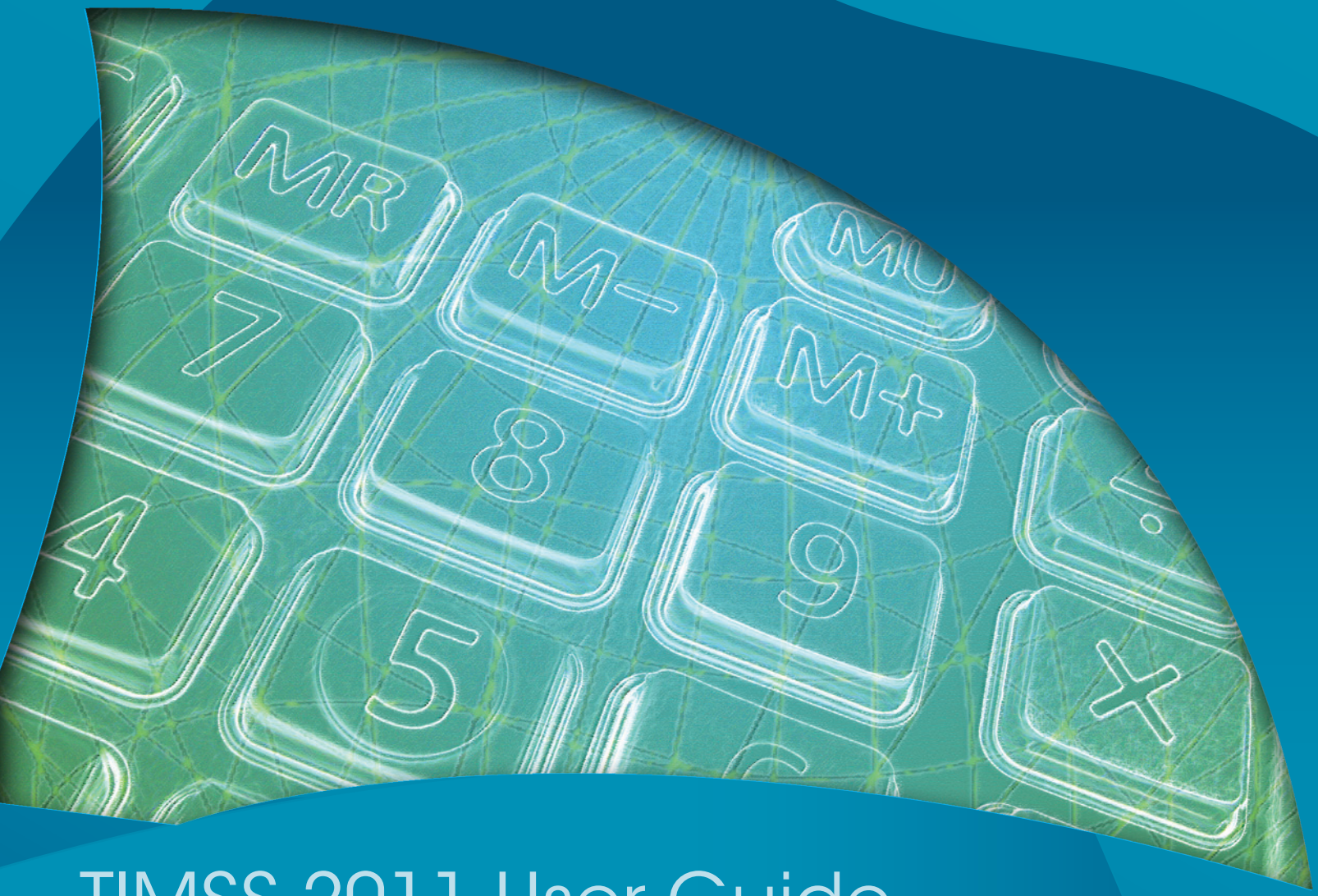
TRENDS IN INTERNATIONAL MATHEMATICS AND SCIENCE STUDY

TIMSS

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

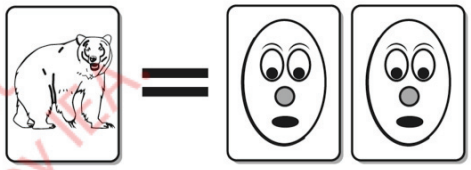


TIMSS 2011 User Guide for the International Database

Released Items

Mathematics – Fourth Grade

The town fair had a booth where people could trade cards.



1 animal card is worth 2 cartoon cards.

2 animal cards are worth 3 sports cards.

Some children went to the booth to trade cards.

Questions for Trading Cards begin on the next page.

MP31346

Content Domain

Number

Topic Area

Whole Numbers

Cognitive Domain

Maximum Points

Key

See scoring guide

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Trading Animal Cards

A. Becky had 5 animal cards to trade for cartoon cards. How many cartoon cards would she get?

Answer: _____ cartoon cards

B. Jim had 8 animal cards to trade for sports cards. How many sports cards would he get?

Answer: _____ sports cards

C. Katrina had 6 animal cards. She wanted to trade them for as many cards as possible.

How many cartoon cards would she get? _____

How many sports cards would she get? _____

Should she trade for cartoon cards or trade for sport cards?

Answer: _____

Content Domain

Number

Topic Area

Whole Numbers

Cognitive Domain

Applying

Maximum Points

1

Key

See scoring guide

M031346

Questions for Trading Cards continue.

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M031379

Trading Sports Cards

Steve had 15 sports cards to trade for animal cards. How many animal cards would he get?

Answer: _____ animal cards

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Content Domain

Number

Topic Area

Whole Numbers

Cognitive Domain

Reasoning

Maximum Points

1

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Trading Cartoon Cards

Brad had 8 cartoon cards to trade for sports cards. How many sports cards would he get?

Answer: _____ sports cards

End of Trading Cards section.

M031380

Content Domain

Number

Topic Area

Whole Numbers

Cognitive Domain

Reasoning

Maximum Points

1

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M031313

There are 218 passengers and 191 crew members on a ship.
How many people are on the ship altogether?

Answer: _____

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Topic Area

Whole Numbers

Cognitive Domain

Applying

Maximum Points

1

Key

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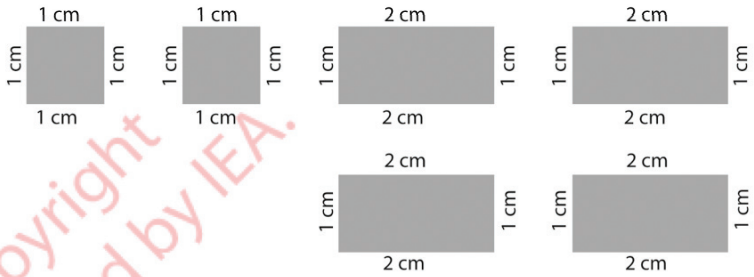
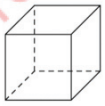
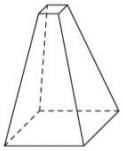
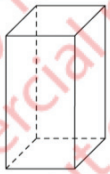


Susan has the 6 pieces of cardboard shown above. Which of the following shapes could Susan make using all 6 of these pieces without cutting them?

