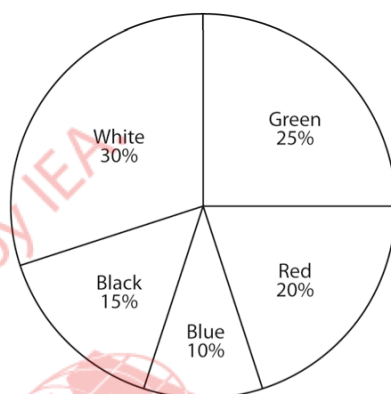
1

Key

D

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Color of Caps



The pie chart shows the percentage of caps for sale at a sporting goods store. If there are 200 caps, what is the total number of caps that are either white or green?

- (A) 55
- (B) 100
- (C) 110
- (D) 145

Content Domain

Number

Topic Area

Ratio, Proportion and Percent

Cognitive Domain

Applying

Maximum Points

1

Key

C

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If t is a number between 6 and 9, then $t + 5$ is between what two numbers?

- (A) 1 and 4
- (B) 10 and 13
- (C) 11 and 14
- (D) 30 and 45

M032673

Content Domain

Algebra

Topic Area

Algebraic Expressions

Cognitive Domain

Knowing

Maximum Points

1

Key

C

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
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Which number is equal to $\frac{3}{5}$?

- (A) 0.8
- (B) 0.6
- (C) 0.53
- (D) 0.35

Content Domain

Number

Topic Area

Fractions and Decimals

Cognitive Domain

Knowing

Maximum Points

1

Key

B

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
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$$42.65 + 5.748 =$$

Answer: _____

M052231

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Content Domain

Number

Topic Area

Fractions and Decimals

Cognitive Domain

Knowing

Maximum Points

1

Key

See scoring guide

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Code	Response	Item: M052231
	Correct Response	
10	48.398	
	Incorrect Response	
70	10013 with decimal point inserted anywhere or without decimal	
79	Other incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

Kim is packing eggs into boxes.

Each box holds 6 eggs.

She has 94 eggs.

What is the smallest number of boxes she needs to pack all the eggs?

Answer: _____ boxes

Content Domain

Number

Topic Area

Whole Numbers

Cognitive Domain

Applying

Maximum Points

1

Key

See scoring guide

M052061



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Code	Response	Item: M052061
	Correct Response	
10	16	
	Incorrect Response	
70	15 OR 15.6 OR 15.67 OR 15.7 OR $15\frac{2}{3}$	
79	Other incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

Which shows a correct method for finding $\frac{1}{3} - \frac{1}{4}$?

(A) $\frac{1-1}{4-3}$

(B) $\frac{1}{4-3}$

(C) $\frac{3-4}{3 \times 4}$

(D) $\frac{4-3}{3 \times 4}$

Content Domain

Number

Topic Area

Fractions and Decimals

Cognitive Domain

Applying

Maximum Points

1

Key

D

M052228

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Which of these number sentences is true?

(A) $\frac{3}{10}$ of 50 = 50% of 3

(B) 3% of 50 = 6% of 100

(C) $50 \div 30 = 30 \div 50$

(D) $\frac{3}{10} \times 50 = \frac{5}{10} \times 30$

Content Domain

Number

Topic Area

Fractions and Decimals

Cognitive Domain

Knowing

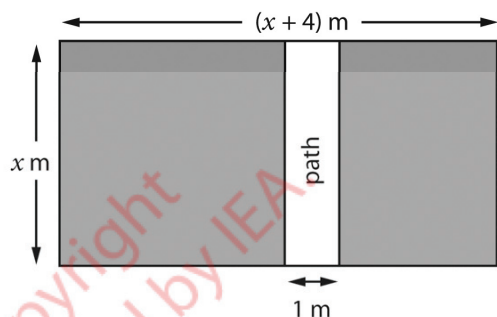
Maximum Points

1

Key

D

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This is a diagram of a rectangular garden.

The white area is a rectangular path that is 1 meter wide.

Which expression shows the area of the shaded portion of the garden in m^2 ?

- (A) $x^2 + 3x$
- (B) $x^2 + 4x$
- (C) $x^2 + 4x - 1$
- (D) $x^2 + 3x - 1$

Content Domain

Algebra

Topic Area

Algebraic Expressions

Cognitive Domain

Applying

Maximum Points

1

Key

A

$$y = \frac{a+b}{c}$$

$a = 8$, $b = 6$, and $c = 2$

What is the value of y ?

- (A) 7
(B) 10
(C) 11
(D) 14

Content Domain

Algebra

Topic Area

Equations/ Formulas and Functions

Cognitive Domain

Knowing

Maximum Points

1

Key

A

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
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A piece of wood was 40 cm long.

It was cut into 3 pieces.

The lengths in cm are

$$2x - 5$$

$$x + 7$$

$$x + 6$$

What is the length of the longest piece?

Answer: _____ cm

Show your work. If you use a calculator, you still must describe all the steps you used to obtain your answer.

Content Domain

Algebra

Topic Area

Equations/ Formulas and Functions

Cognitive Domain

Applying

Maximum Points

2

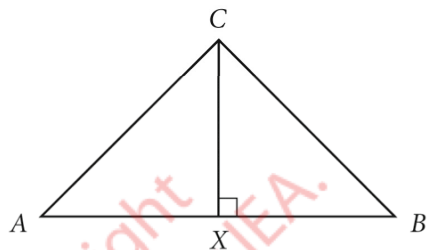
Key

See scoring guide

M052002

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Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.

Code	Response	Item: M052002
	Correct Response	
20	15, with $4x + 8 = 40$ or equivalent algebraic reasoning shown	
	Partially Correct Response	
10	8, with correct working shown or indication of $x = 8$ with correct working	
11	$x + 7$, with correct working shown or indication of $x = 8$	
12	15, with numerical (i.e., non-algebraic) reasoning shown	
	Incorrect Response	
70	15 or $x + 7$ with no/incorrect work shown	
79	Other incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	



In this triangle:

$$AC = BC$$

AB is twice as long as CX .

What is the size of angle B ?

Answer: _____ °

Content Domain

Geometry

Topic Area

Geometric Shapes

Cognitive Domain

Reasoning

Maximum Points

1

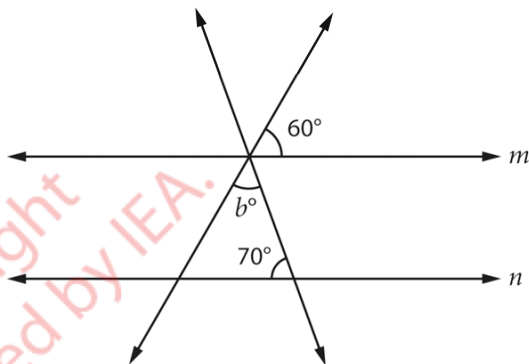
Key

See scoring guide

M052362

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Code	Response	Item: M052362
	Correct Response	
10	45	
	Incorrect Response	
79	Incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	



Lines m and n are parallel.

What is the value of b ?

Answer: _____

Content Domain

Geometry

Topic Area

Geometric Shapes

Cognitive Domain

Reasoning

Maximum Points

1

Key

See scoring guide

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.

Code	Response	Item: M052408
	Correct Response	
10	50	
	Incorrect Response	
79	Incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

The perimeter of a square is 36 cm.

What is the area of this square?

- (A) 81 cm^2
- (B) 36 cm^2
- (C) 24 cm^2
- (D) 18 cm^2

Content Domain

Geometry

Topic Area

Geometric Measurement

Cognitive Domain

Applying

Maximum Points

1

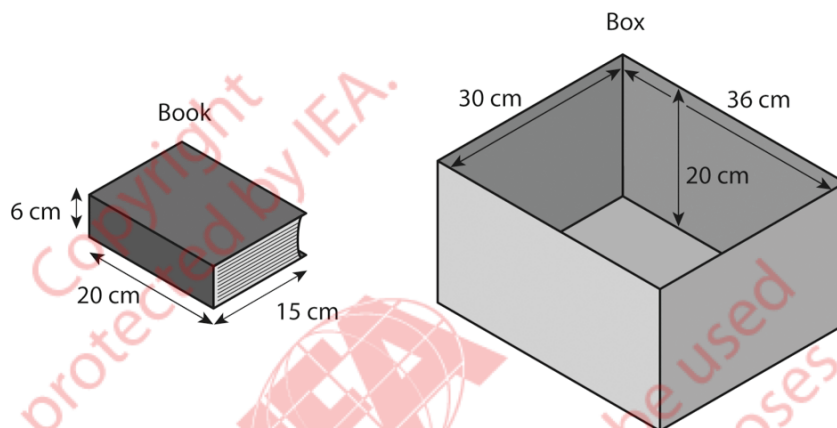
Key

A

M052084

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.

