TRENDS IN INTERNATIONAL MATHEMATICS AND SCIENCE STUDY

# TIMSS

**TIMSS & PIRLS**
International Study Center
Lynch School of Education, Boston College

TIMSS 2011 User Guide
for the International Database

# Released Items

Mathematics – Eighth Grade

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

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M042226

$k = 7$ and $l = 10$.

What is the value of $P$ when $P = \dfrac{3kl}{5}$?

Answer: _____

**Content Domain**

Algebra

**Topic Area**

Equations/ Formulas and Functions

**Cognitive Domain**

Knowing

**Maximum Points**

1

**Key**

See scoring guide

M042103

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

M042086

$a + b = 25$.
What is the value of $2a + 2b + 4$?

Answer: _____

**Content Domain**

Algebra

**Topic Area**

Equations/ Formulas and Functions

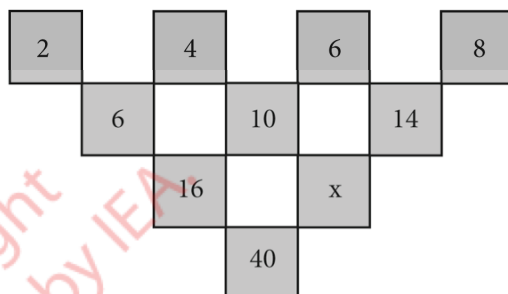**Cognitive Domain**

Applying

**Maximum Points**

1

**Key**

See scoring guide

| 2 | | 4 | | 6 | | 8 |
|---|---|---|---|---|---|---|
| | 6 | | 10 | | 14 | |
| | | 16 | | x | | |
| | | | 40 | | | |

What is the value of *x* in this pattern?

Answer: _____

M042228

**Content Domain**

Algebra

**Topic Area**

Patterns

**Cognitive Domain**

Reasoning

**Maximum Points**

1

**Key**

See scoring guide

M042245

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

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

Ⓐ $x + y = -1$

Ⓑ $2x + y = 5$

Ⓒ $3x - y = 0$

Ⓓ $4x - y = 1$

**Content Domain**

Algebra

**Topic Area**

Equations/ Formulas and Functions
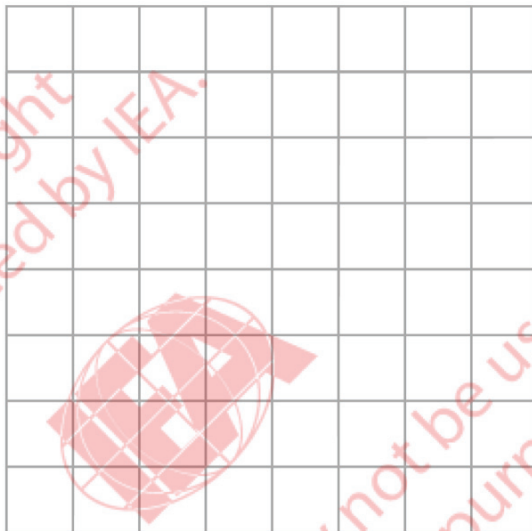
**Cognitive Domain**

Applying

**Maximum Points**

1

**Key**

D

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**
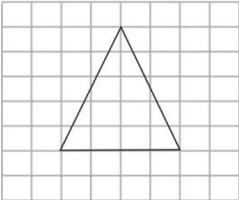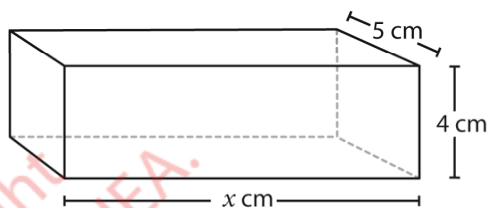
Applying

**Maximum Points**

1

**Key**

See scoring guide

| Code | Response | Item: M042270 |
|------|----------|---------------|
| | **Correct Response** | |
| 10 | Correct triangle drawn (any orientation) <br><br>  | |
| | **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 cm³. What is the value of $x$?