Ⓐ 

Ⓑ

Ⓒ 

Ⓓ 

M031083

Content Domain

Geometric Shapes and Measures

Topic Area

Two- and Three-dimensional Shapes

Cognitive Domain

Knowing

Maximum Points

1

Key

D

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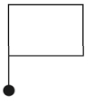
M031071



Which of the following shows the position of the shape above after a half turn or 180° rotation?

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Content Domain

Geometric Shapes and Measures

Topic Area

Two- and Three-dimensional Shapes

Cognitive Domain

Knowing

Maximum Points

1

Key

B

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M031185

The scale on a map indicates that 1 centimeter on the map represents 4 kilometers on the land. The distance between two towns on the map is 8 centimeters. How many kilometers apart are the two towns?

Ⓐ 2
Ⓑ 8
Ⓒ 16
Ⓓ 32

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Content Domain

Number

Topic Area

Whole Numbers

Cognitive Domain

Reasoning

Maximum Points

1

Key

D

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M051305

Duncan first traveled 4.8 km in a car and then he traveled 1.5 km in a bus.

How far did Duncan travel?

Ⓐ 6.3 km
Ⓑ 5.8 km
Ⓒ 5.13 km
Ⓓ 4.95 km

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Content Domain

Number

Topic Area

Fractions and Decimals

Cognitive Domain

Applying

Maximum Points

1

Key

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M051091

Which fraction is **not** equal to the others?

Ⓐ $\frac{1}{2}$

Ⓑ $\frac{4}{8}$

Ⓒ $\frac{2}{4}$

Ⓓ $\frac{2}{8}$

Content Domain

Number

Topic Area

Fractions and Decimals

Cognitive Domain

Knowing

Maximum Points

1

Key

D

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M051001

In a soccer tournament, teams get:

3 points for a win
1 point for a tie
0 points for a loss

Zedland has 11 points.

What is the **smallest** number of games Zedland could have played?

Answer: _____

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Content Domain

Number

Topic Area

Whole Numbers

Cognitive Domain

Reasoning

Maximum Points

1

Key

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Mary left Apton and rode at the same speed for 2 hours.

She reached this sign.

Mary continues to ride at the same speed to Brandon.

How many hours will it take her to ride from the sign to Brandon?

Ⓐ $1\frac{1}{2}$ hours

Ⓑ 2 hours

Ⓒ 3 hours

Ⓓ $3\frac{1}{2}$ hours

M051007

Content Domain

Number

Topic Area

Whole Numbers

Cognitive Domain

Reasoning

Maximum Points

1

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M051203

$23 \times 19 =$

Answer: _____

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Content Domain

Number

Topic Area

Whole Numbers

Cognitive Domain

Knowing

Maximum Points

1

Key

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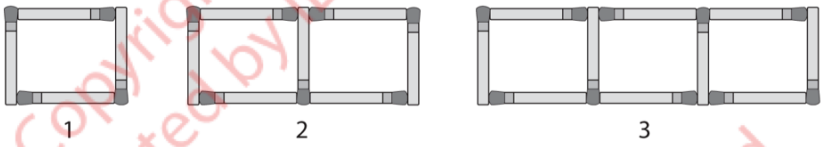
Cooney has to form figures 1 to 4 with matches.

Figures 1, 2, and 3 are shown below.

He needs four matches to form figure 1, seven matches to form figure 2, and ten matches to form figure 3.

He uses the same rule each time to make the next figure in the pattern.



How many matches will he need to form figure 4?

Answer: _____

M051601

Content Domain

Number

Topic Area

Patterns and Relationships

Cognitive Domain

Applying

Maximum Points

1

Key

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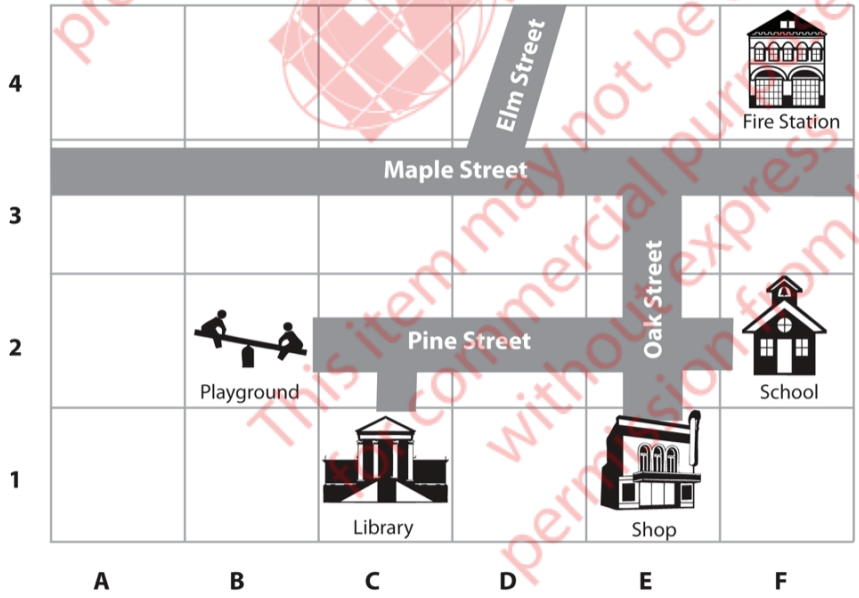
A. Complete the table to show where the places are.

The first one has been done for you.

Places	Grid Square
Playground	B2
School	
Corner of Maple and Oak Streets	



B. Troy lives in a house in square C4. Put an X in the square to show where Troy lives.

M051064

Content Domain

Geometric Shapes and Measures

Topic Area

Points, Lines, and Angles

Cognitive Domain

Knowing

Maximum Points

1

Key

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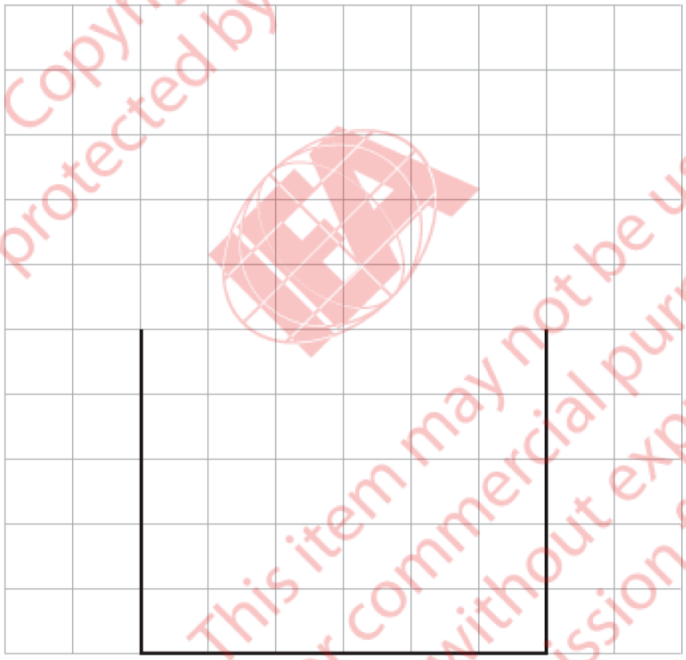
Jay has to draw a shape.

