

**DC Office of the State Superintendent of Education**

# **District of Columbia**

## **Comprehensive Assessment System**

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**2009 Released Items**

**Seventh Grade Mathematics**



Office of the State Superintendent of Education

DISTRICT OF COLUMBIA  
MAYOR ADRIAN M. FENTY

John asked some of his friends how many first cousins they had. His results are shown below.

Number of First Cousins
12
3
7
19
3
4
6
8
1

- A** What is the range of John's data? In the box in the answer booklet, show your work and write your answer on the line.
- B** What is the mean of John's data? In the box in the answer booklet, show your work and write your answer on the line.
- C** The mean and the range measure different things about a data set. Explain what the mean measures and how this is different from what the range measures. On the lines in the answer booklet, write your answer.

Content: Mathematics  
Item Number: 6  
Item ID: 01007870  
Item Type: Constructed Response

Answer Key:  
Max. score points: 3  
Standard: 7.DASP.1  
Reporting Category: Data Analysis, Statistics & Probability



**A**

**B**

**C**

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Content: Mathematics  
Item Number: 6  
Item ID: 01007870  
Item Type: Constructed Response

Answer Key:  
Max. score points: 3  
Standard: 7.DASP.1  
Reporting Category: Data Analysis, Statistics & Probability



A newspaper reports that the median sale price of a condo in a local area is \$300,000. Which statement is true of the condos in this area?

- F** About half the condos have a sale price of more than \$300,000.
- G** More condos have a sale price of \$300,000 than any other amount.
- H** The sum of all the sale prices divided by the number of condos sold is \$300,000.
- J** The difference between the highest price condo and the lowest price condo is \$300,000.

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Content: Mathematics  
Item Number: 18  
Item ID: 01007822  
Item Type: Multiple Choice

Answer Key: F  
Max. score points: 1  
Standard: 7.DASP.1  
Reporting Category: Data Analysis, Statistics & Probability



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MAYOR ADRIAN M. FENTY

The table below shows the monthly rainfall, in inches, for Plainville.

### Plainville Rainfall

Month	Rainfall (in inches)
Jan	2
Feb	2
Mar	2
Apr	2.5
May	3
June	3.5
July	4
Aug	4.5
Sept	4.5
Oct	4.5
Nov	4.5
Dec	5

What is the mean number of inches of monthly rainfall for Plainville?

**F** 3

**H** 3.75

**G** 3.5

**J** 4.5

Content: Mathematics  
Item Number: 22  
Item ID: 00880336  
Item Type: Multiple Choice

Answer Key: G  
Max. score points: 1  
Standard: 7.DASP.1  
Reporting Category: Data Analysis, Statistics & Probability



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Mike recorded the time he took to jog 2 miles every day for 7 days.

Which two measures are the same?

- A** the median and the mode
- B** the median and the mean
- C** the mode and the range
- D** the mean and the range

**Jogging Time**

Day	Time Taken (in minutes)
1	30
2	29
3	27
4	27
5	27
6	28
7	28

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Content: Mathematics  
Item Number: 41  
Item ID: 01172997  
Item Type: Multiple Choice

Answer Key: B  
Max. score points: 1  
Standard: 7.DASP.1  
Reporting Category: Data Analysis, Statistics & Probability



Greg is competing in a bowling tournament. The scores of the 20 bowlers are recorded in the stem-and-leaf plot below.

### Bowling Scores

11	0 2 3
12	4 4 6 8
13	1 2 5 7 8 8 8
14	4 6 6 7
15	1 3

<b>KEY</b>
11   0 = 110

What is the mode of the scores?

- F** 134
- G** 135
- H** 136
- J** 138

Content: Mathematics  
Item Number: 48  
Item ID: 00880340  
Item Type: Multiple Choice

Answer Key: J  
Max. score points: 1  
Standard: 7.DASP.1  
Reporting Category: Data Analysis, Statistics & Probability



Theresa asks her friends to count the number of pencils they have in their backpacks. The results are shown below.

6, 0, 3, 7, 4

What is the mean number of pencils?

- F** 4
- G** 5
- H** 6
- J** 7

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Content: Mathematics  
Item Number: 58  
Item ID: 01007848  
Item Type: Multiple Choice

Answer Key: F  
Max. score points: 1  
Standard: 7.DASP.1  
Reporting Category: Data Analysis, Statistics & Probability



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The scores for 15 students are shown below.

15, 45, 40, 20, 25, 22, 15, 36, 32, 40, 48, 33, 15, 24, 35

What is the median score?

**F** 15

**G** 30

**H** 32

**J** 33

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Content: Mathematics  
Item Number: 60  
Item ID: 00881640  
Item Type: Multiple Choice

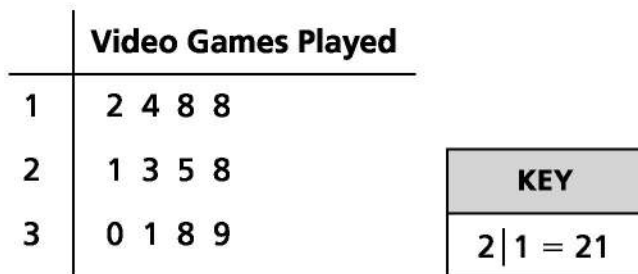
Answer Key: H  
Max. score points: 1  
Standard: 7.DASP.1  
Reporting Category: Data Analysis, Statistics & Probability



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The stem-and-leaf plot shows the number of times Amy played a video game each month during the year.



What is the median of the given data?

- F** 23
- G** 24
- H** 25
- J** 27

Content: Mathematics  
Item Number: 40  
Item ID: 01173006  
Item Type: Multiple Choice

Answer Key: G  
Max. score points: 1  
Standard: 7.DASP.1  
Reporting Category: Data Analysis, Statistics & Probability



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Greg is competing in a bowling tournament. The scores of the 20 bowlers are recorded in the stem-and-leaf plot below.

### Bowling Scores

11	0 2 3
12	4 4 6 8
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KEY
11 0 = 110

What is the mode of the scores?

- F** 134
- G** 135
- H** 136
- J** 138

Content: Mathematics  
Item Number: 48  
Item ID: 00880340  
Item Type: Multiple Choice

Answer Key: J  
Max. score points: 1  
Standard: 7.DASP.1  
Reporting Category: Data Analysis, Statistics & Probability



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Dave made the table below showing the types of shoes his classmates were wearing.

Type of Shoes	Number of Students
Sandals	10
Sneakers	12
Other	3

Dave makes a circle graph showing this data. What fraction of the circle should he shade for sandals?

- A**  $\frac{1}{10}$
- B**  $\frac{1}{3}$
- C**  $\frac{2}{5}$
- D**  $\frac{2}{3}$

Content: Mathematics  
Item Number: 9  
Item ID: 01007820  
Item Type: Multiple Choice

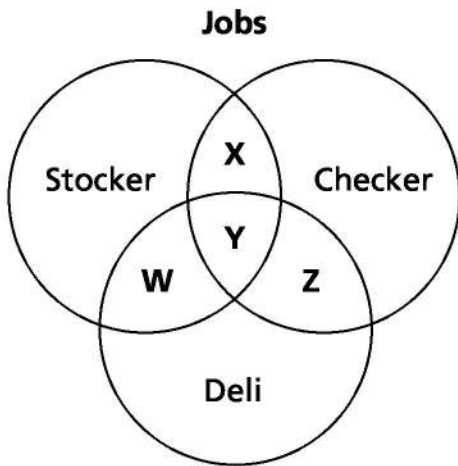
Answer Key: C  
Max. score points: 1  
Standard: 7.DASP.2  
Reporting Category: Data Analysis, Statistics & Probability



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At a grocery store, jobs are recorded on a Venn diagram like the one below.