Answer: _____

**Content Domain**

Geometry

**Topic Area**

Geometric Measurement
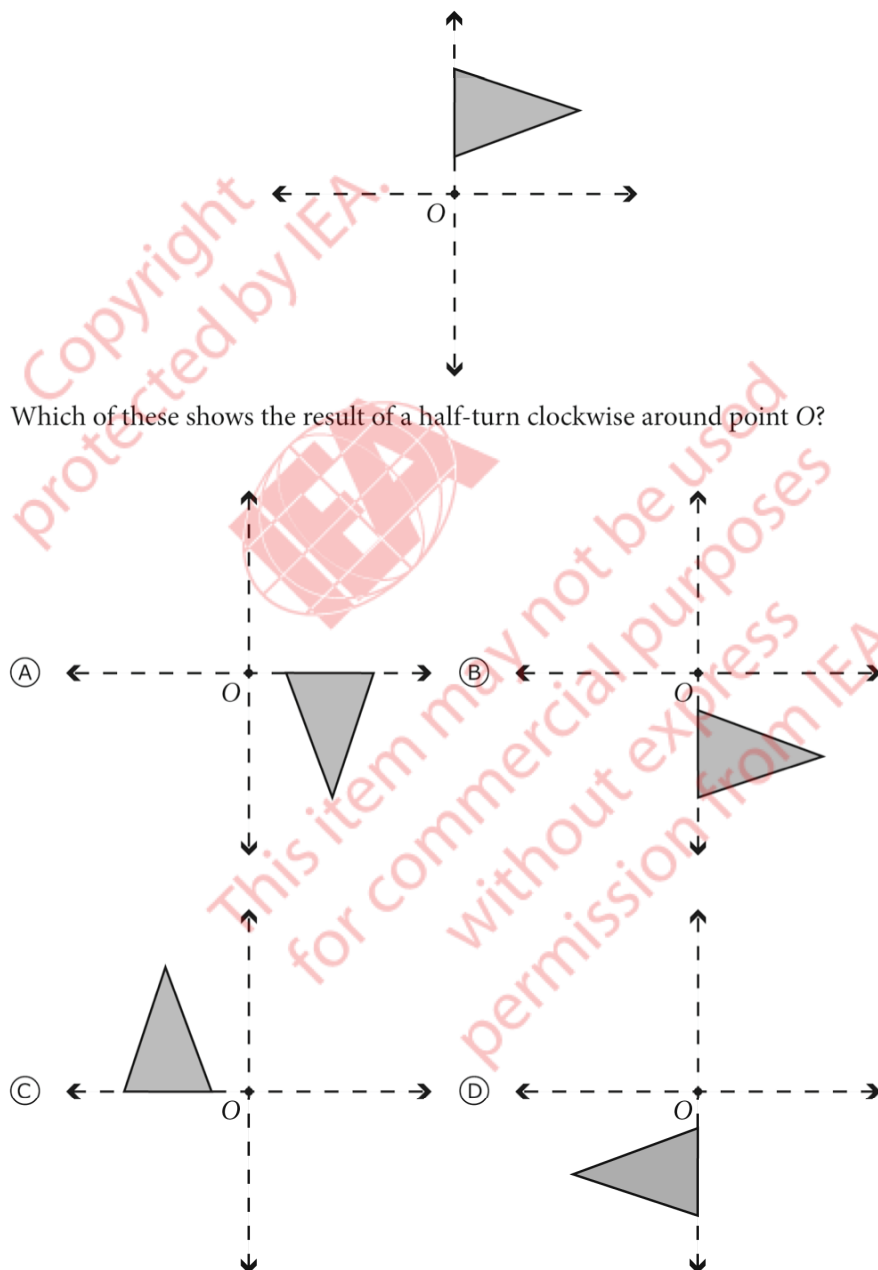
**Cognitive Domain**

Applying

**Maximum Points**

1

**Key**

See scoring guide

M042201

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Which of these shows the result of a half-turn clockwise around point *O*?



**Content Domain**

Geometry

**Topic Area**

Location and Movement

**Cognitive Domain**

Knowing

**Maximum Points**

1

**Key**

D

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?

Ⓐ $\frac{4}{22}$

Ⓑ $\frac{8}{22}$

Ⓒ $\frac{10}{22}$

Ⓓ $\frac{12}{22}$

M042179

**Content Domain**

Data and Chance

**Topic Area**

Chance

**Cognitive Domain**

Applying

**Maximum Points**

1

**Key**

D

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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?