Ryan is packing books into a rectangular box.
All the books are the same size.



What is the largest number of books that will fit inside the box?

Answer: _____

Content Domain

Geometry

Topic Area

Geometric Measurement

Cognitive Domain

Reasoning

Maximum Points

1

Key

See scoring guide

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.

Code	Response	Item: M052206
	Correct Response	
10	12	
	Incorrect Response	
79	Incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

There are 10 marbles in a bag: 5 red, and 5 blue.

Sue draws a marble from the bag at random. The marble is red.

She puts the marble back into the bag.

What is the probability that the next marble she draws at random is red?

- (A) $\frac{1}{2}$
- (B) $\frac{4}{10}$
- (C) $\frac{1}{5}$
- (D) $\frac{1}{10}$

**Content Domain**

Data and Chance

Topic Area

Chance

Cognitive Domain

Reasoning

Maximum Points

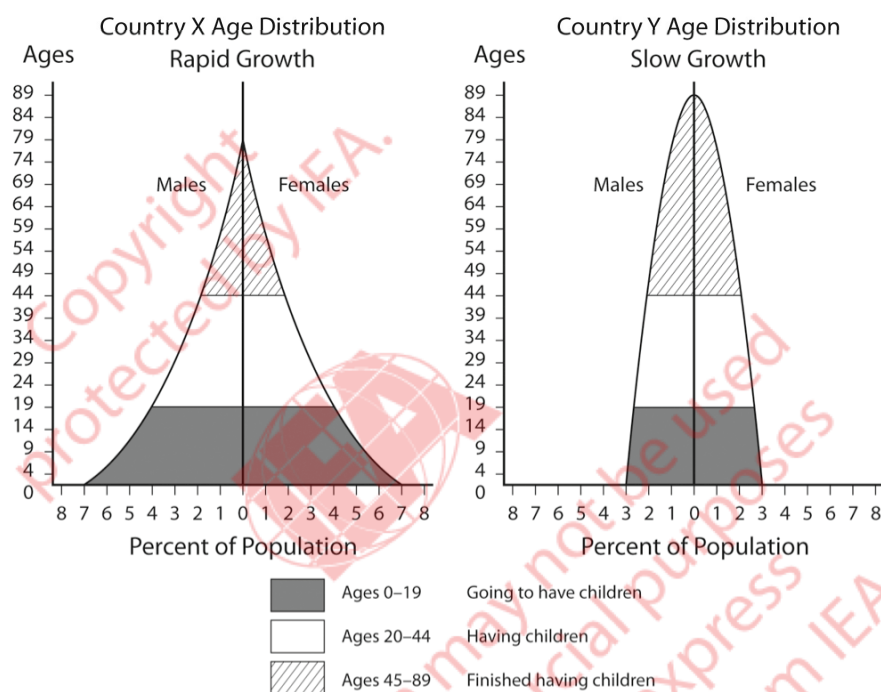
1

Key

A

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
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Comparison of Age Structure Between Country X and Country Y



The graphs for Country X and Country Y show the age structure of each country's population. The population is divided into three age groups from youngest to oldest. The graphs enable predictions about population growth.

- A. Why could the age structure of Country X lead to more rapid population growth than the age structure of Country Y?
- B. Why could Country Y expect to have a bigger problem taking care of its elderly population than Country X?

Content Domain

Data and Chance

Topic Area

Data Interpretation

Cognitive Domain

Reasoning

Maximum Points

1

Key

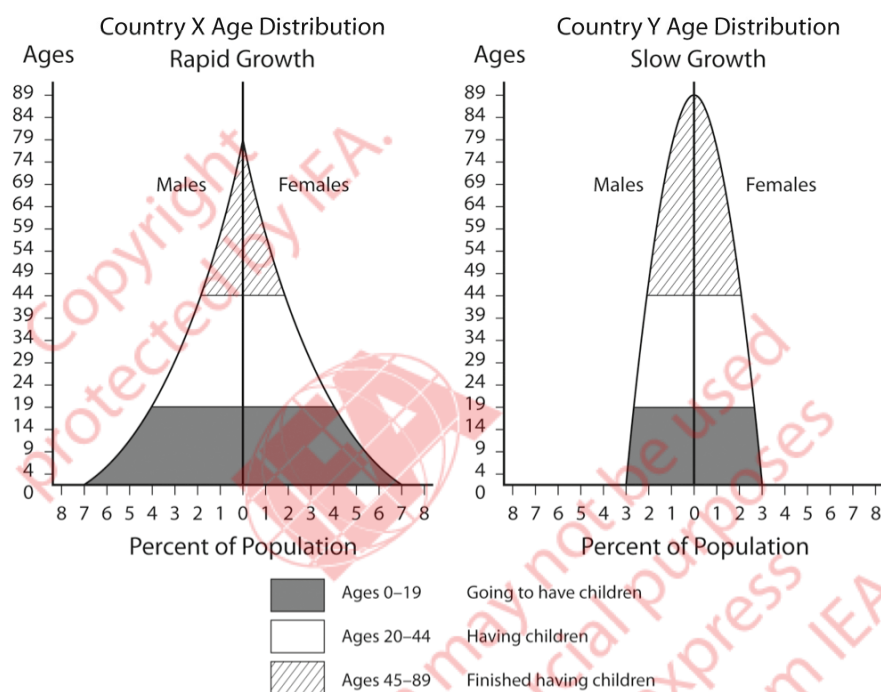
See scoring guide

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.

Code	Response	Item: M052503A
	Correct Response	
10	Within Country X there is a larger percentage of people in the “having children” or “going to have children” categories than in Country Y. Note: The reference to country X needs to be clear. The comparison with Country Y does not need to be stated. Also, accept “more people” as “proportionately more” and “young or younger” in place of “having children” or “going to have children” Examples: <i>Country X has more people about to have children or having children than country Y</i> <i>There are more people going to have children in country X</i> <i>More young people in country X</i> <i>There is more having children than in country Y</i>	
	Incorrect Response	
79	Incorrect (including crossed out, erased, stray marks, illegible, or off task) Examples: <i>There are more “going to have children”</i> <i>Country X has more population compared to country Y</i>	
	Nonresponse	
99	Blank	

c

Comparison of Age Structure Between Country X and Country Y



The graphs for Country X and Country Y show the age structure of each country's population. The population is divided into three age groups from youngest to oldest. The graphs enable predictions about population growth.

- A. Why could the age structure of Country X lead to more rapid population growth than the age structure of Country Y?
- B. Why could Country Y expect to have a bigger problem taking care of its elderly population than Country X?

Content Domain

Data and Chance

Topic Area

Data Interpretation

Cognitive Domain

Reasoning

Maximum Points

1

Key

See scoring guide

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.

Code	Response	Item: M052503B
	Correct Response	
10	Within Country Y, there is a relatively larger population of elderly people (“finished having children”) compared with younger populations. Note: The comparison between older and younger people must be made or implied. Country X and Country Y do not have to be mentioned. Examples: <i>More older people than younger people</i> <i>Too many elderly and very little young people</i> <i>Not enough young people to take care of the elderly</i> <i>Less number of people “having children” to keep up the population</i> <i>Aging population, less youngsters, lesser workforce</i>	
	Incorrect Response	
79	Incorrect (including crossed out, erased, stray marks, illegible, or off task) Examples: <i>There are many more elders in Y than X</i> <i>Country Y has a wider range of not having children than country X</i>	
	Nonresponse	
99	Blank	

Which fraction is equivalent to 0.125?