It must have 5 sides.

It must have one line of symmetry.

Jay has started to draw the shape.

Complete Jay's shape.



M051015

Content Domain

Geometric Shapes and Measures

Topic Area

Two- and Three-dimensional Shapes

Cognitive Domain

Applying

Maximum Points

1

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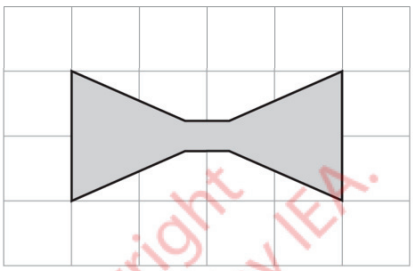

How many lines of symmetry does this figure have?

Ⓐ 1
Ⓑ 2
Ⓒ 3
Ⓓ 4

M051123

Content Domain

Geometric Shapes and Measures

Topic Area

Two- and Three-dimensional Shapes

Cognitive Domain

Knowing

Maximum Points

1

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Favorite Ice Cream Flavors

Flavor	Number of Children
Vanilla	
Chocolate	
Strawberry	
Lemon	

stands for 4 children

How many children chose vanilla as their favorite flavor?

Answer: _____

M051109

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Content Domain

Data Display

Topic Area

Reading and Interpreting

Cognitive Domain

Knowing

Maximum Points

1

Key

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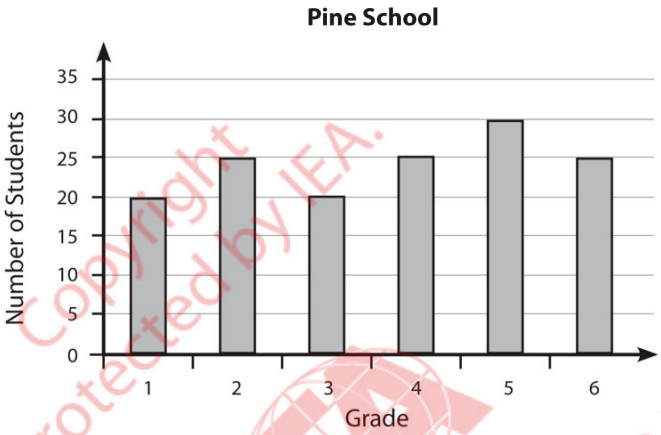
The graph shows the number of students at each grade in the Pine School.



In the Pine School there is room in each grade for 30 students.
How many more students could be in the school?

Ⓐ 20
Ⓑ 25
Ⓒ 30
Ⓓ 35

M051117

Content Domain

Data Display

Topic Area

Reading and Interpreting

Cognitive Domain

Reasoning

Maximum Points

1

Key

D

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M041010

In which number does the 8 have the value of 800?

Ⓐ 1,468
Ⓑ 2,587
Ⓒ 3,809
Ⓓ 8,634

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Content Domain

Number

Topic Area

Whole Numbers

Cognitive Domain

Knowing

Maximum Points

1

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C

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M041098

Paint comes in 5 liter cans. Sean needs 37 liters of paint. How many cans must he buy?

Ⓐ 5
Ⓑ 6
Ⓒ 7
Ⓓ 8

Content Domain

Number

Topic Area

Whole Numbers

Cognitive Domain

Applying

Maximum Points

1

Key

D

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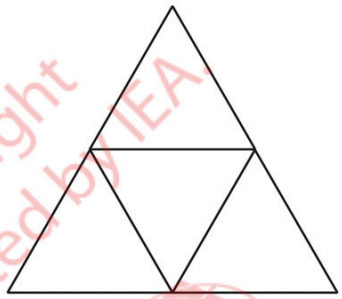
M041064

Shade $\frac{1}{2}$ of the large triangle.



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Content Domain

Number

Topic Area

Fractions and Decimals

Cognitive Domain

Applying

Maximum Points

1

Key

See scoring guide

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Anna has these cards with numbers on them.

1	8	6	5	2

What is the smallest three digit number she can show with the cards?

She may use each card only once.

Answer: _____

M041003

Content Domain

Number

Topic Area

Whole Numbers

Cognitive Domain

Knowing

Maximum Points

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M041104

Write a number that is larger than 5 and is smaller than 6.

Answer _____

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Content Domain

Number

Topic Area

Fractions and Decimals

Cognitive Domain

Knowing

Maximum Points

1

Key

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M041299

Tom ate $\frac{1}{2}$ of a cake, and Jane ate $\frac{1}{4}$ of the cake. How much of the cake did they eat altogether?

Answer: _____

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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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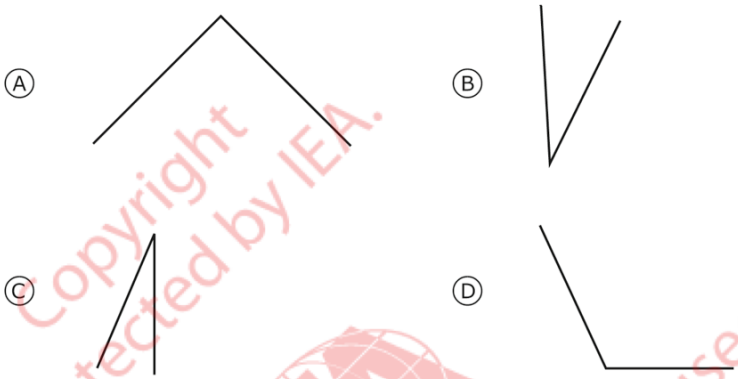
One of these angles is a right angle. Which one?



M041329

Content Domain

Geometric Shapes and Measures

Topic Area

Points, Lines, and Angles

Cognitive Domain

Knowing

Maximum Points

1

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A

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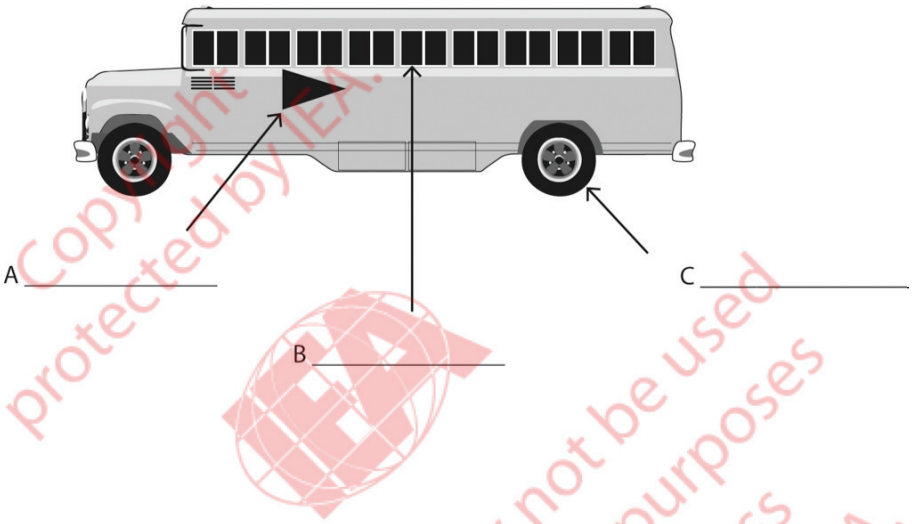
M041143

Write the names of shapes A, B, and C in the spaces provided.