If an employee only works as a checker and in the deli, in which region of the diagram does the employee belong?

- F** W
- G** X
- H** Y
- J** Z

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Content: Mathematics  
Item Number: 20  
Item ID: 00881632  
Item Type: Multiple Choice

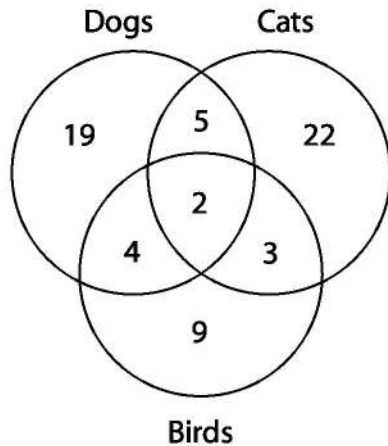
Answer Key: J  
Max. score points: 1  
Standard: 7.DASP.2  
Reporting Category: Data Analysis, Statistics & Probability



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Benji asked some customers in a pet store what kind of pets they owned. The Venn diagram below shows Benji's data.



Of the people Benji asked, how many do not own a dog?

- F** 30
- G** 34
- H** 38
- J** 45

Content: Mathematics  
Item Number: 66  
Item ID: 01007880  
Item Type: Multiple Choice

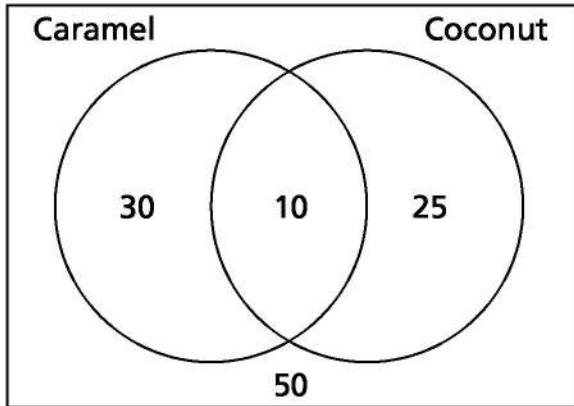
Answer Key: G  
Max. score points: 1  
Standard: 7.DASP.2  
Reporting Category: Data Analysis, Statistics & Probability



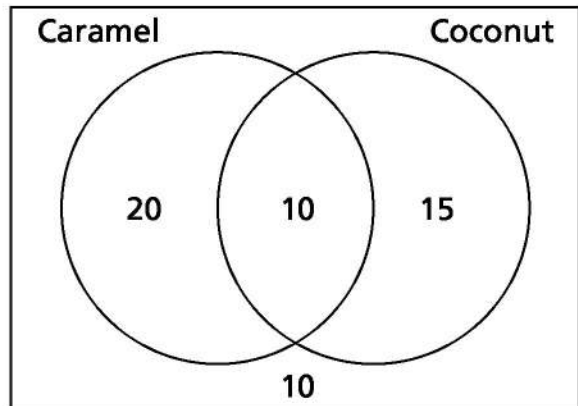
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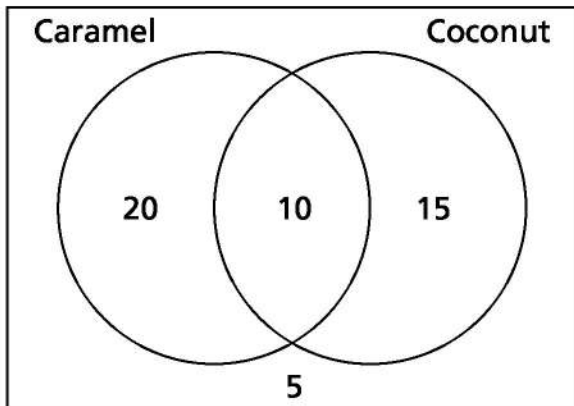
In a box of 50 chocolates, 30 chocolates contain caramel, 25 contain coconut, 10 contain both caramel and coconut, and the rest contain neither caramel nor coconut. Which Venn diagram best represents the information about the chocolates in the box?



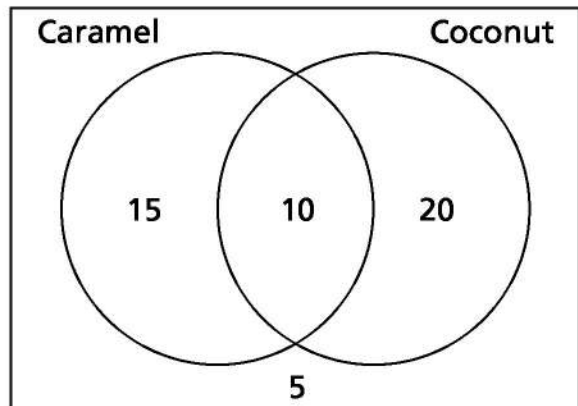
**A**



**C**



**B**



**D**

Content: Mathematics  
 Item Number: 51  
 Item ID: 01173014  
 Item Type: Multiple Choice

Answer Key: B  
 Max. score points: 1  
 Standard: 7.DASP.2  
 Reporting Category: Data Analysis, Statistics & Probability

A television channel wants to find the most popular television show among children by surveying members of a sample population. Which of these samples is likely to give the most representative results?

- F** a group of mothers at a doctor's office
- G** fifty high school students at a football game
- H** the first 50 people at the library on a Saturday
- J** fifty children from different age groups at a shopping mall

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Content: Mathematics  
Item Number: 70  
Item ID: 01173037  
Item Type: Multiple Choice

Answer Key: J  
Max. score points: 1  
Standard: 7.DASP.3  
Reporting Category: Data Analysis, Statistics & Probability

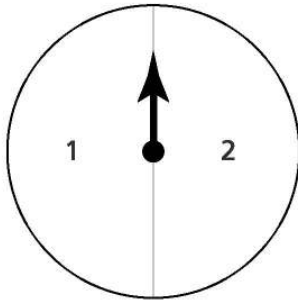


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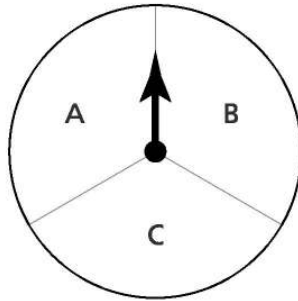
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Michelle is playing a game in which she has to spin the two spinners shown below. She has to spin the number spinner first and then the alphabet spinner.



Number Spinner



Alphabet Spinner

- A:** Draw a tree diagram to show all the possible number and alphabet combinations that the arrows can land on. Show your work in the box in the answer booklet.
- B:** Michelle will win the game if the arrow lands on the number 2 and the letter A. What is the probability that Michelle will win the game? Show your work in the box in the answer booklet and write your answer on the line.

<b>A</b>	
<b>B</b>	<div style="text-align: right; margin-top: 10px;">_____</div>

Content: Mathematics  
Item Number: 32  
Item ID: 01173045  
Item Type: Constructed Response

Answer Key:  
Max. score points: 3  
Standard: 7.DASP.4  
Reporting Category: Data Analysis, Statistics & Probability



Which three-dimensional figure has exactly one pair of parallel faces?

- A** cone
- B** cylinder
- C** rectangular prism
- D** triangular pyramid

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Content: Mathematics  
Item Number: 23  
Item ID: 01007854  
Item Type: Multiple Choice

Answer Key: B  
Max. score points: 1  
Standard: 7.G.1  
Reporting Category: Geometry



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Alan looked at a wood block and made the statement below.

“The wood block has 3 vertices less than the number of vertices in a rectangular prism.” Which of these solids was the wood block?