- (A) $\frac{125}{100}$
- (B) $\frac{125}{1,000}$
- (C) $\frac{125}{10,000}$
- (D) $\frac{125}{100,000}$

Content Domain

Number

Topic Area

Fractions and Decimals

Cognitive Domain

Knowing

Maximum Points

1

Key

B

M042032

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.

The fractions $\frac{4}{14}$ and $\frac{\square}{21}$ are equivalent.

What is the value of $\square$?

- (A) 6
- (B) 7
- (C) 11
- (D) 14

Content Domain

Number

Topic Area

Fractions and Decimals

Cognitive Domain

Applying

Maximum Points

1

Key

A

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.

Here is a pattern:

$$3 - 3 = 0$$

$$3 - 2 = 1$$

$$3 - 1 = 2$$

$$3 - 0 = 3$$

What will the next line in the pattern be?

Answer:

**Content Domain**

Number

Topic Area

Integers

Cognitive Domain

Reasoning

Maximum Points

1

Key

See scoring guide

M042186

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.

Code	Response	Item: M042186
	Correct Response	
10	$3 - (-1) = 4$ or $3 + 1 = 4$	
	Incorrect Response	
79	Incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

Peter, James, and Andrew each had 20 tries at throwing balls into a basket.
Complete the missing boxes below.

Name	Number of Successful Shots	Percentage of Successful Shots
Peter	10 out of 20	50 %
James	15 out of 20	
Andrew	out of 20	80%

Content Domain

Number

Topic Area

Ratio, Proportion and Percent

Cognitive Domain

Knowing

Maximum Points

2

Key

See scoring guide

M042059

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.

Code	Response	Item: M042059
	Correct Response	
20	75% and 16, both correct	
	Partially Correct Response	
10	Only 75% correct	
11	Only 16 correct	
	Incorrect Response	
79	Incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

Which of these is equal to $3p^2 + 2p + 2p^2 + p$?

- (A) $8p$
- (B) $8p^2$
- (C) $5p^2 + 3p$
- (D) $7p^2 + p$

Content Domain

Algebra

Topic Area

Algebraic Expressions

Cognitive Domain

Knowing

Maximum Points

1

Key

C

M042236

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M042226

 $k = 7$ and $l = 10$.What is the value of P when $P = \frac{3kl}{5}$?

Answer: _____

Content Domain

Algebra

Topic AreaEquations/ Formulas and
Functions**Cognitive Domain**

Knowing

Maximum Points

1

Key

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Code	Response	Item: M042226
	Correct Response	
10	42	
	Incorrect Response	
79	Incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

Solve this inequality.

$$9x - 6 < 4x + 4$$

Answer: _____

Content Domain

Algebra

Topic Area

Equations/ Formulas and
Functions

Cognitive Domain

Knowing

Maximum Points

1

Key

See scoring guide

M042103

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Code	Response	Item: M042103
	Correct Response	
10	$x < 2$ or $2 > x$ Note: $5x < 10$ is coded as 79.	
	Incorrect Response	
70	$x = 2$	
71	$x > 2$ or $2 < x$	
79	Other incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

M042086

$$a + b = 25.$$

What is the value of $2a + 2b + 4$?

Answer: _____

Content Domain

Algebra

Topic Area

Equations/ Formulas and Functions

Cognitive Domain

Applying

Maximum Points

1

Key

See scoring guide

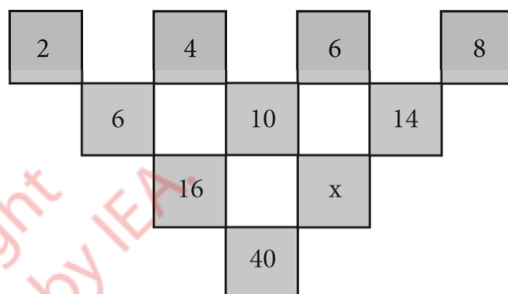
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Code	Response	Item: M042086
	Correct Response	
10	54	
	Incorrect Response	
70	104	
79	Other incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	



What is the value of x in this pattern?

Answer: _____

Content Domain

Algebra

Topic Area

Patterns

Cognitive Domain

Reasoning

Maximum Points

1

Key

See scoring guide

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Code	Response	Item: M042228
	Correct Response	
10	24	
	Incorrect Response	
70	22	
79	Other incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

(0, -1), (1, 3)

Which equation is satisfied by BOTH of these pairs of numbers (x, y) ?

- (A) $x + y = -1$
- (B) $2x + y = 5$
- (C) $3x - y = 0$
- (D) $4x - y = 1$

Content Domain

Algebra

Topic Area

Equations/ Formulas and Functions

Cognitive Domain

Applying

Maximum Points

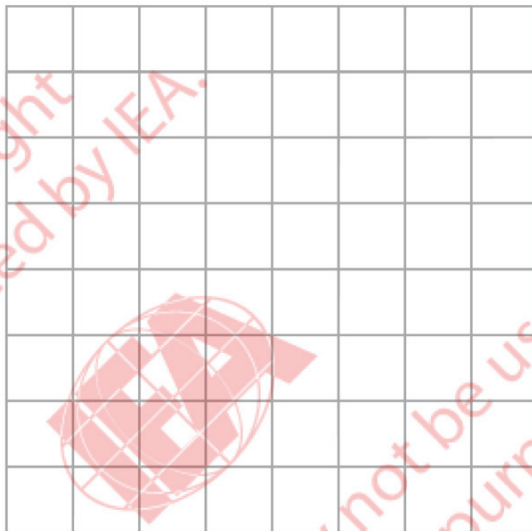
1

Key

D

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.

The length of side of each of the small squares represents 1 cm. Draw an isosceles triangle with a base of 4 cm and a height of 5 cm.



M042270

Content Domain

Geometry

Topic Area

Geometric Shapes

Cognitive Domain

Applying

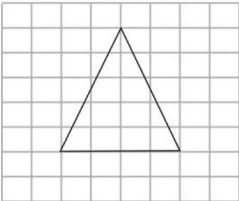
Maximum Points

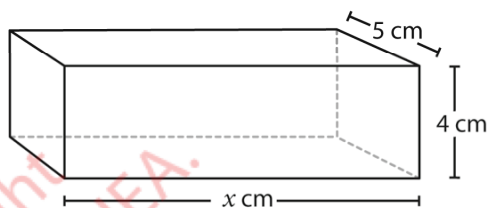
1

Key

See scoring guide

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
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Code	Response	Item: M042270
	Correct Response	
10	Correct triangle drawn (any orientation) 	
	Incorrect Response	
79	Incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	



The volume of the rectangular box is 200 cm^3 . What is the value of x ?