Content Domain

Geometric Shapes and Measures

Topic Area

Two- and Three-dimensional Shapes

Cognitive Domain

Knowing

Maximum Points

2

Key

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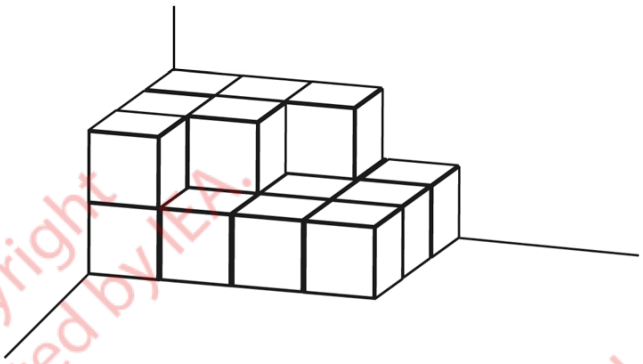
M041158



Ann stacks these boxes in the corner of the room. All the boxes are the same size. How many boxes does she use?

Ⓐ 25
Ⓑ 19
Ⓒ 18
Ⓓ 13

Content Domain

Geometric Shapes and Measures

Topic Area

Two- and Three-dimensional Shapes

Cognitive Domain

Applying

Maximum Points

1

Key

C

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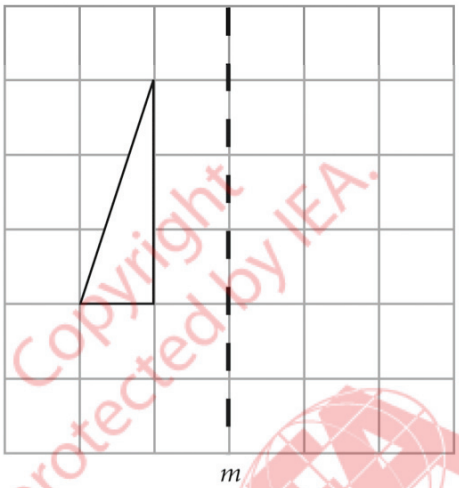

Draw the reflection of the triangle. Line m is the mirror line.

M041328

Content Domain

Geometric Shapes and Measures

Topic Area

Two- and Three-dimensional Shapes

Cognitive Domain

Applying

Maximum Points

1

Key

See scoring guide

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M041155

The school playground is a square. The playground is 100 meters long. Ruth walks all the way around the edge of the playground. How far does she walk?

Ⓐ 100 meters
Ⓑ 200 meters
Ⓒ 400 meters
Ⓓ 10,000 meters

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Content Domain

Geometric Shapes and Measures

Topic Area

Two- and Three-dimensional Shapes

Cognitive Domain

Applying

Maximum Points

1

Key

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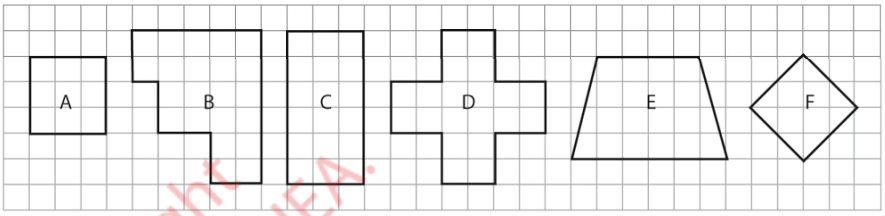

Sean used the table to sort these shapes.
Put the letter of each shape in the space where it belongs.
Shape A has been done for you.

	Has 4 Sides	Does Not Have 4 Sides
All sides are the same length	A	
All sides are NOT the same length		

M041284

Content Domain

Geometric Shapes and Measures

Topic Area

Two- and Three-dimensional Shapes

Cognitive Domain

Reasoning

Maximum Points

2

Key

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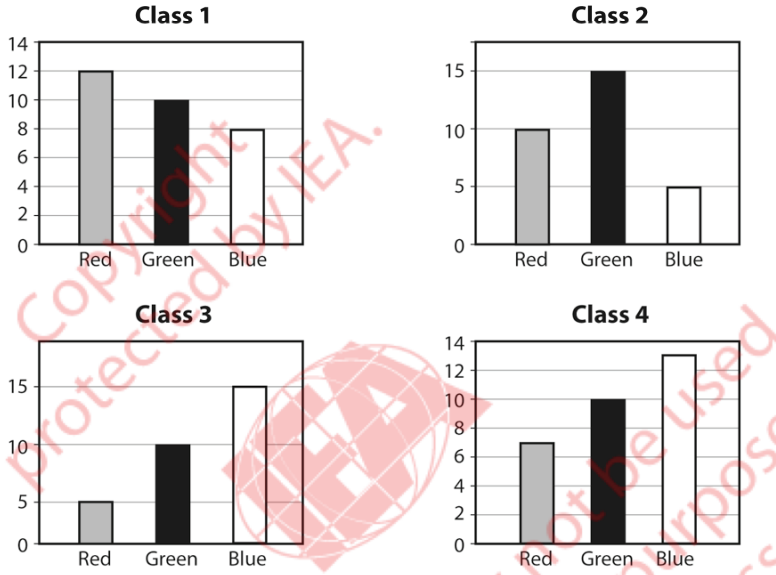
Ahmed made a survey of the favorite color of the students in 4 classes.



In which class do the fewest students choose blue?

Ⓐ Class 1
Ⓑ Class 2
Ⓒ Class 3
Ⓓ Class 4

M041335

Content Domain

Data Display

Topic Area

Reading and Interpreting

Cognitive Domain

Knowing

Maximum Points

1

Key

B

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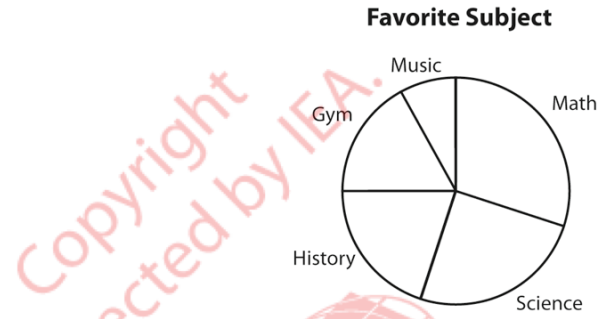
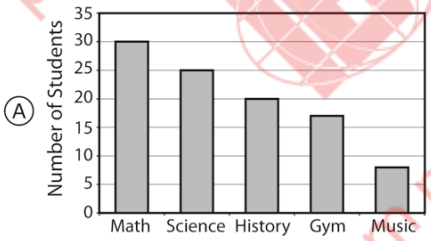
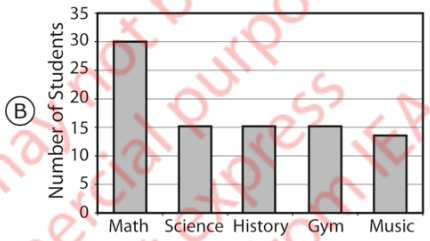
Mr. Johnson asked the students in his school about their favorite subject.