- A** rectangular pyramid
- B** triangular pyramid
- C** triangular prism
- D** cylinder

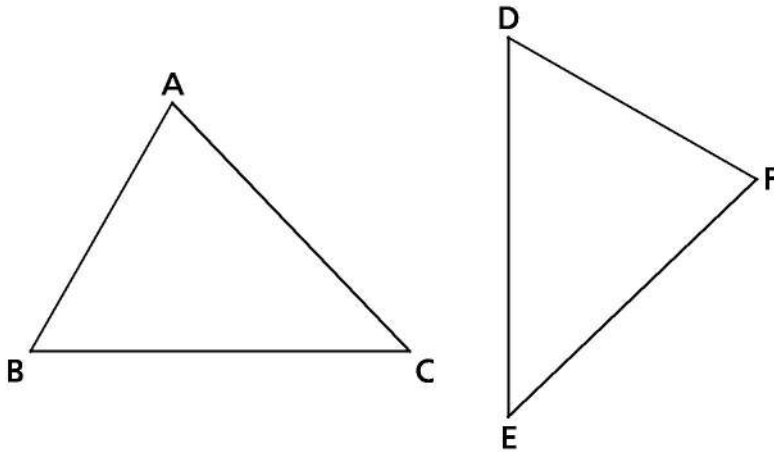
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Content: Mathematics  
Item Number: 33  
Item ID: 01173025  
Item Type: Multiple Choice

Answer Key: A  
Max. score points: 1  
Standard: 7.G.1  
Reporting Category: Geometry



Look at the two triangles below.



In the two triangles,  $\angle ABC \cong \angle FDE$  and  $\overline{BC} \cong \overline{DE}$ .

Which of these should also be true for the two triangles to be congruent?

- A**  $\overline{DF} \cong \overline{AC}$
- B**  $\overline{FE} \cong \overline{BC}$
- C**  $\angle BAC \cong \angle FED$
- D**  $\angle CAB \cong \angle EFD$

Content: Mathematics  
Item Number: 67  
Item ID: 01173053  
Item Type: Multiple Choice

Answer Key: D  
Max. score points: 1  
Standard: 7.G.2  
Reporting Category: Geometry

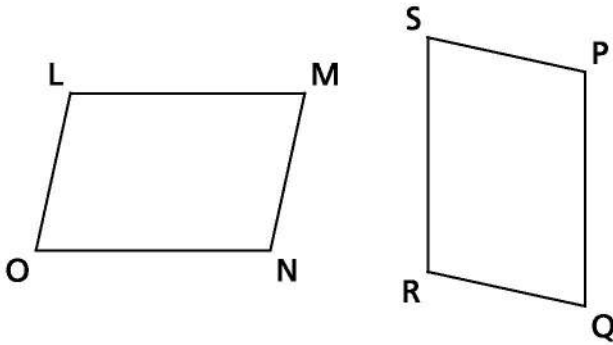


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The quadrilaterals LMNO and PQRS are congruent.



If  $\overline{LM} \cong \overline{PQ}$ ,  $\overline{ON} \cong \overline{SR}$ ,  $\overline{OL} \cong \overline{SP}$ , and  $\overline{NM} \cong \overline{RQ}$ , then which angle is congruent to  $\angle LMN$  ?

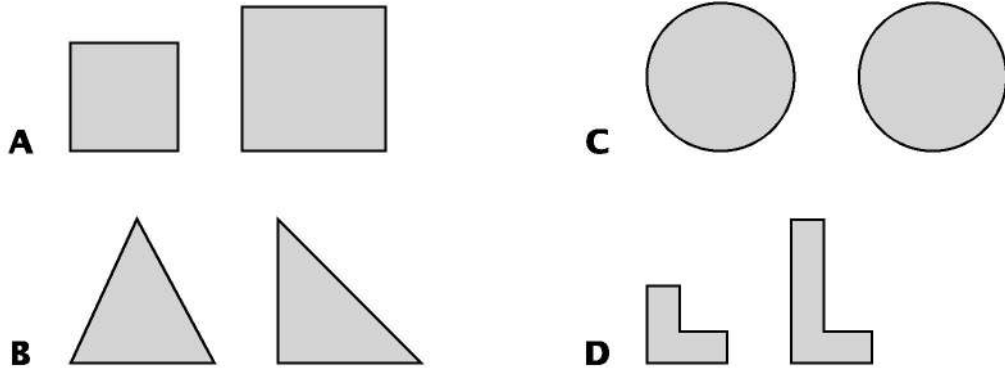
- A**  $\angle SPQ$
- B**  $\angle PSR$
- C**  $\angle PQR$
- D**  $\angle SRQ$

Content: Mathematics  
 Item Number: 69  
 Item ID: 01173057  
 Item Type: Multiple Choice

Answer Key: C  
 Max. score points: 1  
 Standard: 7.G.2  
 Reporting Category: Geometry



Which pair of figures appears similar but not congruent?

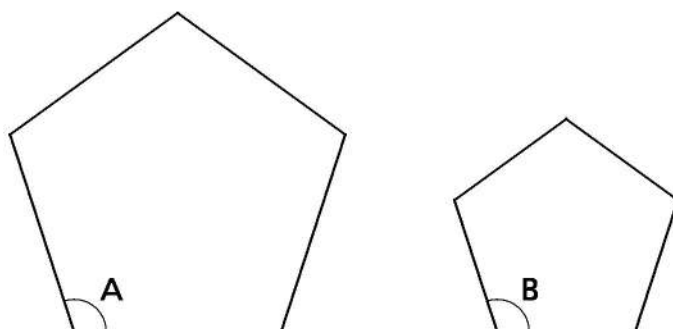


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Content: Mathematics  
Item Number: 17  
Item ID: 01007852  
Item Type: Multiple Choice

Answer Key: A  
Max. score points: 1  
Standard: 7.G.3  
Reporting Category: Geometry

Look at the similar figures below.



If the measure of angle A is  $108^\circ$ , what is the measure of angle B?

- A**  $54^\circ$
- B**  $108^\circ$
- C**  $162^\circ$
- D**  $216^\circ$

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Content: Mathematics  
Item Number: 27  
Item ID: 00881616  
Item Type: Multiple Choice

Answer Key: B  
Max. score points: 1  
Standard: 7.G.3  
Reporting Category: Geometry



Joanne made a rectangular "Save the Environment" sticker. The figure below shows the dimensions of the sticker.



Width = 2 in.

Length = 3 in.

She also made a poster in the same shape. The poster was similar in size to the sticker.

If the length of the poster was 24 inches, what was the width, in inches, of the poster?

- A** 8
- B** 16
- C** 23
- D** 36

---

Content: Mathematics  
Item Number: 35  
Item ID: 01173029  
Item Type: Multiple Choice

Answer Key: B  
Max. score points: 1  
Standard: 7.G.3  
Reporting Category: Geometry

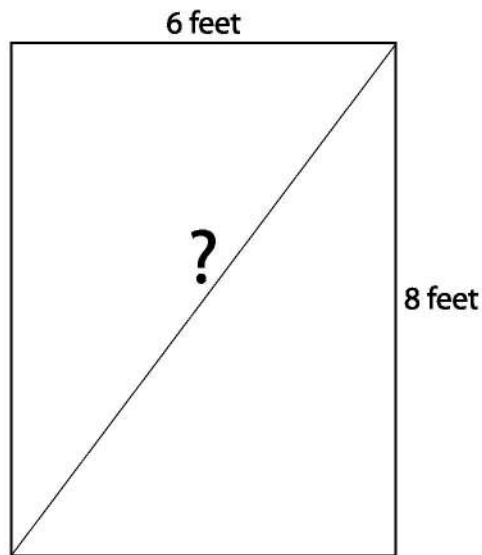


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Abrianna built a bookcase that is 8 feet tall and 6 feet wide. She put a diagonal brace across the back of the bookcase, as shown below.



What is the length of the diagonal brace?