Answer: _____

Content Domain

Geometry

Topic Area

Geometric Measurement

Cognitive Domain

Applying

Maximum Points

1

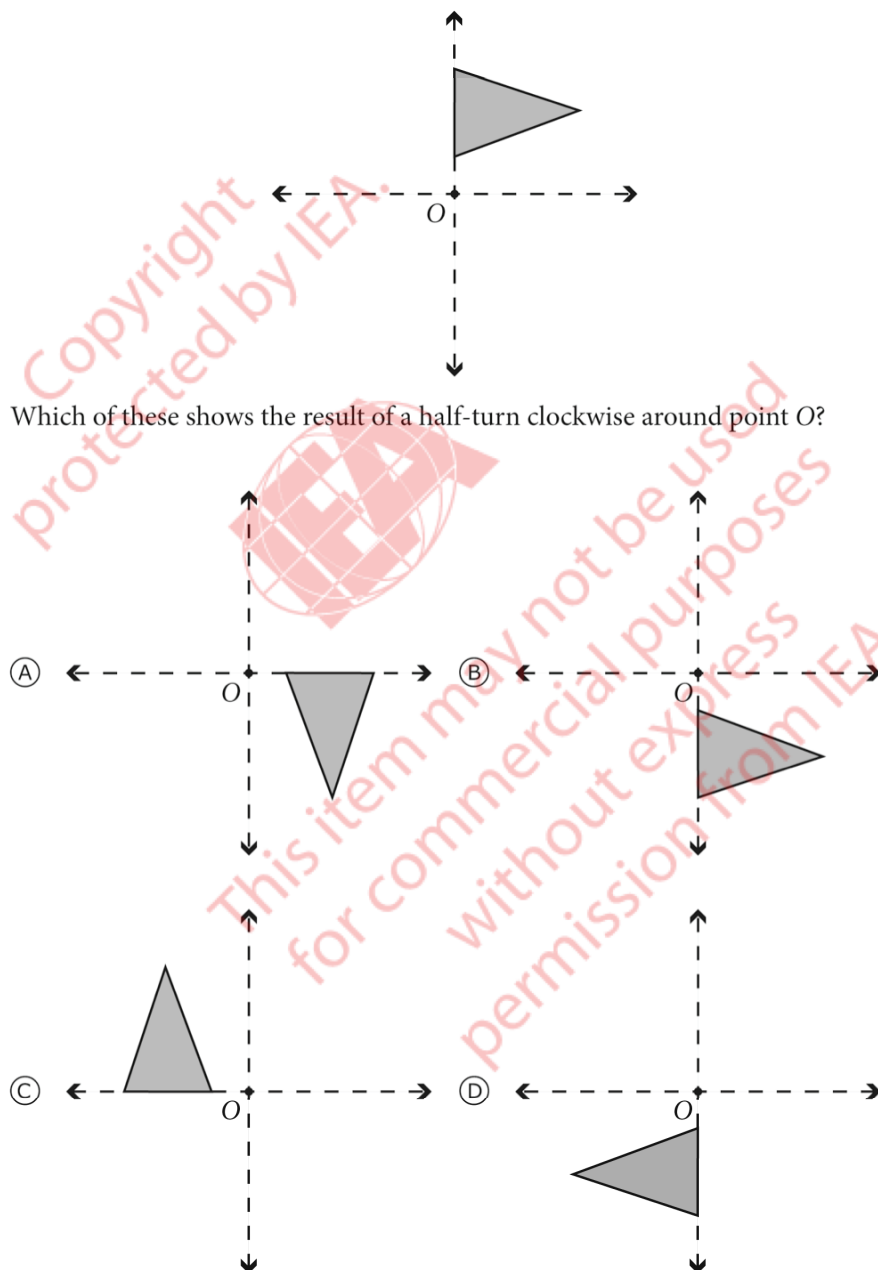
Key

See scoring guide

M042201

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Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.

Code	Response	Item: M042201
	Correct Response	
10	10	
	Incorrect Response	
79	Incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

**Content Domain**

Geometry

Topic Area

Location and Movement

Cognitive Domain

Knowing

Maximum Points

1

Key

D

The results of a long jump competition were reported as follows:

Average Length

Team A 3.6 m

Team B 4.8 m

There were the same number of students in each team.

Which statement about the competition MUST be true?

- (A) Each student in team B jumped farther than any student in team A.
- (B) After every student in team A jumped, there was a student in team B who jumped farther.
- (C) As a group, team B jumped farther than team A.
- (D) Some students in team A jumped farther than some students in team B.

Content Domain

Data and Chance

Topic Area

Data Interpretation

Cognitive Domain

Reasoning

Maximum Points

1

Key

C

M042269

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.

There are 10 red, 8 blue, and 4 white buttons in a bag. What is the chance of taking out either a blue button or a white button?

- (A) $\frac{4}{22}$
- (B) $\frac{8}{22}$
- (C) $\frac{10}{22}$
- (D) $\frac{12}{22}$

Content Domain

Data and Chance

Topic Area

Chance

Cognitive Domain

Applying

Maximum Points

1

Key

D

M042179

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.

Over recent weeks, a shop's average sales of bottles of soda have been 50% in the regular size, 40% in the small size, and 10% in the large size. Next week, the shopkeeper will order 1200 bottles of soda. How many of these bottles should he order in the regular size?

- (A) 120
- (B) 480
- (C) 600
- (D) 720

Content Domain

Data and Chance

Topic Area

Chance

Cognitive Domain

Applying

Maximum Points

1

Key

C

M042177

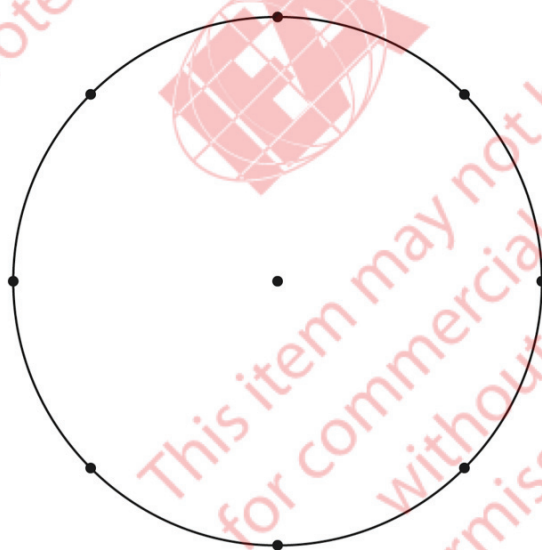
SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.

480 students were asked to name their favorite sport. The results are shown in this table.

Sport	Number of Students
Hockey	60
Football	180
Tennis	120
Basketball	120

Use the information in the table to complete and label this pie chart.

Popularity of Sports



Content Domain

Data and Chance

Topic Area

Data Organization and Representation

Cognitive Domain

Applying

Maximum Points

2

Key

See scoring guide

M042207

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.

Code	Response	Item: M042207
	Correct Response	
20	Hockey $\frac{1}{8}$, Football $\frac{3}{8}$, Tennis, Basketball both $\frac{1}{4}$, and labels all correct	
	Partially Correct Response	
10	All sectors correct size but labeling incomplete or missing	
	Incorrect Response	
79	Incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

$$\frac{4}{100} + \frac{3}{1000} =$$

- (A) 0.043
(B) 0.1043
(C) 0.403
(D) 0.43

M032094

Content Domain

Number

Topic Area

Fractions and Decimals

Cognitive Domain

Knowing

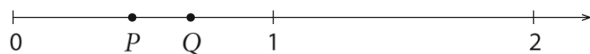
Maximum Points

1

Key

A

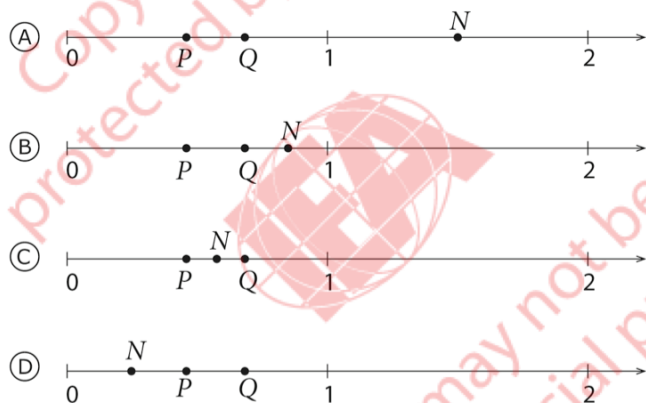
SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
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P and Q represent two fractions on the number line above.

$$P \times Q = N.$$

Which of these shows the location of N on the number line?



Content Domain

Number

Topic Area

Fractions and Decimals

Cognitive Domain

Reasoning

Maximum Points

1

Key

D

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
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Ann and Jenny divide 560 zeds between them. If Jenny gets $\frac{3}{8}$ of the money, how many zeds will Ann get?

Answer: _____

Content Domain

Number

Topic Area

Fractions and Decimals

Cognitive Domain

Applying

Maximum Points

1

Key

See scoring guide

M032064

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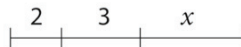
Code	Response	Item: M032064
	Correct Response	
10	350	
	Incorrect Response	
70	210	
71	$\frac{5}{8}$	
79	Other incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

Which of these could represent the expression $2x + 3x$?

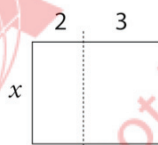
- (A) The length of this segment:



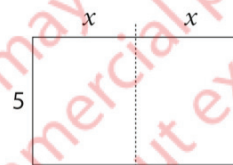
- (B) The length of this segment:



- (C) The area of this figure:



- (D) The area of this figure:



Content Domain

Algebra

Topic Area

Algebraic Expressions

Cognitive Domain

Knowing

Maximum Points

1

Key

C

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
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The taxi company has a basic charge of 25 zeds and a charge of 0.2 zeds for each kilometer the taxi is driven. Which of these represents the cost in zeds to hire a taxi for a trip of n kilometers?