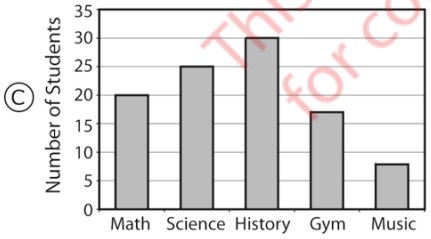
This pie chart shows how many students liked each of 5 subjects.

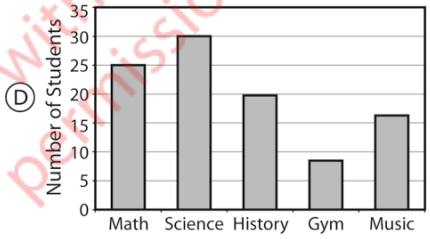


Which graph shows the same information as the pie chart?









M041184

Content Domain

Data Display

Topic Area

Organizing and Representing

Cognitive Domain

Reasoning

Maximum Points

1

Key

A

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M031128

5631 + 286 =

Answer: _____

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Content Domain

Number

Topic Area

Whole Numbers

Cognitive Domain

Knowing

Maximum Points

1

Key

See scoring guide

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M031016

Three thousand tickets for a basketball game are numbered 1 to 3000.
People with ticket numbers ending with 112 receive a prize.
Write down all the prize-winning numbers.

Prize-winning numbers: _____

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Content Domain

Number

Topic Area

Whole Numbers

Cognitive Domain

Reasoning

Maximum Points

1

Key

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Ingredients	
Eggs	4
Flour	8 cups
Milk	$\frac{1}{2}$ cup

The above ingredients are used to make a recipe for 6 people. Sam wants to make this recipe for only 3 people.

Complete the table below to show what Sam needs to make the recipe for 3 people. The number of eggs he needs is shown.

Ingredients	
Eggs	2
Flour	___ cups
Milk	___ cups

M031183

Content Domain

Number

Topic Area

Whole Numbers

Cognitive Domain

Applying

Maximum Points

2

Key

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M031187

▲ stands for the number of pencils Pete had. Kim gave Pete 3 more pencils. How many pencils does Pete have now?

Ⓐ $3 \div ▲$

Ⓑ $▲ + 3$

Ⓒ $▲ - 3$

Ⓓ $3 \times ▲$

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Content Domain

Number

Topic Area

Number Sentences with Whole Numbers

Cognitive Domain

Applying

Maximum Points

1

Key

B

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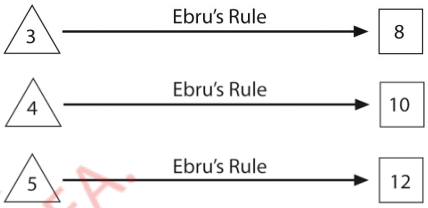

Ebru used a rule to get the number in the ☐ from the number in the △. What was the rule?

Ⓐ Multiply by 1 then add 5.

Ⓑ Multiply by 2 then add 2.

Ⓒ Multiply by 3 then subtract 1.

Ⓓ Multiply by 4 then subtract 4.

M031251

Content Domain

Number

Topic Area

Patterns and Relationships

Cognitive Domain

Applying

Maximum Points

1

Key

B

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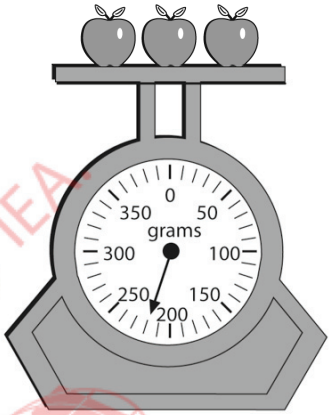

How much do the apples weigh in grams?

Ⓐ 200
Ⓑ 202
Ⓒ 210
Ⓓ 220

M031294

Content Domain

Data Display

Topic Area

Reading and Interpreting

Cognitive Domain

Knowing

Maximum Points

1

Key

D

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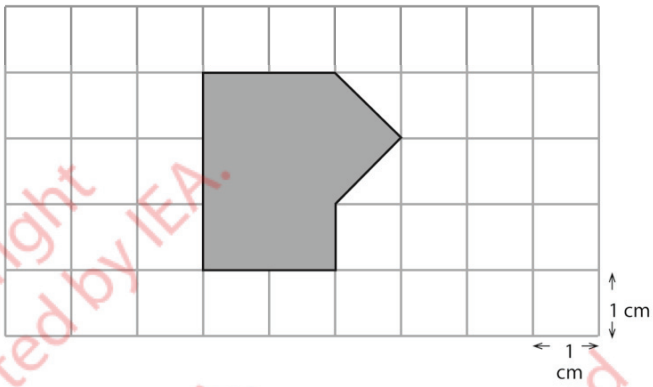

The squares in the grid above are 1 cm by 1 cm.
What is the shaded area in square centimeters?

Answer: _____ square centimeters

M031297

Content Domain

Geometric Shapes and Measures

Topic Area

Two- and Three-dimensional Shapes

Cognitive Domain

Applying

Maximum Points

1

Key

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M031218

Six hundred books have to be packed into boxes that hold 15 books each. Which of the following could be used to find the number of boxes needed?

Ⓐ add 15 to 600

Ⓑ subtract 15 from 600

Ⓒ multiply 600 by 15

Ⓓ divide 600 by 15

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Content Domain

Number

Topic Area

Whole Numbers

Cognitive Domain

Applying

Maximum Points

1

Key

D

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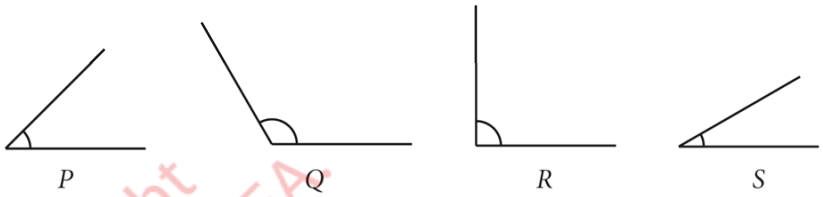

In which of the following are the angles ordered by size, from least to greatest?

Ⓐ *Q, P, R, S*
Ⓑ *Q, R, P, S*
Ⓒ *S, P, R, Q*
Ⓓ *S, R, P, Q*

M031109

Content Domain

Geometric Shapes and Measures

Topic Area

Points, Lines, and Angles

Cognitive Domain

Knowing

Maximum Points

1

Key

C

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A pattern rule says "Rotate the shape $\frac{1}{4}$ turn clockwise each time."

What will the pattern look like?