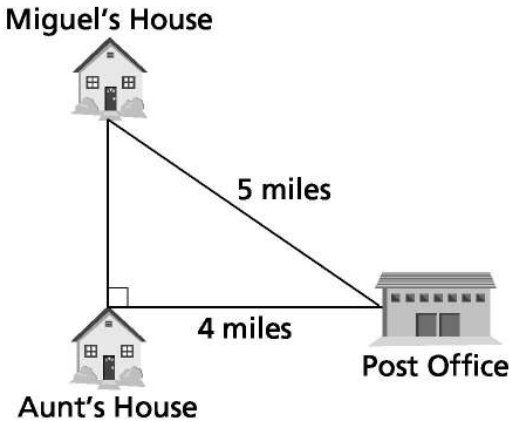
- A** 7 feet
- B** 10 feet
- C** 12 feet
- D** 14 feet

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Content: Mathematics  
Item Number: 7  
Item ID: 01007832  
Item Type: Multiple Choice

Answer Key: B  
Max. score points: 1  
Standard: 7.G.4  
Reporting Category: Geometry

- A The lengths of the sides of a triangle are 5 units, 12 units, and 13 units. Prove that the triangle is a right triangle. Show your work in the box in the answer booklet and write your answer on the line.
- B Miguel cycled from his house to his aunt's house and then to the post office. The distances between all these places are shown in the figure below.



What is the distance, in miles, between Miguel's house and his aunt's house? Write your answer on the line in the answer booklet.

**A**

\_\_\_\_\_

**B** \_\_\_\_\_ miles

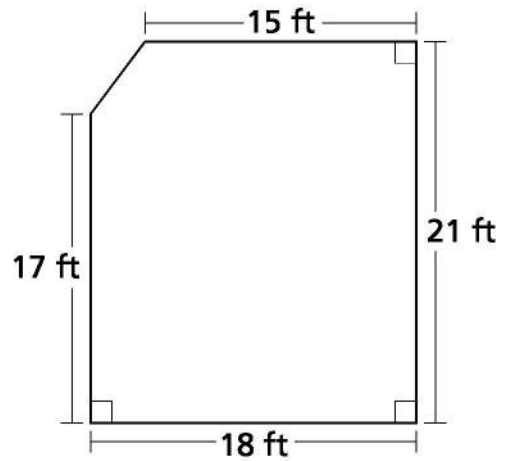
Content: Mathematics  
Item Number: 32  
Item ID: 01173023  
Item Type: Constructed Response

Answer Key:  
Max. score points: 3  
Standard: 7.G.4  
Reporting Category: Geometry

Joshua is planning to build a fence around his vegetable garden. The shape and some measurements of the garden are shown in the figure below.

What is the perimeter, in feet, of the garden?

- F** 71
- G** 76
- H** 83
- J** 96



Content: Mathematics  
Item Number: 40  
Item ID: 01172995  
Item Type: Multiple Choice

Answer Key: G  
Max. score points: 1  
Standard: 7.G.4  
Reporting Category: Geometry



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Which shape can be drawn using only a compass?

- F** circle
- G** square
- H** triangle
- J** trapezoid

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Content: Mathematics  
Item Number: 44  
Item ID: 01007830  
Item Type: Multiple Choice

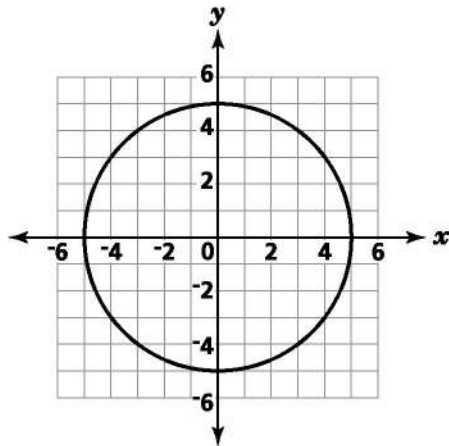
Answer Key: F  
Max. score points: 1  
Standard: 7.G.5  
Reporting Category: Geometry



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Look at the circle on the coordinate grid below.



$$\text{Area} = \pi r^2$$

What is the area of the circle?

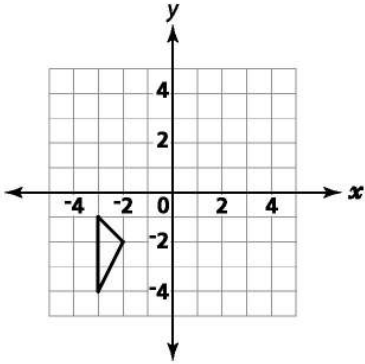
- F**  $5\pi$  square units
- G**  $10\pi$  square units
- H**  $25\pi$  square units
- J**  $100\pi$  square units

Content: Mathematics  
Item Number: 12  
Item ID: 00881618  
Item Type: Multiple Choice

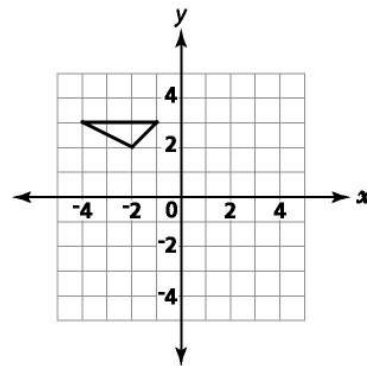
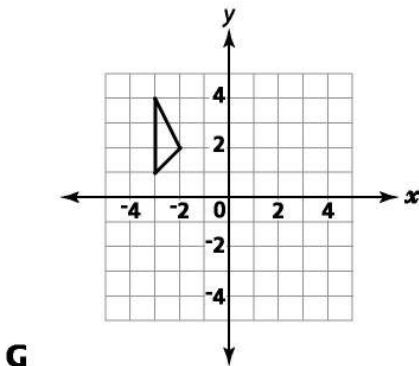
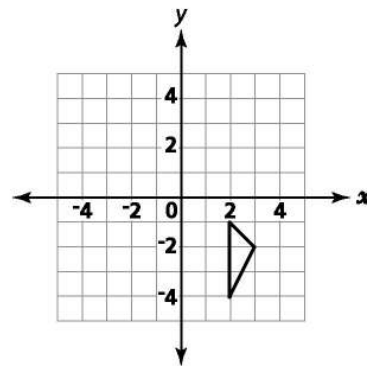
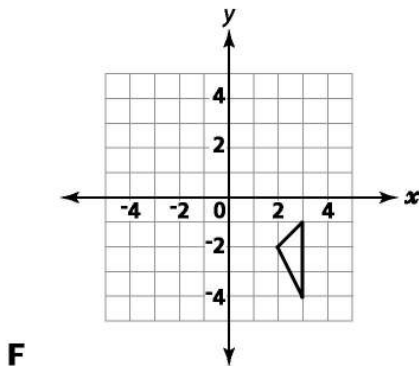
Answer Key: H  
Max. score points: 1  
Standard: 7.G.6  
Reporting Category: Geometry



Raphael graphed the triangle on the coordinate grid below.



Then Raphael flipped the triangle over the y-axis. Which coordinate grid shows the resulting figure?