Ⓐ 120

Ⓑ 480

Ⓒ 600

Ⓓ 720

M042177

**Content Domain**

Data and Chance

**Topic Area**

Chance

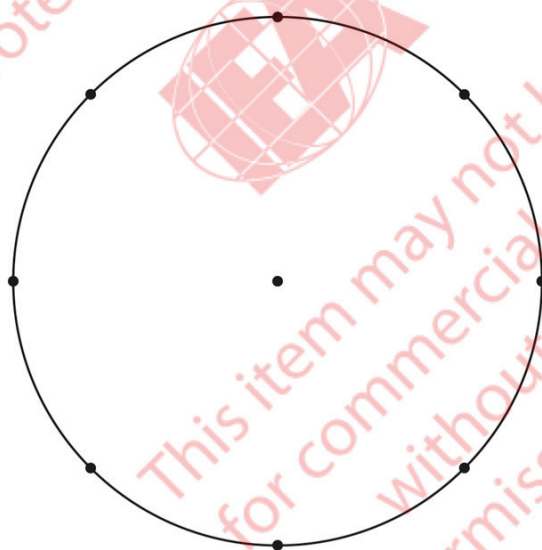**Cognitive Domain**

Applying

**Maximum Points**

1

**Key**

C

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

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M032094

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

Ⓐ    0.043

Ⓑ    0.1043

Ⓒ    0.403

Ⓓ    0.43

**Content Domain**

Number

**Topic Area**
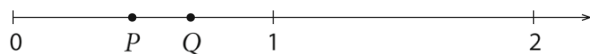
Fractions and Decimals

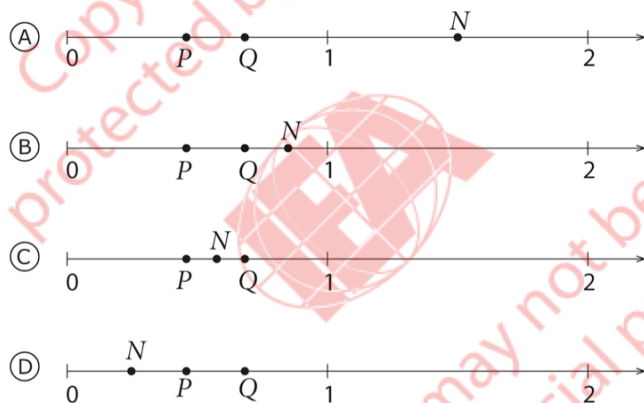**Cognitive Domain**

Knowing

**Maximum Points**

1

**Key**

A

$P$ 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

M032064

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

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

Ⓐ The length of this segment:

$$\begin{array}{c|c} x & 5 \end{array}$$

Ⓑ The length of this segment:

$$\begin{array}{c|c|c} 2 & 3 & x \end{array}$$

Ⓒ The area of this figure:

(figure: rectangle with $x$ on the left side, and $2$ and $3$ across the top, divided by a dashed line)

Ⓓ The area of this figure:

(figure: rectangle with $5$ on the left side, and $x$ and $x$ across the top, divided by a dashed line)

M032419

**Content Domain**

Algebra

**Topic Area**

Algebraic Expressions

**Cognitive Domain**

Knowing

**Maximum Points**

1

**Key**

C

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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?

Ⓐ $25 + 0.2n$

Ⓑ $25 \times 0.2n$

Ⓒ $0.2 \times (25 + n)$

Ⓓ $0.2 \times 25 + n$

M032477

**Content Domain**

Algebra

**Topic Area**

Algebraic Expressions

**Cognitive Domain**

Knowing

**Maximum Points**

1

**Key**

A

Use the formula $y = 100 - \dfrac{100}{1+t}$ to find the value of $y$ when $t = 9$.

Answer: _____

M032538

**Content Domain**

Algebra

**Topic Area**

Equations/ Formulas and Functions

**Cognitive Domain**

Knowing

**Maximum Points**

1

**Key**

See scoring guide

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*?

Ⓐ   2.4 cm

Ⓑ   2.6 cm

Ⓒ   5.0 cm

Ⓓ   7.6 cm

M032324

**Content Domain**

Geometry

**Topic Area**

Geometric Shapes

**Cognitive Domain**

Reasoning

**Maximum Points**

1

**Key**

D

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The area of a square is 144 cm². What is the perimeter of the square?