- (A) $25 + 0.2n$
(B) $25 \times 0.2n$
(C) $0.2 \times (25 + n)$
(D) $0.2 \times 25 + n$

Content Domain

Algebra

Topic Area

Algebraic Expressions

Cognitive Domain

Knowing

Maximum Points

1

Key

A

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
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Use the formula $y = 100 - \frac{100}{1+t}$ to find the value of y when $t = 9$.

Answer: _____

Content Domain

Algebra

Topic AreaEquations/ Formulas and
Functions**Cognitive Domain**

Knowing

Maximum Points

1

Key

See scoring guide

M032538

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Note: 100 – 10 is coded as 79

Code	Response	Item: M032538
	Correct Response	
10	90	
	Incorrect Response	
70	10	
79	Other incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

Points A , B , and C lie on a line and B is between A and C . If $AB = 10$ cm and $BC = 5.2$ cm, what is the distance between the midpoints of AB and BC ?

- (A) 2.4 cm
- (B) 2.6 cm
- (C) 5.0 cm
- (D) 7.6 cm

Content Domain

Geometry

Topic Area

Geometric Shapes

Cognitive Domain

Reasoning

Maximum Points

1

Key

D

M032324

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.

The area of a square is 144 cm^2 . What is the perimeter of the square?

- (A) 12 cm
- (B) 48 cm
- (C) 288 cm
- (D) 576 cm

M032116

Content Domain

Geometry

Topic Area

Geometric Measurement

Cognitive Domain

Applying

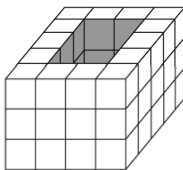
Maximum Points

1

Key

B

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Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.



The figure above shows a shape made up of cubes that are all the same size. There is a hole all the way through the shape. How many cubes would be needed to fill the hole?

- (A) 6
- (B) 12
- (C) 15
- (D) 18

Content Domain

Geometry

Topic Area

Geometric Measurement

Cognitive Domain

Applying

Maximum Points

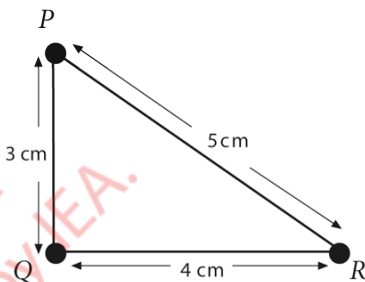
1

Key

D

M032100

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Which of these is the reason that triangle PQR is a right angle triangle?

- (A) $3^2 + 4^2 = 5^2$
- (B) $5 < 3 + 4$
- (C) $3 + 4 = 12 - 5$
- (D) $3 > 5 - 4$

Content Domain

Geometry

Topic Area

Geometric Shapes

Cognitive Domain

Reasoning

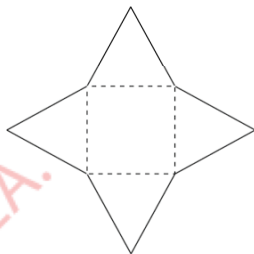
Maximum Points

1

Key

A

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.



The shape shown above is cut out of cardboard. The triangle flaps are then folded up along the dotted lines until they touch the edges of the flaps next to them.

Complete the diagram below to show what the shape would look like when viewed from directly above.

**Content Domain**

Geometry

Topic Area

Geometric Shapes

Cognitive Domain

Knowing

Maximum Points

1

Key

See scoring guide

M032734

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.

Code	Response	Item: M032734
	Correct Response	
10	Correct figure (square with diagonals meeting in center)	
	Incorrect Response	
79	Incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

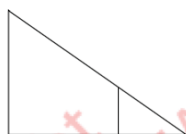


Figure 1

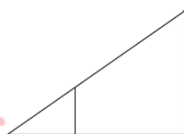


Figure 2

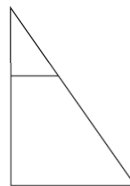


Figure 3

Which of these transformations, taken in order, can be used so that Figure 1 above becomes Figure 2 and then Figure 3?

- (A) reflection and then translation
- (B) reflection and then $\frac{1}{4}$ turn rotation clockwise
- (C) $\frac{1}{2}$ turn rotation and then translation
- (D) $\frac{1}{4}$ turn rotation counterclockwise and then reflection

Content Domain

Geometry

Topic Area

Location and Movement

Cognitive Domain

Knowing

Maximum Points

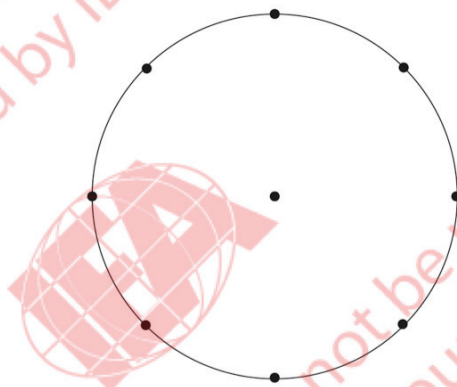
1

Key

B

Of the 400 students in a school, 50 plan to go to university, 100 to a polytechnic, 150 to a business college, and the remainder plan to enter the workforce.

Use the circle below to make a pie chart showing the proportions of students planning to do each of these. Put labels on your chart.

**Content Domain**

Data and Chance

Topic Area

Data Organization and Representation

Cognitive Domain

Applying

Maximum Points

2

Key

See scoring guide

M032695

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.

Code	Response	Item: M032695
	Correct Response	
20	Pie chart correctly divided and labeled (1 section – university; 2 sections – polytechnic; 2 sections – workforce; 3 sections – business college)	
	Partially Correct Response	
10	Four sections with at least two, but not all, of correct size and correctly labeled	
11	Four sections of correct size but no labels, or labels 50, 100, 150, 100	
	Incorrect Response	
70	Four sections with one or none of correct size	
79	Other incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

A machine has 100 candies and dispenses a candy when a lever is turned. The machine has the same number of blue, pink, yellow, and green candies all mixed together. Megan turned the lever and obtained a pink candy. Peter turned the lever next.

How likely is it that Peter will get a pink candy?

- (A) It is certain that his candy will be pink.
- (B) It is more likely than it was for Megan.
- (C) It is exactly as likely as it was for Megan.
- (D) It is less likely than it was for Megan.

Content Domain

Data and Chance

Topic Area

Chance

Cognitive Domain

Knowing

Maximum Points

1

Key

D

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.

A workman cut off $\frac{1}{5}$ of a pipe. The piece he cut off was 3 meters long.

How many meters long was the original pipe?

- (A) 8 m
- (B) 12 m
- (C) 15 m
- (D) 18 m

Content Domain

Number

Topic Area

Fractions and Decimals

Cognitive Domain

Applying

Maximum Points

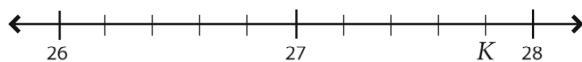
1

Key

C

M042041

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.



Which number does K represent on this number line?

- (A) 27.4
- (B) 27.8
- (C) 27.9
- (D) 28.2

Content Domain

Number

Topic Area

Fractions and Decimals

Cognitive Domain

Knowing

Maximum Points

1

Key

B

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.

Look at this table:

4^1	4^2	4^3	4^4	4^5	4^6
4	16	64	256	1024	4096

Use the table to express the value of 256×4096 as a power of 4.

- (A) 4^{10}
 (B) 4^{16}
 (C) 4^{20}
 (D) 4^{24}

Content Domain

Number

Topic Area

Whole Numbers

Cognitive Domain

Applying

Maximum Points

1

Key

A

M042016

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
 Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.

Place the four digits 3, 5, 7, and 9 into the boxes below in the positions that would give the greatest result when the two numbers are multiplied.

$$\begin{array}{r} \square \square \\ \times \square \square \\ \hline \end{array}$$
Content Domain

Number

Topic Area

Whole Numbers

Cognitive Domain

Reasoning

Maximum Points

1

Key

See scoring guide

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.