Content: Mathematics  
Item Number: 50  
Item ID: 01007872  
Item Type: Multiple Choice

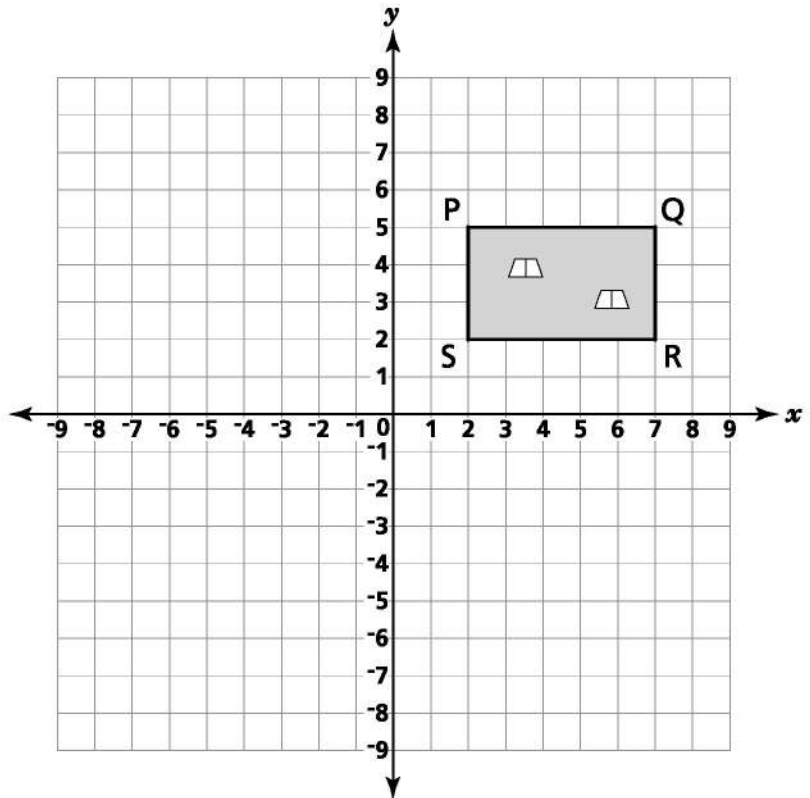
Answer Key: F  
Max. score points: 1  
Standard: 7.G.6  
Reporting Category: Geometry



The figure below shows the position of the rectangular table, PQRS, in Jen's dining room.

Jen rearranged the table by rotating it  $180^\circ$  clockwise about its center. Which of these shows the new coordinates of the table?

- A** P (2, 5), Q (7, 5), R (7, 2), S (2, 2)
- B** P (3, 1), Q (3, 6), R (6, 6), S (6, 1)
- C** P (6, 6), Q (6, 1), R (3, 1), S (3, 6)
- D** P (7, 2), Q (2, 2), R (2, 5), S (7, 5)



Content: Mathematics  
Item Number: 69  
Item ID: 01173035  
Item Type: Multiple Choice

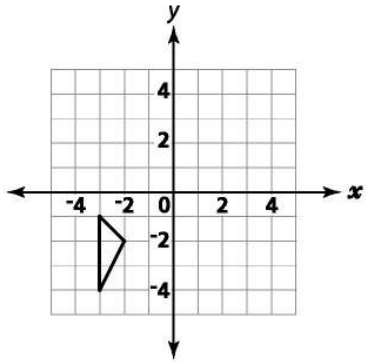
Answer Key: D  
Max. score points: 1  
Standard: 7.G.6  
Reporting Category: Geometry



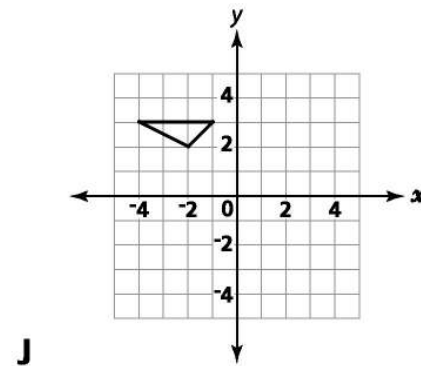
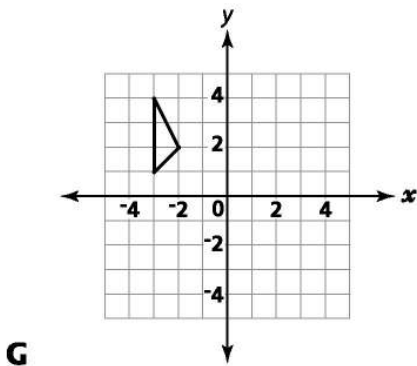
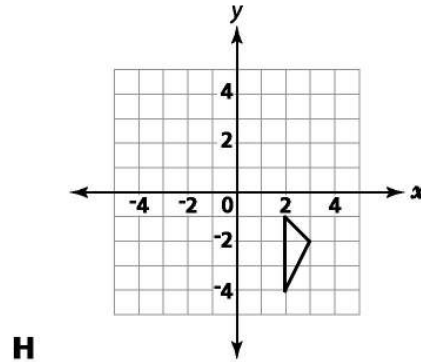
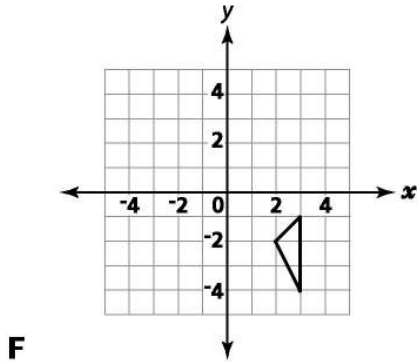
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Raphael graphed the triangle on the coordinate grid below.



Then Raphael flipped the triangle over the  $y$ -axis. Which coordinate grid shows the resulting figure?



Content: Mathematics  
 Item Number: 50  
 Item ID: 01007872  
 Item Type: Multiple Choice

Answer Key: F  
 Max. score points: 1  
 Standard: 7.G.6  
 Reporting Category: Geometry





Ivan ran 200 yards. Which of these is closest to the number of meters he ran?

1 yard = 0.91 meters

- A** 16.6 meters
- B** 66.6 meters
- C** 180 meters
- D** 220 meters

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Content: Mathematics  
Item Number: 11  
Item ID: 00881620  
Item Type: Multiple Choice

Answer Key: C  
Max. score points: 1  
Standard: 7.M.1  
Reporting Category: Measurement



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Jerome's bowling ball weighs 15 pounds. About how many kilograms does his bowling ball weigh?

1 kilogram  $\approx$  2.2 pounds

- F** 7 kilograms
- G** 13 kilograms
- H** 17 kilograms
- J** 30 kilograms

---

Content: Mathematics  
Item Number: 36  
Item ID: 01007864  
Item Type: Multiple Choice

Answer Key: F  
Max. score points: 1  
Standard: 7.M.1  
Reporting Category: Measurement



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Jerome's bowling ball weighs 15 pounds. About how many kilograms does his bowling ball weigh?

1 kilogram  $\approx$  2.2 pounds

- F** 7 kilograms
- G** 13 kilograms
- H** 17 kilograms
- J** 30 kilograms

---

Content: Mathematics  
Item Number: 36  
Item ID: 01007864  
Item Type: Multiple Choice

Answer Key: F  
Max. score points: 1  
Standard: 7.M.1  
Reporting Category: Measurement



A high school soccer field is 120 yards long. Which of these is closest to the length of the soccer field, in meters?

1 yard  $\cong$  0.91 meter

**F** 131.86

**G** 120.91

**H** 119.09

**J** 109.20

---

Content: Mathematics  
Item Number: 42  
Item ID: 01173010  
Item Type: Multiple Choice

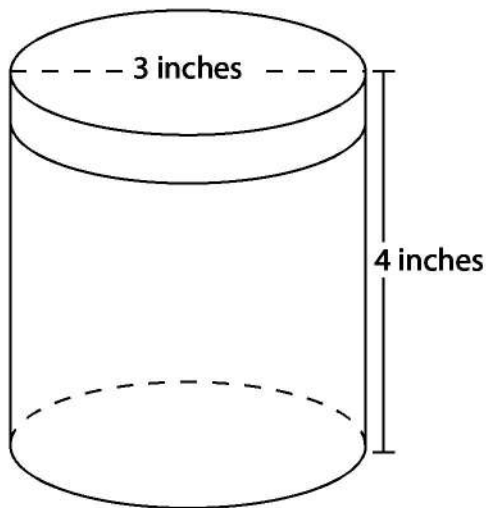
Answer Key: J  
Max. score points: 1  
Standard: 7.M.1  
Reporting Category: Measurement



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Maria has a cylindrical jar of paint, as shown below.



$$\text{Volume} = \pi r^2 h$$

What is the volume, to the nearest cubic inch, of this jar of paint?

