

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

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

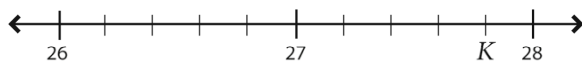
1

Key

C

M042041

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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).
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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

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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

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

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

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

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

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).
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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

M042077

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

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

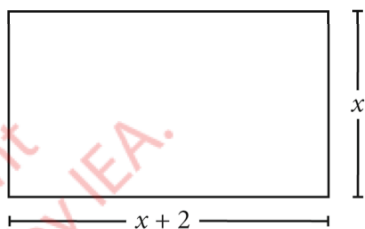
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Key

D

M042235

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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

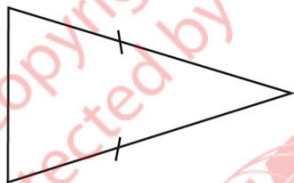
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Which shape has a line of symmetry?

(A)



(B)



(C)



(D)

**Content Domain**

Geometry

Topic Area

Geometric Shapes

Cognitive Domain

Knowing

Maximum Points

1

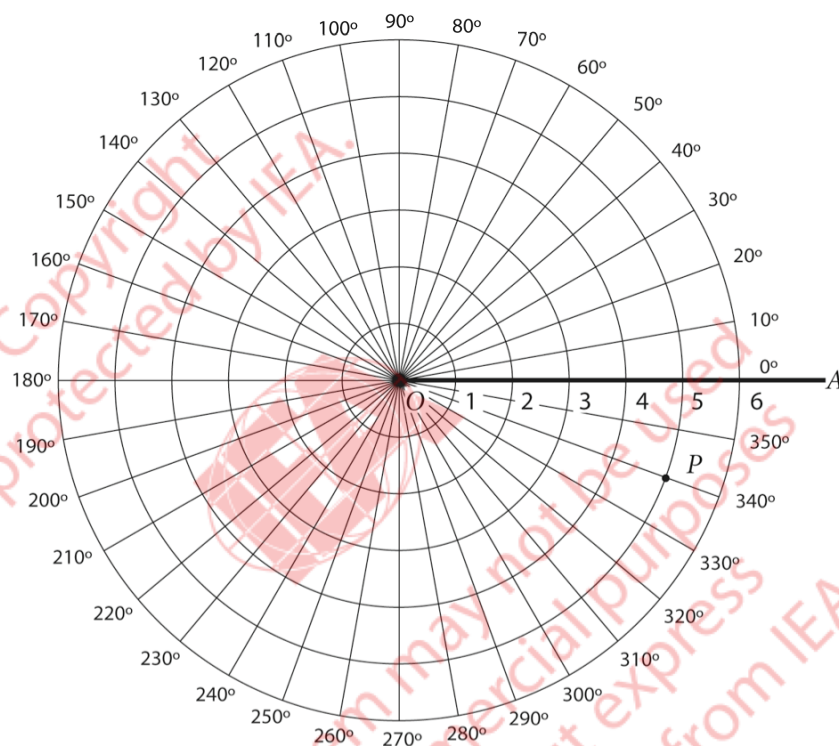
Key

B

M042150

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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).
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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).
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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).
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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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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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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



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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).
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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

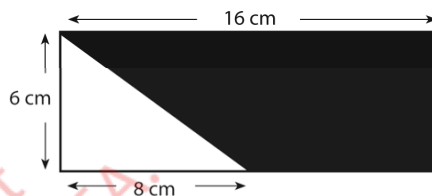
Maximum Points

1

Key

B

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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

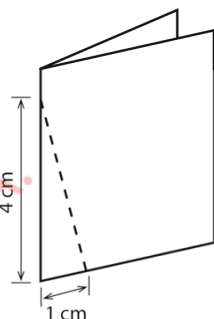
1

Key

D

M032623

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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

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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

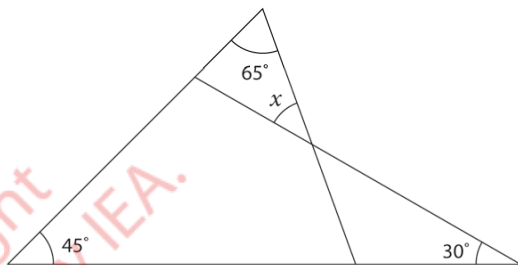
Maximum Points

1

Key

B

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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

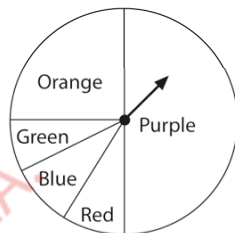
1

Key

B

M032398

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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

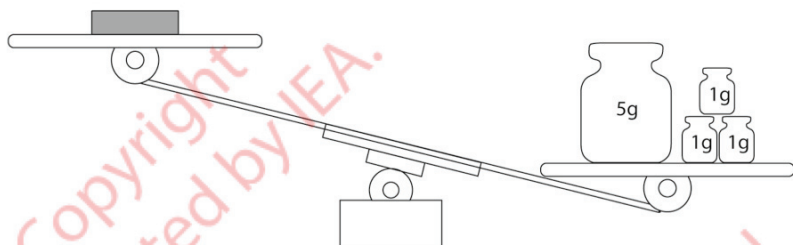
Key

C

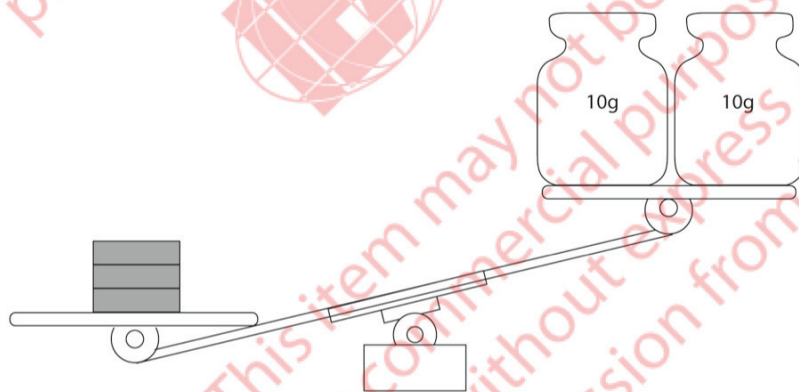
M032507

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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**

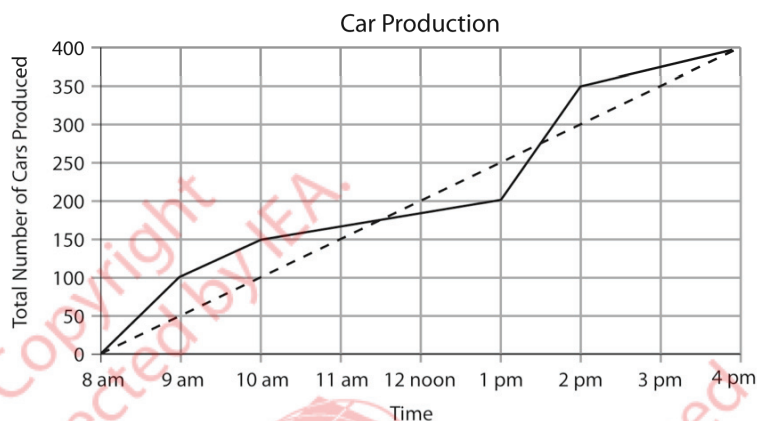
Reasoning

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



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