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

**Content Domain**

Geometry

**Topic Area**

Geometric Measurement

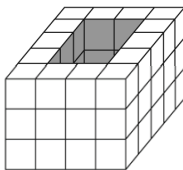**Cognitive Domain**

Applying

**Maximum Points**

1

**Key**

B

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?

Ⓐ  6
Ⓑ  12
Ⓒ  15
Ⓓ  18

M032100

**Content Domain**

Geometry

**Topic Area**

Geometric Measurement
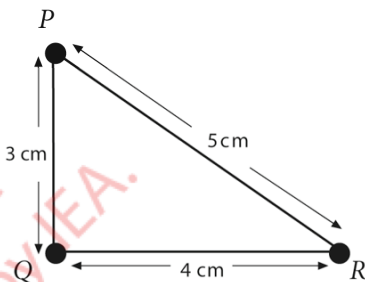
**Cognitive Domain**

Applying

**Maximum Points**

1

**Key**

D

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

Ⓐ $3^2 + 4^2 = 5^2$

Ⓑ $5 < 3 + 4$

Ⓒ $3 + 4 = 12 - 5$

Ⓓ $3 > 5 - 4$

**Content Domain**

Geometry

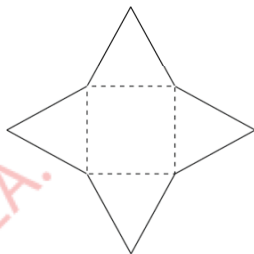**Topic Area**

Geometric Shapes

**Cognitive Domain**

Reasoning

**Maximum Points**

1

**Key**

A

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.

M032734

**Content Domain**

Geometry

**Topic Area**

Geometric Shapes

**Cognitive Domain**

Knowing

**Maximum Points**

1

**Key**

See scoring guide

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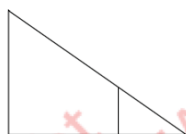
TIMSS & PIRLS
International Study Center
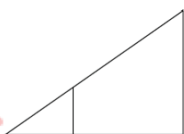Lynch School of Education, Boston College

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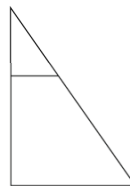
Which of these transformations, taken in order, can be used so that Figure 1 above becomes Figure 2 and then Figure 3?

Ⓐ  reflection and then translation

Ⓑ  reflection and then $\frac{1}{4}$ turn rotation clockwise

Ⓒ  $\frac{1}{2}$ turn rotation and then translation

Ⓓ  $\frac{1}{4}$ turn rotation counterclockwise and then reflection

M032397

**Content Domain**

Geometry

**Topic Area**

Location and Movement

**Cognitive Domain**

Knowing

**Maximum Points**

1

**Key**

B

TIMSS & PIRLS
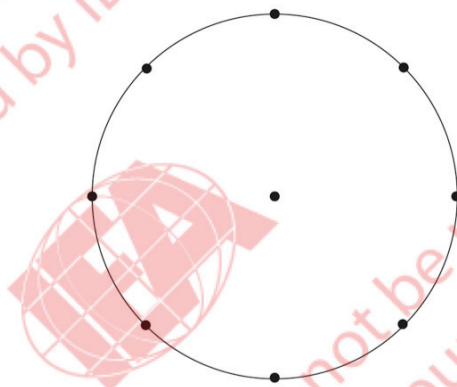International Study Center
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Of the 400 students in a school, 50 plan to go to university, 100 to a polytechnic, 150 to a business college, and the remainder plan to enter the workforce.

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.

M032695

**Content Domain**

Data and Chance

**Topic Area**

Data Organization and Representation

**Cognitive Domain**

Applying

**Maximum Points**

2

**Key**

See scoring guide

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?

Ⓐ  It is certain that his candy will be pink.

Ⓑ  It is more likely than it was for Megan.

Ⓒ  It is exactly as likely as it was for Megan.

Ⓓ  It is less likely than it was for Megan.

M032132

**Content Domain**

Data and Chance

**Topic Area**

Chance

**Cognitive Domain**

Knowing

**Maximum Points**

1

**Key**

D

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