Use 3.14 for  $\pi$ .

- A** 7 cubic inches
- B** 28 cubic inches
- C** 38 cubic inches
- D** 113 cubic inches

Content: Mathematics  
Item Number: 5  
Item ID: 01172990  
Item Type: Multiple Choice

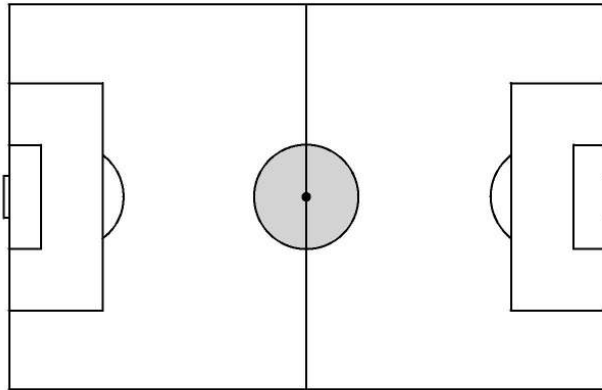
Answer Key: B  
Max. score points: 1  
Standard: 7.M.2  
Reporting Category: Measurement



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The shaded part of the figure shows the center circle in a soccer field. The circle has a circumference of 62.8 yards.



Use  $\pi = 3.14$  in all your calculations.

- A** During kickoff, the defending team members have to be on their side of the field and cannot be in the center circle. The ball is at the center of the circle. What is the shortest distance, in yards, from the ball that a defender can stand during kickoff? Show your work in the box in the answer booklet, and write your answer on the line.
- B** What is the area, in square yards, of the center circle? Show your work in the box in the answer booklet and write your answer on the line.

**A**

\_\_\_\_\_ yards

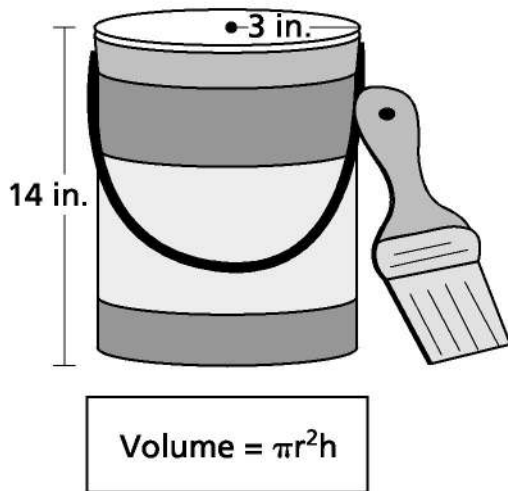
**B**

\_\_\_\_\_ square yards

Content: Mathematics  
 Item Number: 43  
 Item ID: 01173001  
 Item Type: Constructed Response

Answer Key:  
 Max. score points: 3  
 Standard: 7.M.2  
 Reporting Category: Measurement

Julian bought the can of paint shown below.



Which of these is closest to the volume of paint in the can when the can is full?

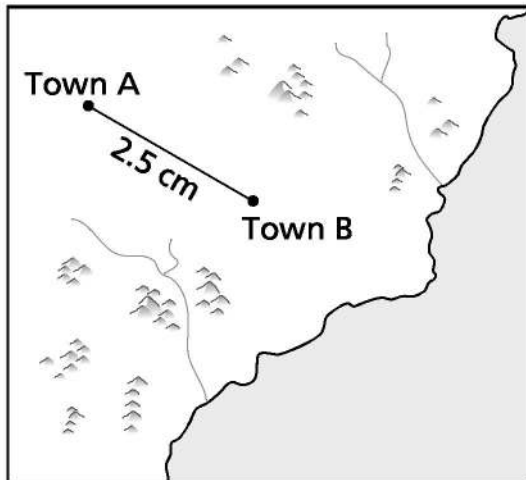
- A** 99 cubic inches
- B** 264 cubic inches
- C** 396 cubic inches
- D** 1,848 cubic inches

---

Content: Mathematics  
Item Number: 41  
Item ID: 01173008  
Item Type: Multiple Choice

Answer Key: C  
Max. score points: 1  
Standard: 7.M.2  
Reporting Category: Measurement

Look at the map below.



Town A is 100 miles from Town B. What is the scale used for this map?

- F** 1 cm = 4 miles
- G** 1 cm = 25 miles
- H** 1 cm = 40 miles
- J** 1 cm = 250 miles

---

Content: Mathematics  
Item Number: 38  
Item ID: 00881624  
Item Type: Multiple Choice

Answer Key: H  
Max. score points: 1  
Standard: 7.M.4  
Reporting Category: Measurement



Ronald makes a scale drawing of a bus, using a scale of 2 inches = 8 feet. The bus is 24 feet long. What is the length of the scale drawing?

- F** 3 inches
- G** 6 inches
- H** 12 inches
- J** 96 inches

---

Content: Mathematics  
Item Number: 64  
Item ID: 01007842  
Item Type: Multiple Choice

Answer Key: G  
Max. score points: 1  
Standard: 7.M.5  
Reporting Category: Measurement



- A** Derek plans to make  $2\frac{1}{2}$  loaves of nut bread. Each loaf uses  $1\frac{2}{3}$  cups of flour.

In total, how many cups of flour will Derek use? Show your work in the box in the answer booklet and write your answer on the line.

- B** Each loaf of nut bread uses  $\frac{3}{4}$  cup of walnuts. Derek has a total of  $6\frac{1}{4}$  cups of walnuts.

How many cups of walnuts will Derek have left after making  $2\frac{1}{2}$  loaves of nut bread? Show your work in the box in the answer booklet and write your answer on the line.

**A**

\_\_\_\_\_ cups

**B**

\_\_\_\_\_ cups of walnuts left

Content: Mathematics  
Item Number: 59  
Item ID: 01007856  
Item Type: Constructed Response

Answer Key:  
Max. score points: 3  
Standard: 7.NSO-C.10  
Reporting Category: Number Sense & Operations



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Ellen can run 3 miles in 21 minutes. If she continues running at the same rate, how long, in minutes, will it take her to run 7 miles?

- F** 28 minutes
- G** 42 minutes
- H** 49 minutes
- J** 63 minutes

---

Content: Mathematics  
Item Number: 4  
Item ID: 00789537  
Item Type: Multiple Choice

Answer Key: H  
Max. score points: 1  
Standard: 7.NSO-C.12  
Reporting Category: Number Sense & Operations



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Tim went to a fruit smoothie shop. The prices, including tax, are shown on the sign below.

<b>Smoothies</b>	
<b>Small Smoothie</b>	<b>\$3.37</b>
<b>Medium Smoothie</b>	<b>\$3.63</b>
<b>Large Smoothie</b>	<b>\$3.95</b>
<b>Whipped Cream</b>	<b>\$0.75</b>
<b>Vitamin Boost</b>	<b>\$0.50</b>

Tim gave the clerk \$5.00 for a medium smoothie with whipped cream and a vitamin boost. How much change should he receive?

- F** \$0.12
- G** \$0.62
- H** \$0.87
- J** \$1.37

---

Content: Mathematics  
Item Number: 10  
Item ID: 00880334  
Item Type: Multiple Choice

Answer Key: F  
Max. score points: 1  
Standard: 7.NSO-C.12  
Reporting Category: Number Sense & Operations



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Kevin's puppy weighed 18 pounds when he got her. When she was full-grown, she weighed 45 pounds. By what percentage did her weight increase?