Ⓐ

Ⓑ

Ⓒ

Ⓓ

M031159

Content Domain

Geometric Shapes and Measures

Topic Area

Two- and Three-dimensional Shapes

Cognitive Domain

Knowing

Maximum Points

1

Key

A

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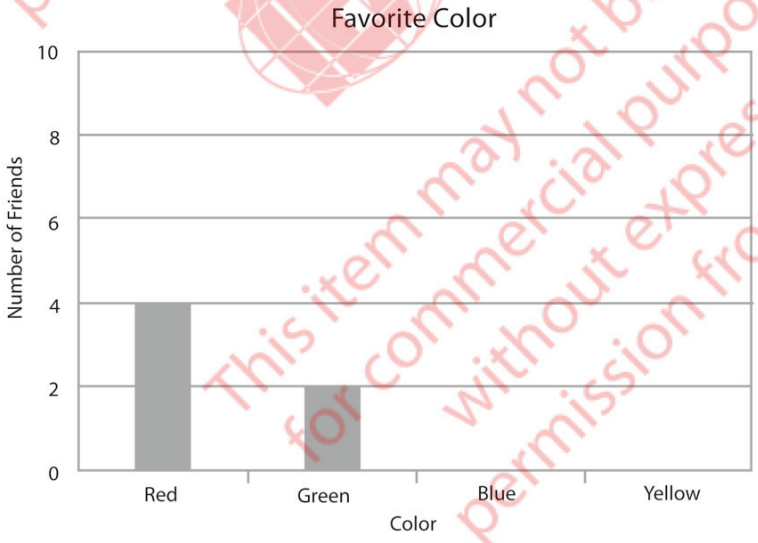
Darin asked his friends to name their favorite color. He collected the information in the table shown below.

Favorite Color	Number of Friends
Red	4
Green	2
Blue	6
Yellow	7

Then Darin started to draw a graph to show the information. Complete Darin's graph.



M031133

Content Domain

Data Display

Topic Area

Organizing and Representing

Cognitive Domain

Applying

Maximum Points

1

Key

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M041107

Joan had 12 apples. She ate some apples, and there were 9 left.
Which number sentence describes what happened?

Ⓐ $12 + 9 = \square$

Ⓑ $9 = 12 + \square$

Ⓒ $12 - \square = 9$

Ⓓ $9 - \square = 12$

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Content Domain

Number

Topic Area

Number Sentences with Whole Numbers

Cognitive Domain

Applying

Maximum Points

1

Key

C

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M041011

Which number is 100 more than 5,432?

Ⓐ 6,432
Ⓑ 5,532
Ⓒ 5,442
Ⓓ 5,433

Content Domain

Number

Topic Area

Whole Numbers

Cognitive Domain

Knowing

Maximum Points

1

Key

B

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M041122

Circle each number which is a factor of 12.

1	2	3	4	5	6	7	8	9	10	11	12

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Content Domain

Number

Topic Area

Whole Numbers

Cognitive Domain

Knowing

Maximum Points

2

Key

See scoring guide

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M041041

Which gives an answer closest to 9×22?

Ⓐ 5×20

Ⓑ 5×25

Ⓒ 10×20

Ⓓ 10×25

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Content Domain

Number

Topic Area

Whole Numbers

Cognitive Domain

Knowing

Maximum Points

1

Key

C

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M041320

Which sentence means Jack ate $\frac{2}{4}$ of a pizza?

Ⓐ Jack ate $\frac{1}{5}$ of the pizza

Ⓑ Jack ate $\frac{1}{4}$ of the pizza

Ⓒ Jack ate $\frac{1}{3}$ of the pizza

Ⓓ Jack ate $\frac{1}{2}$ of the pizza

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Content Domain

Number

Topic Area

Fractions and Decimals

Cognitive Domain

Knowing

Maximum Points

1

Key

D

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Bill is arranging squares in the following way:

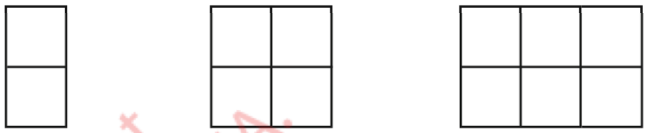

Figure 1 Figure 2 Figure 3

A. Draw Figure 5.

B. How many squares would Bill need to make Figure 16?

Answer: _____

M041115

Content Domain

Number

Topic Area

Patterns and Relationships

Cognitive Domain

Applying

Maximum Points

1

Key

See scoring guide

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Bill is arranging squares in the following way:

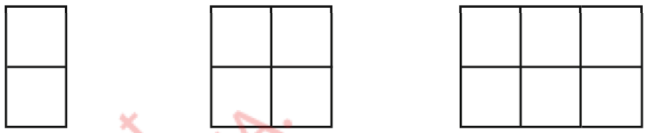

Figure 1 Figure 2 Figure 3

A. Draw Figure 5.

B. How many squares would Bill need to make Figure 16?

Answer: _____

M041115

Content Domain

Number

Topic Area

Patterns and Relationships

Cognitive Domain

Reasoning

Maximum Points

1

Key

See scoring guide

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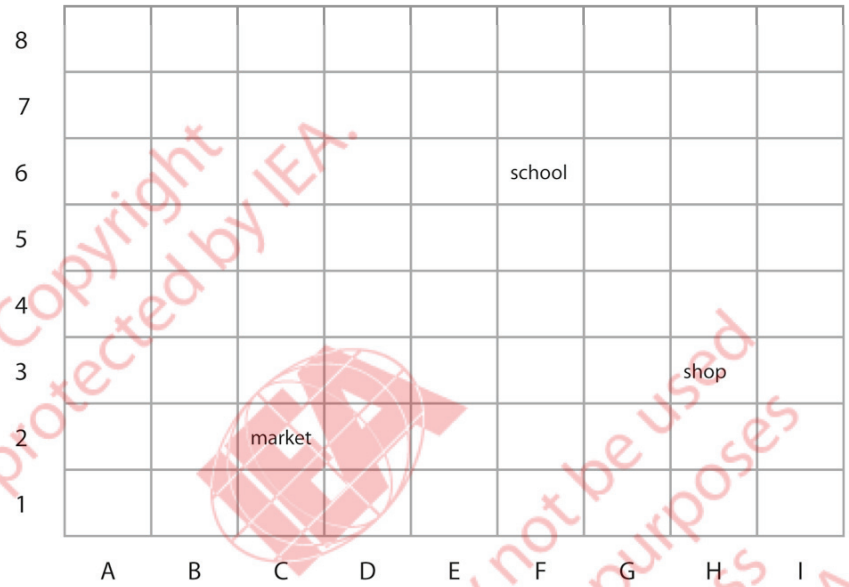
This is a map of Lucy's town. The market is at the position C2.