Code	Response	Item: M042002
	Correct Response	
10	93 × 75 or 75 × 93	
	Incorrect Response	
70	95 × 73 or 73 × 95	
71	97 × 53 or 53 × 97	
79	Other incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

$$\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \frac{5}{6}$$

A. What is the next term in this pattern?

Answer: _____

B. What would term number 100 be?

Answer: _____

C. What would term number n be?

Answer: _____

Content Domain

Algebra

Topic Area

Patterns

Cognitive Domain

Knowing

Maximum Points

1

Key

See scoring guide

M042198

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.

Code	Response	Item: M042198A
	Correct Response	
10	$\frac{6}{7}$	
	Incorrect Response	
79	Incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

$$\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \frac{5}{6}$$

A. What is the next term in this pattern?

Answer: _____

B. What would term number 100 be?

Answer: _____

C. What would term number n be?

Answer: _____

Content Domain

Algebra

Topic Area

Patterns

Cognitive Domain

Reasoning

Maximum Points

1

Key

See scoring guide

M042198

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.

Code	Response	Item: M042198B
	Correct Response	
10	$\begin{array}{r} 100 \\ 101 \end{array}$	
	Incorrect Response	
70	$\begin{array}{r} 99 \\ 100 \end{array}$	
79	Other incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

$$\frac{1}{2}, \frac{2}{3}, \frac{3}{4}, \frac{4}{5}, \frac{5}{6}$$

A. What is the next term in this pattern?

Answer: _____

B. What would term number 100 be?

Answer: _____

C. What would term number n be?

Answer: _____

Content Domain

Algebra

Topic Area

Patterns

Cognitive Domain

Reasoning

Maximum Points

1

Key

See scoring guide

M042198

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.

Code	Response	Item: M042198C
	Correct Response	
10	$\frac{n}{n+1}$	
	Incorrect Response	
70	$\frac{n-1}{n}$	
79	Other incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

Which expression is equivalent to $4(3 + x)$?

- (A) $12 + x$
- (B) $7 + x$
- (C) $12 + 4x$
- (D) $12x$

Content Domain

Algebra

Topic Area

Algebraic Expressions

Cognitive Domain

Knowing

Maximum Points

1

Key

C

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.

$$x + y = 12 \text{ and } 2x + 5y = 36.$$

What are the values of x and y ?

- (A) $x = 2, y = 10$
- (B) $x = 4, y = 8$
- (C) $x = 6, y = 6$
- (D) $x = 8, y = 4$

Content Domain

Algebra

Topic Area

Equations/ Formulas and Functions

Cognitive Domain

Knowing

Maximum Points

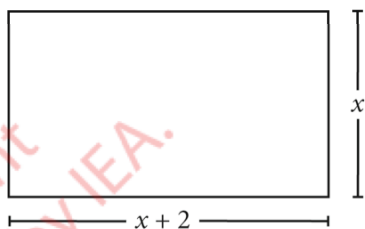
1

Key

D

M042235

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.



What is the area of this rectangle?

- (A) $x^2 + 2$
- (B) $x^2 + 2x$
- (C) $2x + 2$
- (D) $4x + 4$

Content Domain

Algebra

Topic Area

Algebraic Expressions

Cognitive Domain

Applying

Maximum Points

1

Key

B

M042067

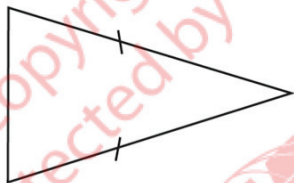
SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.

Which shape has a line of symmetry?

(A)



(B)



(C)



(D)

**Content Domain**

Geometry

Topic Area

Geometric Shapes

Cognitive Domain

Knowing

Maximum Points

1

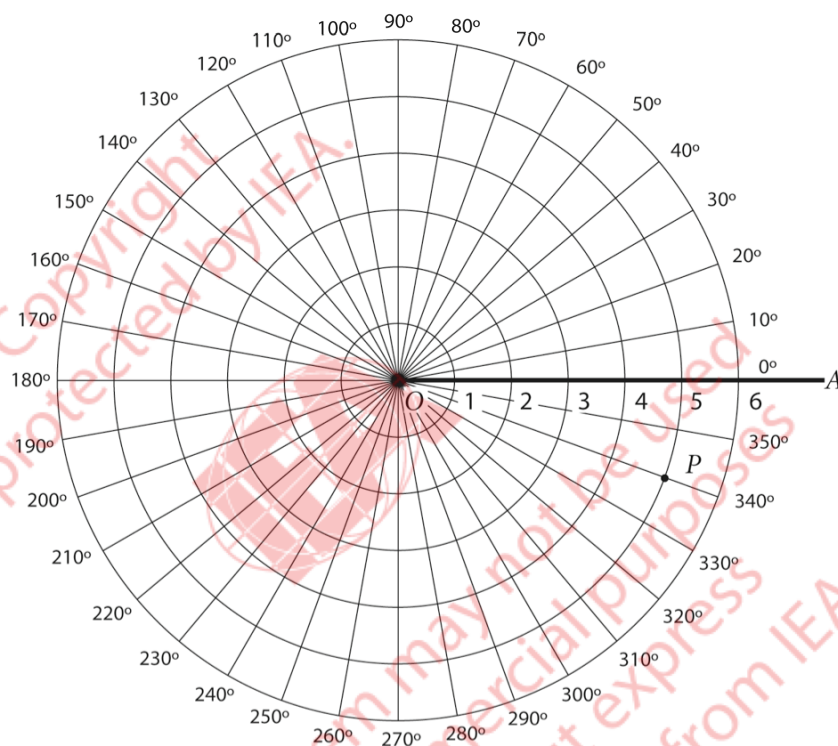
Key

B

M042150

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.

The diagram shows a system for locating points



In this system, the position of a point P is described by its distance from origin, O , and the amount of counterclockwise turn from a baseline OA to OP . Thus, the coordinates of P are $(5, 340^\circ)$.

A. Mark the points $B(3, 30^\circ)$ and $C(4, 120^\circ)$ on the graph above.

B. Draw the angle BOC . What is the measure of angle BOC ?

Angle $BOC = \underline{\hspace{2cm}}^\circ$

Content Domain

Geometry

Topic Area

Location and Movement

Cognitive Domain

Applying

Maximum Points

2

Key

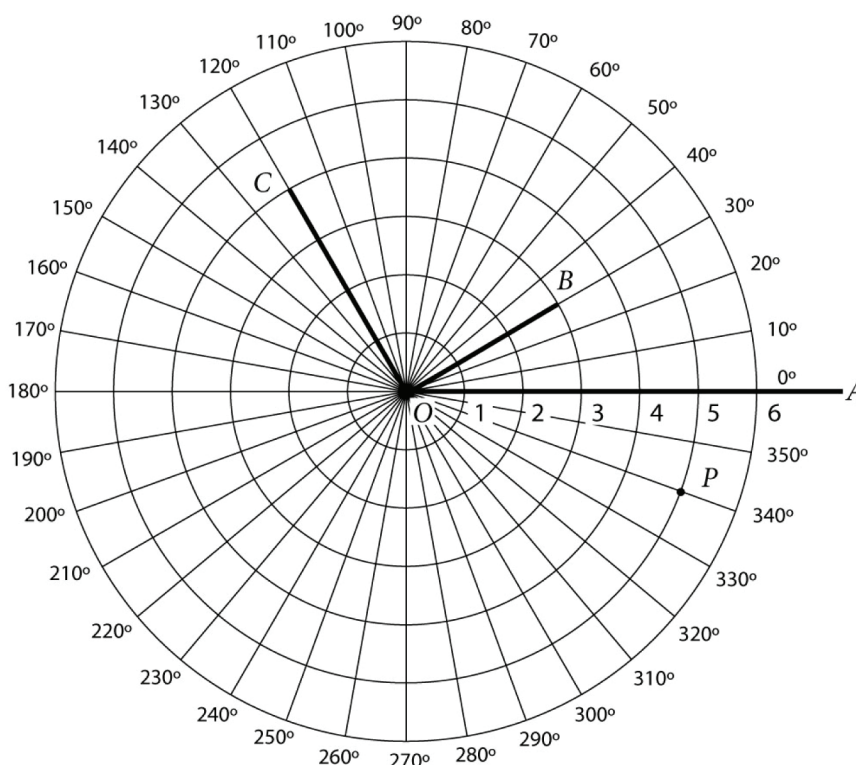
See scoring guide

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.