- A** 27%
- B** 60%
- C** 150%
- D** 250%

---

Content: Mathematics  
Item Number: 1  
Item ID: 01007868  
Item Type: Multiple Choice

Answer Key: C  
Max. score points: 1  
Standard: 7.NSO-C.13  
Reporting Category: Number Sense & Operations



The number of bald eagle nests found in a state increased from 54 one year to 62 the next. What was the approximate percentage of increase in bald eagle nests from one year to the next?

- F** 0.08%
- G** 8%
- H** 12.9%
- J** 14.8%

---

Content: Mathematics  
Item Number: 42  
Item ID: 01172999  
Item Type: Multiple Choice

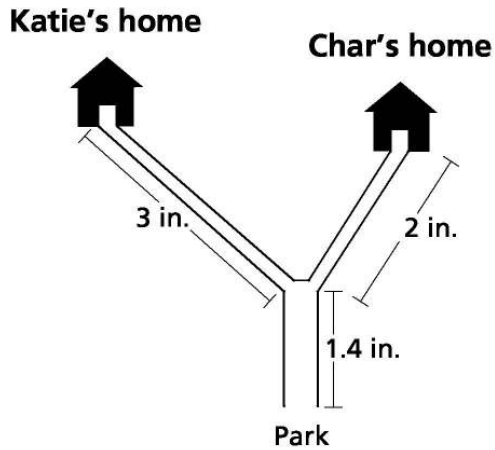
Answer Key: J  
Max. score points: 1  
Standard: 7.NSO-C.13  
Reporting Category: Number Sense & Operations



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The map below shows the locations of Katie's home, Char's home, and the nearest park.



Scale: 1 inch (in.) = 0.5 mile (mi)

- A What is the total distance, in miles, between Char's home and the park? Show your work in the box in the answer booklet and write your answer on the line.
- B How many more miles away from the park does Katie live than Char? Write your answer on the line in the answer booklet.

A  \_\_\_\_\_ miles

B  \_\_\_\_\_ miles

Content: Mathematics  
Item Number: 43  
Item ID: 01173012  
Item Type: Constructed Response

Answer Key:  
Max. score points: 3  
Standard: 7.NSO-C.14  
Reporting Category: Number Sense & Operations

What is the value of  $\frac{(2^5)(2^{-3})}{2^2}$ ?

- A** 64
- B** 16
- C** 2
- D** 1

---

Content: Mathematics  
Item Number: 35  
Item ID: 01173051  
Item Type: Multiple Choice

Answer Key: D  
Max. score points: 1  
Standard: 7.NSO-C.16  
Reporting Category: Number Sense & Operations



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Which expression has the same value as  $4(7 + 9)$ ?

**A**  $4 \times 7 \times 9$

**B**  $4 \times 7 + 9$

**C**  $(4 + 7) \times (4 + 9)$

**D**  $(4 \times 7) + (4 \times 9)$

---

Content: Mathematics  
Item Number: 45  
Item ID: 01007828  
Item Type: Multiple Choice

Answer Key: D  
Max. score points: 1  
Standard: 7.NSO-C.18  
Reporting Category: Number Sense & Operations



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What is the value of the expression below?

$$2(3 + 4)^2$$

- F** 22
- G** 28
- H** 98
- J** 100

---

Content: Mathematics  
Item Number: 8  
Item ID: 01007818  
Item Type: Multiple Choice

Answer Key: H  
Max. score points: 1  
Standard: 7.NSO-C.19  
Reporting Category: Number Sense & Operations



The distance, in miles, jogged by four students in a week is shown in the table below.

### Jogging Distances

Student	Distance Jogged (in miles)
Paula	$9\frac{1}{3}$
Amy	16.3
Winston	$\frac{182}{25}$
Charlie	11.8

Who jogged the least distance?

- F** Paula
- G** Amy
- H** Winston
- J** Charlie

Content: Mathematics  
Item Number: 14  
Item ID: 01173017  
Item Type: Multiple Choice

Answer Key: H  
Max. score points: 1  
Standard: 7.NSO-N.1  
Reporting Category: Number Sense & Operations



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Which inequality is true?

**A**  $0.3 < \frac{1}{3}$

**B**  $\frac{1}{3} < 0.3$

**C**  $0.75 < \frac{3}{4}$

**D**  $\frac{3}{4} < 0.75$

---

Content: Mathematics  
Item Number: 65  
Item ID: 01007876  
Item Type: Multiple Choice

Answer Key: A  
Max. score points: 1  
Standard: 7.NSO-N.1  
Reporting Category: Number Sense & Operations



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Which of these is an irrational number?

**F**  $\sqrt{9}$

**G**  $\sqrt{36}$

**H**  $\sqrt{53}$

**J**  $\sqrt{64}$

---

Content: Mathematics  
Item Number: 54  
Item ID: 00880322  
Item Type: Multiple Choice

Answer Key: H  
Max. score points: 1  
Standard: 7.NSO-N.2  
Reporting Category: Number Sense & Operations



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Which fraction is equivalent to 0.45?

**F**  $\frac{9}{20}$

**G**  $\frac{5}{11}$

**H**  $\frac{27}{59}$

**J**  $\frac{41}{90}$

---

Content: Mathematics  
Item Number: 14  
Item ID: 01173039  
Item Type: Multiple Choice

Answer Key: F  
Max. score points: 1  
Standard: 7.NSO-N.2  
Reporting Category: Number Sense & Operations



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A store sold 13,600 video games in one year. How is 13,600 written in scientific notation?

- A**  $1.36 \times 10^4$
- B**  $1.36 \times 10^5$
- C**  $13.6 \times 10^3$
- D**  $13.6 \times 10^4$

---

Content: Mathematics  
Item Number: 53  
Item ID: 01007878  
Item Type: Multiple Choice

Answer Key: A  
Max. score points: 1  
Standard: 7.NSO-N.4  
Reporting Category: Number Sense & Operations



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Earth is an average distance of  $9.3 \times 10^7$  miles from the sun. Jupiter is an average distance of  $4.83 \times 10^8$  miles from the sun. What is the difference between the two distances, in scientific notation?

- A**  $9.783 \times 10^9$
- B**  $8.817 \times 10^9$
- C**  $5.76 \times 10^8$
- D**  $3.9 \times 10^8$

---

Content: Mathematics  
Item Number: 33  
Item ID: 01173047  
Item Type: Multiple Choice

Answer Key: D  
Max. score points: 1  
Standard: 7.NSO-N.4  
Reporting Category: Number Sense & Operations



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What is the simplified form of the expression  $\frac{x^4y^{-2}}{x^{-9}y^4}$ ?

**F**  $x^{-5}y^2$

**G**  $x^{-13}y^6$

**H**  $x^{13}y^{-6}$

**J**  $x^5y^{-2}$

---

Content: Mathematics  
Item Number: 68  
Item ID: 01173055  
Item Type: Multiple Choice

Answer Key: H  
Max. score points: 1  
Standard: 7.NSO-N.6  
Reporting Category: Number Sense & Operations



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Which of these shows the prime factorization of 480?

**F**  $2^4 \times 3 \times 5$

**H**  $2^5 \times 3 \times 5$

**G**  $2^6 \times 3$

**J**  $2^6 \times 3 \times 5$

---

Content: Mathematics  
Item Number: 28  
Item ID: 00880338  
Item Type: Multiple Choice

Answer Key: H  
Max. score points: 1  
Standard: 7.NSO-N.7  
Reporting Category: Number Sense & Operations



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Which expression shows the prime factorization of 432?