A. What is the position of the shop?

The shop is at _____

B. Lucy's house is at D5. Put an X on the map to show where Lucy's house is.

M041160

Content Domain

Geometric Shapes and Measures

Topic Area

Points, Lines, and Angles

Cognitive Domain

Knowing

Maximum Points

1

Key

See scoring guide

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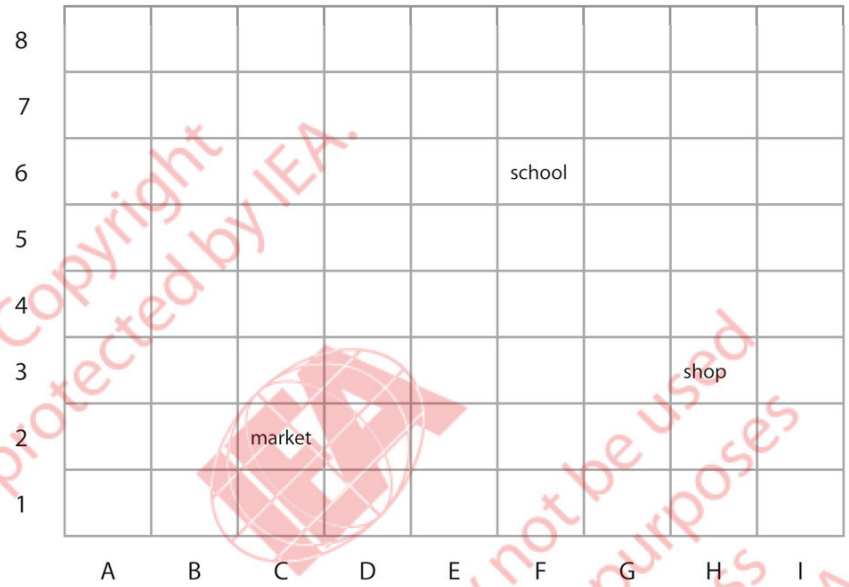
This is a map of Lucy's town. The market is at the position C2.



A. What is the position of the shop?

The shop is at _____

B. Lucy's house is at D5. Put an X on the map to show where Lucy's house is.

M041160

Content Domain

Geometric Shapes and Measures

Topic Area

Points, Lines, and Angles

Cognitive Domain

Applying

Maximum Points

1

Key

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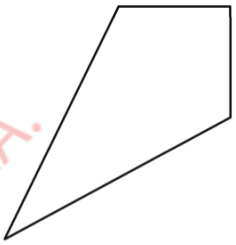
M041327

Draw the line of symmetry on this shape.



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Content Domain

Geometric Shapes and Measures

Topic Area

Two- and Three-dimensional Shapes

Cognitive Domain

Applying

Maximum Points

1

Key

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Figure A

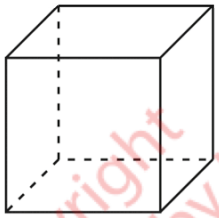
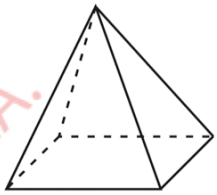


Figure B



Here are some statements about Figure A and Figure B. Put an X to show whether each statement is true or false.

Statement	True	False
A and B both have a square face.	X	
A and B both have the same number of faces.		
All the angles in A are right angles.		
B has more edges than A.		
Some of the edges in B are curved.		

M041148

Content Domain

Geometric Shapes and Measures

Topic Area

Two- and Three-dimensional Shapes

Cognitive Domain

Knowing

Maximum Points

2

Key

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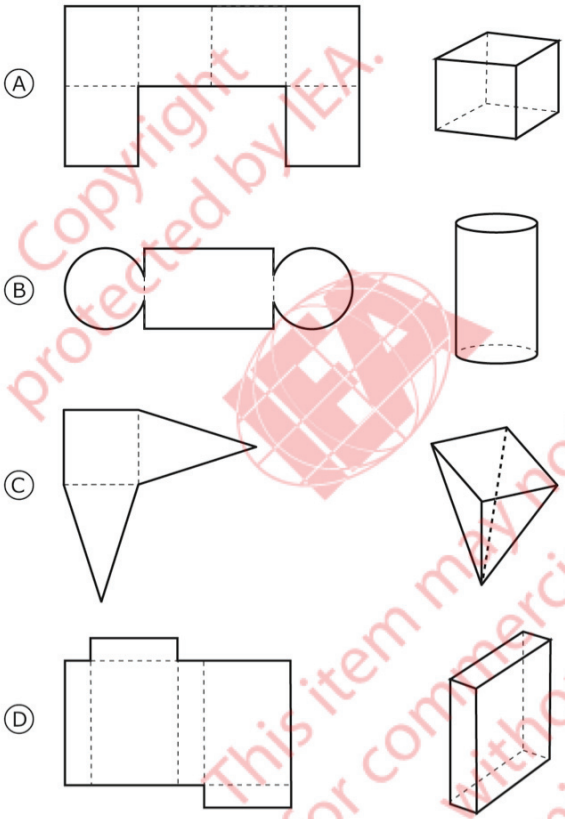
Ina found the following patterns to make containers. Which pattern actually makes the container shown beside it?



M041265

Content Domain

Geometric Shapes and Measures

Topic Area

Two- and Three-dimensional Shapes

Cognitive Domain

Reasoning

Maximum Points

1

Key

D

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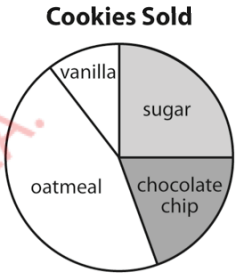
This chart shows the types of cookies sold by the local bakery.



Which type of cookie did the bakery sell most?

Ⓐ oatmeal
Ⓑ vanilla
Ⓒ chocolate chip
Ⓓ sugar

M041175

Content Domain

Data Display

Topic Area

Reading and Interpreting

Cognitive Domain

Knowing

Maximum Points

1

Key

A

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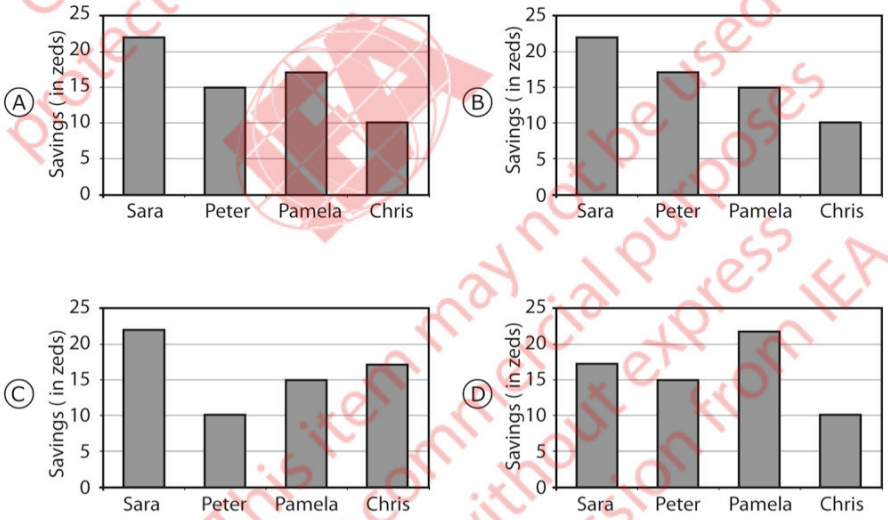
John was given the following table by his teacher and was asked to identify the graph that correctly displays the data. Which graph below should he choose?

Name	Savings
Sara	22 zeds
Peter	15 zeds
Pamela	17 zeds
Chris	10 zeds



M041199

Content Domain

Data Display

Topic Area

Organizing and Representing

Cognitive Domain

Reasoning

Maximum Points

1

Key

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Which of these fractions is larger than $\frac{1}{2}$?

Ⓐ $\frac{3}{5}$

Ⓑ $\frac{3}{6}$

Ⓒ $\frac{3}{8}$

Ⓓ $\frac{3}{10}$

M031210

Content Domain

Number

Topic Area

Fractions and Decimals

Cognitive Domain

Knowing

Maximum Points

1

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M031009

Georgia wants to send letters to 12 of her friends. Half of the letters will need 1 page each and the other half will need 2 pages each. How many pages will be needed altogether?