Note: Two score points will be given if both parts A and B are correct (code 10). One score point will be given if only part A is correct. No credit is given if only part B is correct.

Code	Response	Item: M042300A
	Correct Response	
10	Both points correctly marked	
	Incorrect Response	
70	One point correctly marked	
79	Other incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

Code	Response	Item: M042300B
	Correct Response	
10	90°	
	Incorrect Response	
70	Correct value given for incorrect point(s) drawn in A	
79	Incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	



Pat and Chris were candidates for school president.

Here are the election results:

Pat 80%

Chris 20%

How likely would it be for a student asked at random to have voted for Pat?

- (A) It is certain that the student voted for Pat.
- (B) It is likely that the student voted for Pat.
- (C) It is unlikely that the student voted for Pat.
- (D) It is certain that the student did not vote for Pat.

Content Domain

Data and Chance

Topic Area

Chance

Cognitive Domain

Knowing

Maximum Points

1

Key

B

M042260

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.

The Real Burger Company owns 5 restaurants. The numbers of staff members employed in their 5 restaurants are: 12, 18, 19, 21, and 30 people.

A. What is the mean number of staff members in the 5 restaurants?

Answer: _____

B. What is the median number of staff members in the 5 restaurants?

Answer: _____

C. If the restaurant with 30 staff members increased its number of staff members to 50, how would this affect the median and the mean?

Content Domain

Data and Chance

Topic Area

Data Interpretation

Cognitive Domain

Knowing

Maximum Points

1

Key

See scoring guide

M042169

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.

Code	Response	Item: M042169A
	Correct Response	
10	20	
	Incorrect Response	
79	Incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

The Real Burger Company owns 5 restaurants. The numbers of staff members employed in their 5 restaurants are: 12, 18, 19, 21, and 30 people.

A. What is the mean number of staff members in the 5 restaurants?

Answer: _____

B. What is the median number of staff members in the 5 restaurants?

Answer: _____

C. If the restaurant with 30 staff members increased its number of staff members to 50, how would this affect the median and the mean?

Content Domain

Data and Chance

Topic Area

Data Interpretation

Cognitive Domain

Knowing

Maximum Points

1

Key

See scoring guide

M042169

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.

Code	Response	Item: M042169B
	Correct Response	
10	19	
	Incorrect Response	
79	Incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

The Real Burger Company owns 5 restaurants. The numbers of staff members employed in their 5 restaurants are: 12, 18, 19, 21, and 30 people.

A. What is the mean number of staff members in the 5 restaurants?

Answer: _____

B. What is the median number of staff members in the 5 restaurants?

Answer: _____

C. If the restaurant with 30 staff members increased its number of staff members to 50, how would this affect the median and the mean?

Content Domain

Data and Chance

Topic Area

Data Interpretation

Cognitive Domain

Applying

Maximum Points

1

Key

See scoring guide

M042169

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.

Code	Response	Item: M042169C
	Correct Response	
10	The mean would increase/change, the median would not change. If student gives a new value for the mean, it should be between 21 and 29. If a value is given for the median, it must be correct (i.e., 19 or the answer given for Part B if incorrect)	
	Incorrect Response	
70	Both would increase	
79	Other incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

Bush height (cm)	Shadow length (cm)
20	16
40	32
60	48
80	64

The table above shows the shadow lengths of four bushes of different heights at 10 a.m. What is the shadow length at 10 a.m. of a bush that has a height of 50 centimeters?

- (A) 36 cm
(B) 38 cm
(C) 40 cm
(D) 42 cm

Content Domain

Algebra

Topic Area

Patterns

Cognitive Domain

Applying

Maximum Points

1

Key

C

Write $3\frac{5}{6}$ in decimal form, rounded to 2 decimal places.

Answer: _____

Content Domain

Number

Topic Area

Fractions and Decimals

Cognitive Domain

Knowing

Maximum Points

1

Key

See scoring guide

M032725

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Code	Response	Item: M032725
	Correct Response	
10	3.83	
	Incorrect Response	
70	3.56	
79	Other incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

Simplify the expression $\frac{3x}{8} + \frac{x}{4} + \frac{x}{2}$. Show your work.

Answer: _____

Content Domain

Algebra

Topic Area

Algebraic Expressions

Cognitive Domain

Knowing

Maximum Points

2

Key

See scoring guide

M032683

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Code	Response	Item: M032683
	Correct Response	
20	$\frac{9}{8}x$ or $1\frac{1}{8}x$ with work shown	
	Partially Correct Response	
10	$\frac{9}{8}x$ or $1\frac{1}{8}x$ with no work shown	
11	Any two terms combined correctly or three terms with a common denominator	
	Incorrect Response	
70	$\frac{5}{14}x$	
71	Any other expression involving $5x$ or 14	
79	Other incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	

What does $xy + 1$ mean?

- Ⓐ Add 1 to y , then multiply by x .
- Ⓑ Multiply x and y by 1.
- Ⓒ Add x to y , then add 1.
- Ⓓ Multiply x by y , then add 1.

Content Domain

Algebra

Topic Area

Algebraic Expressions

Cognitive Domain

Knowing

Maximum Points

1

Key

D

M032738



SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.

There were m boys and n girls in a parade. Each person carried 2 balloons. Which of these expressions represents the total number of balloons that were carried in the parade?

- (A) $2(m + n)$
- (B) $2 + (m + n)$
- (C) $2m + n$
- (D) $m + 2n$

Content Domain

Algebra

Topic Area

Algebraic Expressions

Cognitive Domain

Knowing

Maximum Points

1

Key

A

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.

How many degrees does a minute hand of a clock turn through from 6:20 a.m. to 8:00 a.m. on the same day?

- (A) 680°
- (B) 600°
- (C) 540°
- (D) 420°

Content Domain

Geometry

Topic Area

Geometric Shapes

Cognitive Domain

Applying

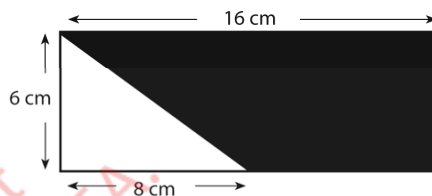
Maximum Points

1

Key

B

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.



In the figure above, what is the area of the shaded region in cm^2 ?

- (A) 24
- (B) 44
- (C) 48
- (D) 72

Content Domain

Geometry

Topic Area

Geometric Measurement

Cognitive Domain

Applying

Maximum Points

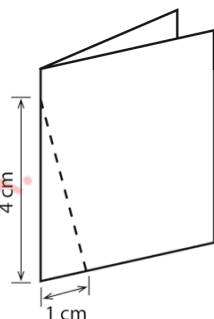
1

Key

D

M032623

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.



A piece of paper in the shape of a rectangle is folded in half as shown in the figure above. It is then cut along the dotted line, and the small piece that is cut is opened. What is the shape of the cutout figure?

- (A) an isosceles triangle
- (B) two isosceles triangles
- (C) a right triangle
- (D) an equilateral triangle

Content Domain

Geometry

Topic Area

Geometric Shapes

Cognitive Domain

Knowing

Maximum Points

1

Key

A

M032679

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.

What is the sum of the three consecutive whole numbers with $2n$ as the middle number?

- (A) $6n + 3$
- (B) $6n$
- (C) $6n - 1$
- (D) $6n - 3$

Content Domain

Algebra

Topic Area

Algebraic Expressions

Cognitive Domain

Applying

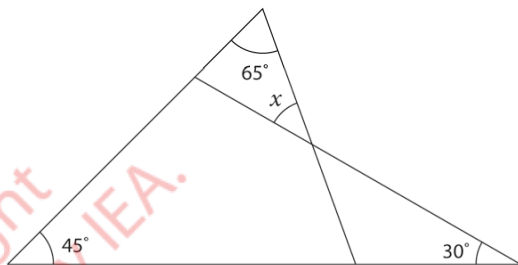
Maximum Points

1

Key

B

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.



In the figure above, what is the value of x ?