Answer: _____

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Content Domain

Number

Topic Area

Whole Numbers

Cognitive Domain

Applying

Maximum Points

1

Key

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M031252

If the pattern 3, 6, 9, 12 was continued, which of these numbers would be one of the numbers in the pattern?

Ⓐ 26
Ⓑ 27
Ⓒ 28
Ⓓ 29

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Content Domain

Number

Topic Area

Patterns and Relationships

Cognitive Domain

Applying

Maximum Points

1

Key

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M031316

$4 \times \square = 28$

What number goes in the box to make this number sentence true?

Answer: _____

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Content Domain

Number

Topic Area

Number Sentences with Whole Numbers

Cognitive Domain

Knowing

Maximum Points

1

Key

See scoring guide

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M031317

$3 + 8 = \square + 6$

What number goes in the box to make this number sentence true?

Ⓐ 17
Ⓑ 11
Ⓒ 7
Ⓓ 5

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Content Domain

Number

Topic Area

Number Sentences with Whole Numbers

Cognitive Domain

Knowing

Maximum Points

1

Key

D

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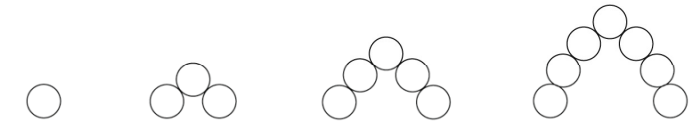

Figure 1 Figure 2 Figure 3 Figure 4

A sequence of four figures is shown above.

A. Complete the table below for Figure 4.

Figure	Number of Circles
1	1
2	3
3	5
4	

B. If there were a Figure 5, how many circles would it have?

Answer: _____

C. If the figures were continued, how many circles would there be in Figure 10? (Do not draw the figures.)

Answer: _____

M031079

Content Domain

Number

Topic Area

Patterns and Relationships

Cognitive Domain

Applying

Maximum Points

1

Key

See scoring guide

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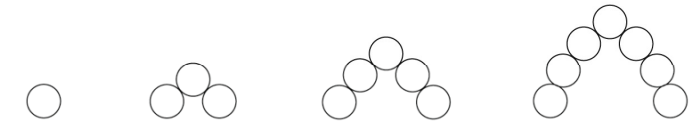

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M031079

Content Domain

Number

Topic Area

Patterns and Relationships

Cognitive Domain

Reasoning

Maximum Points

1

Key

See scoring guide

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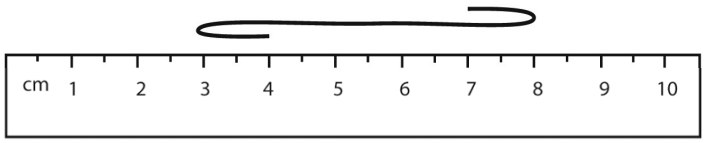

If the string in the diagram above is pulled straight, which of these is closest to its length?

Ⓐ 5 cm
Ⓑ 7 cm
Ⓒ 8 cm
Ⓓ 9 cm

M031004

Content Domain

Geometric Shapes and Measures

Topic Area

Points, Lines, and Angles

Cognitive Domain

Applying

Maximum Points

1

Key

B

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M031043

A train left Redville at 8:45 a.m. It arrived in Bedford 2 hours and 18 minutes later. What time did it arrive in Bedford?

Ⓐ 11:15 a.m.

Ⓑ 11:13 a.m.

Ⓒ 11:03 a.m.

Ⓓ 10:53 a.m.

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Content Domain

Number

Topic Area

Whole Numbers

Cognitive Domain

Applying

Maximum Points

1

Key

C

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M031325

In the space below, draw an angle that is greater than 90 degrees but less than 180 degrees.

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Content Domain

Geometric Shapes and Measures

Topic Area

Points, Lines, and Angles

Cognitive Domain

Applying

Maximum Points

1

Key

See scoring guide

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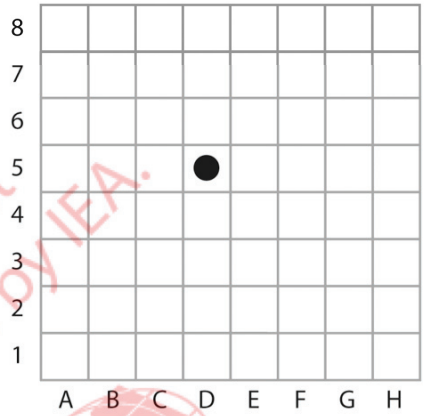

Jamie is playing a board game. His counter is on square D5. Which of these moves would put his counter on square G7?

Ⓐ 2 squares to the right and 3 squares up

Ⓑ 2 squares to the left and 3 squares up

Ⓒ 3 squares to the right and 2 squares up

Ⓓ 3 squares to the left and 2 squares up

M031088

Content Domain

Geometric Shapes and Measures

Topic Area

Points, Lines, and Angles

Cognitive Domain

Applying

Maximum Points

1

Key

C

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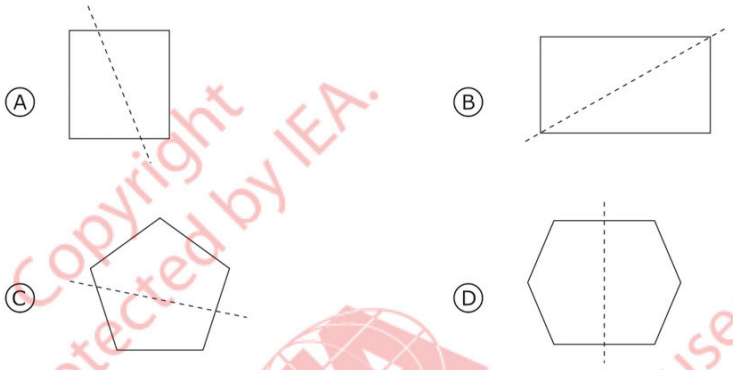
In which of the following figures is the dotted line a line of symmetry?



M031093

Content Domain

Geometric Shapes and Measures

Topic Area

Two- and Three-dimensional Shapes

Cognitive Domain

Knowing

Maximum Points

1

Key

D

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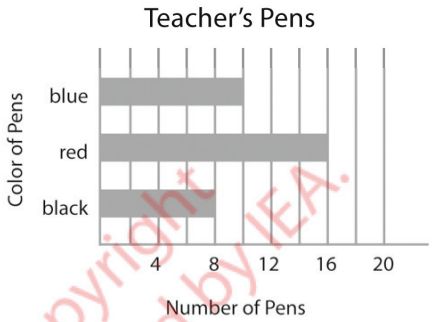

The graph shows the number of blue, red, and black pens the teacher has in his desk. How many more red pens are there than black pens?

Ⓐ 2 more
Ⓑ 4 more
Ⓒ 6 more
Ⓓ 8 more

M031155

Content Domain

Data Display

Topic Area

Reading and Interpreting

Cognitive Domain

Applying

Maximum Points

1

Key

D

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