- (A) 30°
- (B) 40°
- (C) 45°
- (D) 65°

Content Domain

Geometry

Topic Area

Geometric Shapes

Cognitive Domain

Reasoning

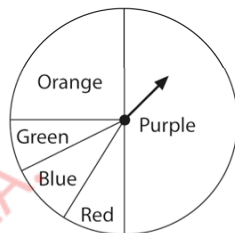
Maximum Points

1

Key

B

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.



The spinner is for Steve's new game. Out of 600 spins, approximately how many times should he expect the arrow to land on the red sector?

- (A) 30
- (B) 40
- (C) 50
- (D) 60

Content Domain

Data and Chance

Topic Area

Chance

Cognitive Domain

Applying

Maximum Points

1

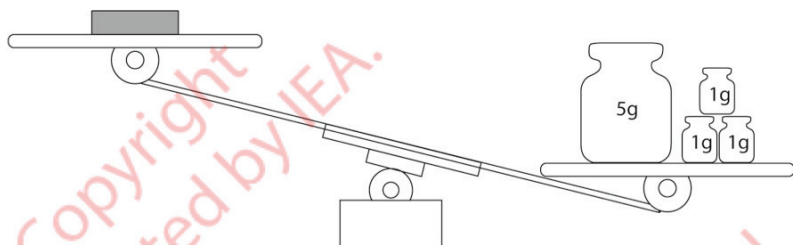
Key

C

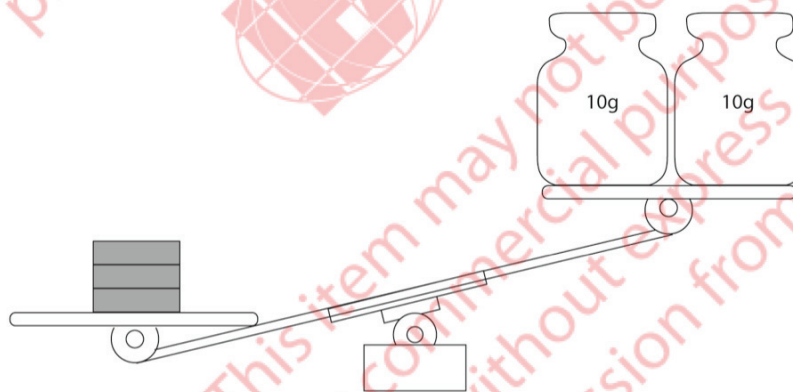
M032507

SOURCE: TIMSS 2011 Assessment. Copyright © 2013 International Association for the Evaluation of Educational Achievement (IEA).
Publisher: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.

Jo has three metal blocks. The weight of each block is the same.
When she weighed one block against 8 grams, this is what happened.



When she weighed all three blocks against 20 grams, this is what happened.



Which of the following could be the weight of one metal block?

- (A) 5 g
- (B) 6 g
- (C) 7 g
- (D) 8 g

Content Domain

Algebra

Topic AreaEquations/ Formulas and
Functions**Cognitive Domain**

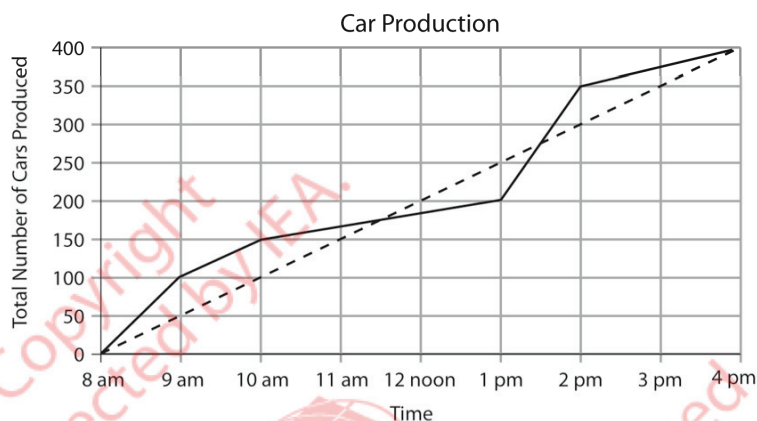
Reasoning

Maximum Points

1

Key

C



The solid line (—) on the graph shows car production by the NU Car Motor Company during a particular day.

The dotted line (-----) shows what the total number of cars produced would be if the rate of production were constant.

A. By what time had a total of 150 cars been produced?

Answer: _____

B. What was the average number of cars produced per hour on this day?

Answer: _____

C. During which hour were the most cars produced?

Between _____ and _____

Content Domain

Data and Chance

Topic Area

Data Organization and Representation

Cognitive Domain

Knowing

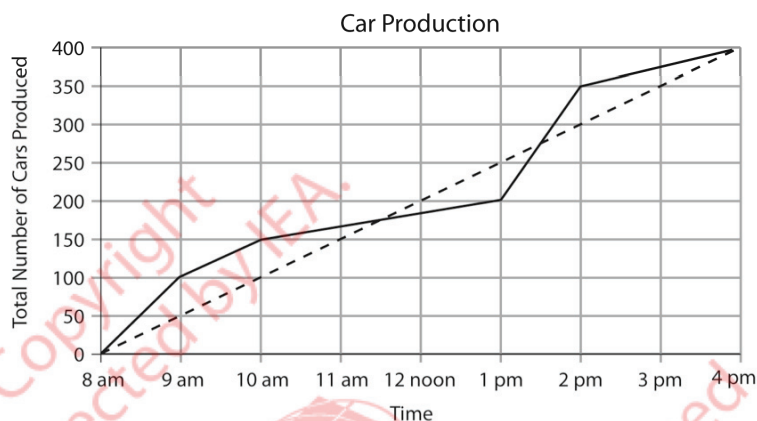
Maximum Points

1

Key

See scoring guide

Code	Response	Item: M032681A
	Correct Response	
10	10 a.m.	
	Incorrect Response	
70	11 a.m.	
79	Other incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	



The solid line (—) on the graph shows car production by the NU Car Motor Company during a particular day.

The dotted line (-----) shows what the total number of cars produced would be if the rate of production were constant.

A. By what time had a total of 150 cars been produced?

Answer: _____

B. What was the average number of cars produced per hour on this day?

Answer: _____

C. During which hour were the most cars produced?

Between _____ and _____

Content Domain

Data and Chance

Topic Area

Data Interpretation

Cognitive Domain

Applying

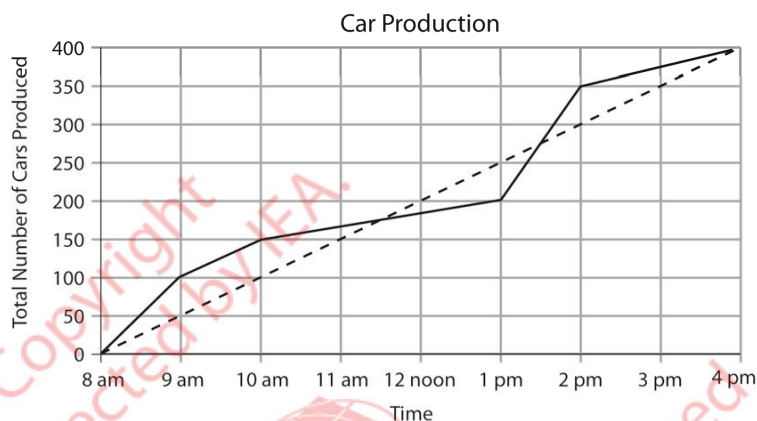
Maximum Points

1

Key

See scoring guide

Code	Response	Item: M032681B
	Correct Response	
10	50	
	Incorrect Response	
70	400	
79	Other incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	



The solid line (—) on the graph shows car production by the NU Car Motor Company during a particular day.

The dotted line (-----) shows what the total number of cars produced would be if the rate of production were constant.

A. By what time had a total of 150 cars been produced?

Answer: _____

B. What was the average number of cars produced per hour on this day?

Answer: _____

C. During which hour were the most cars produced?

Between _____ and _____

Content Domain

Data and Chance

Topic Area

Data Interpretation

Cognitive Domain

Applying

Maximum Points

1

Key

See scoring guide

Code	Response	Item: M032681C
	Correct Response	
10	1 p.m. and 2 p.m.	
	Incorrect Response	
79	Incorrect (including crossed out, erased, stray marks, illegible, or off task)	
	Nonresponse	
99	Blank	



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