**A**  $2^3 \times 3^4$

**B**  $2^4 \times 3^3$

**C**  $2^4 \times 3^4$

**D**  $4^2 \times 3^3$

---

Content: Mathematics  
Item Number: 49  
Item ID: 01007840  
Item Type: Multiple Choice

Answer Key: B  
Max. score points: 1  
Standard: 7.NSO-N.7  
Reporting Category: Number Sense & Operations

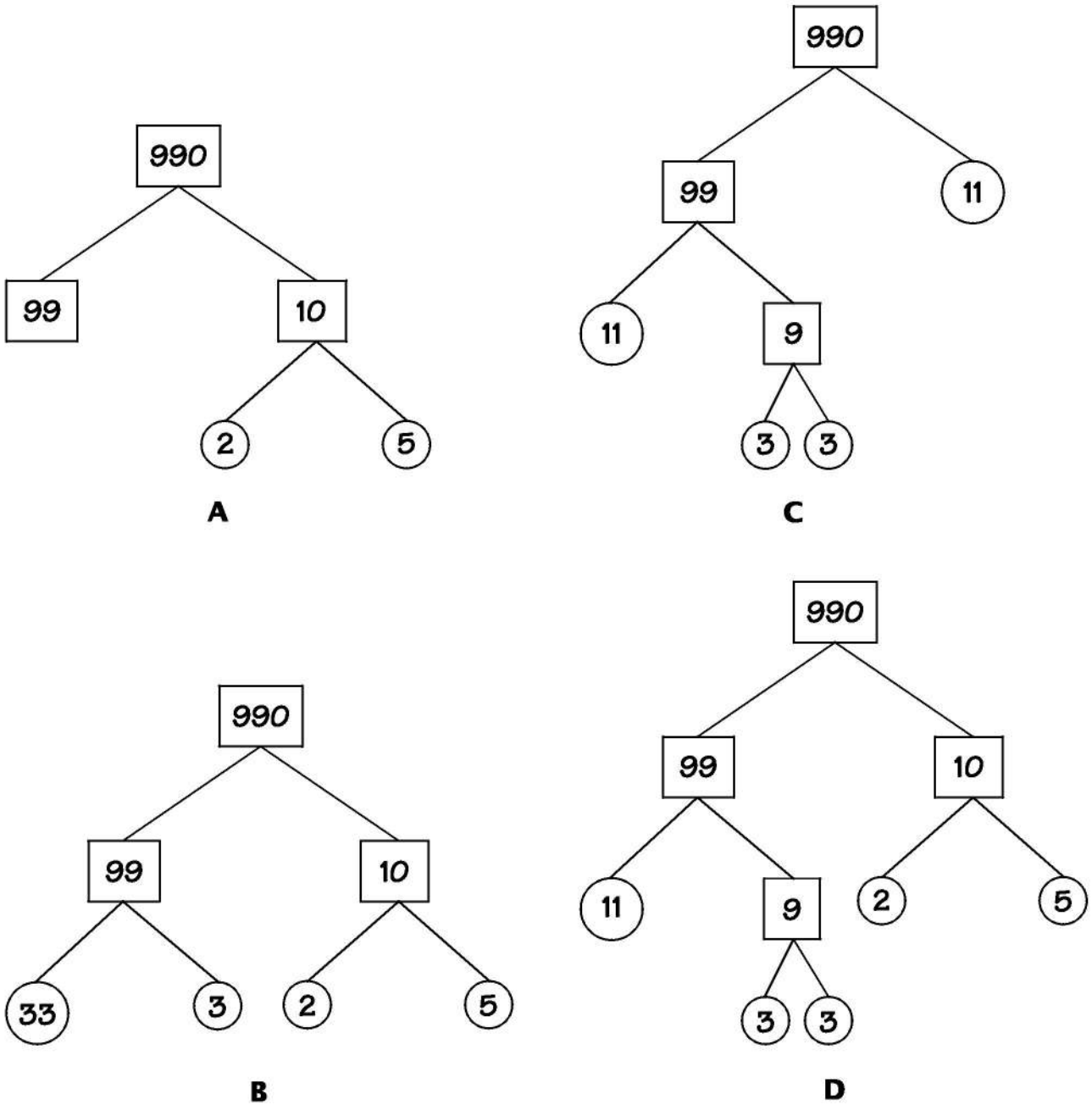


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Which of the following shows the correct prime factorization of 990?



Content: Mathematics  
 Item Number: 51  
 Item ID: 01173003  
 Item Type: Multiple Choice

Answer Key: D  
 Max. score points: 1  
 Standard: 7.NSO-N.7  
 Reporting Category: Number Sense & Operations

Which expression shows the prime factorization of 432?

**A**  $2^3 \times 3^4$

**B**  $2^4 \times 3^3$

**C**  $2^4 \times 3^4$

**D**  $4^2 \times 3^3$

---

Content: Mathematics  
Item Number: 49  
Item ID: 01007840  
Item Type: Multiple Choice

Answer Key: B  
Max. score points: 1  
Standard: 7.NSO-N.7  
Reporting Category: Number Sense & Operations

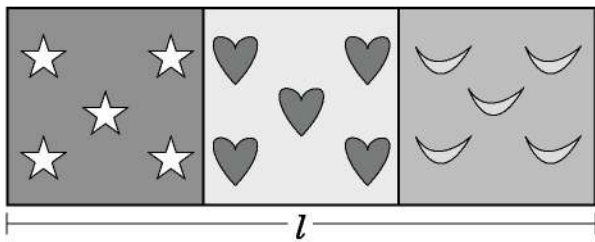


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For a project, Anna painted 3 square cardboard sheets and placed them next to each other, as shown.



If each cardboard sheet has an area of 16 square centimeters, what is the total length, in centimeters, of the 3 sheets?

- A** 64
- B** 48
- C** 24
- D** 12

Content: Mathematics  
Item Number: 15  
Item ID: 01173019  
Item Type: Multiple Choice

Answer Key: D  
Max. score points: 1  
Standard: 7.NSO-N.9  
Reporting Category: Number Sense & Operations



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A square has an area of 49 square inches.

What is the length of one side?

**F** 7 inches

**G**  $12\frac{1}{4}$  inches

**H**  $24\frac{1}{2}$  inches

**J** 28 inches

---

Content: Mathematics  
Item Number: 46  
Item ID: 00881638  
Item Type: Multiple Choice

Answer Key: F  
Max. score points: 1  
Standard: 7.NSO-N.9  
Reporting Category: Number Sense & Operations

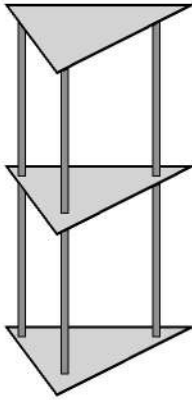


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Robert is playing a game in which he uses rods to support triangular-shaped sheets of cardboard as shown in the figure below.



The table below shows the number of rods he needs to support different numbers of sheets.

<b>Number of Sheets</b>	2	3	4	5
<b>Number of Rods</b>	3	6	9	12

Which rule can be used to find the number of rods required for different numbers of sheets?

- F** number of rods =  $2 \times$  number of sheets
- G** number of rods = number of sheets + 1
- H** number of rods =  $(3 \times$  number of sheets)  $- 3$
- J** number of rods =  $(2 \times$  number of sheets)  $- 1$

Content: Mathematics  
Item Number: 16  
Item ID: 01173021  
Item Type: Multiple Choice

Answer Key: H  
Max. score points: 1  
Standard: 7.PRA.1  
Reporting Category: Patterns, Relations & Algebra



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Nicholas made a number pattern by adding the same amount to the previous number each time. Which number pattern could Nicholas have made?

- A** 2.84, 28.4, 284, . . .
- B** 3.45, 5.67, 6.78, . . .
- C** 4.01, 5.51, 8.01, . . .
- D** 5.72, 6.97, 8.22, . . .

---

Content: Mathematics  
Item Number: 37  
Item ID: 01007834  
Item Type: Multiple Choice

Answer Key: D  
Max. score points: 1  
Standard: 7.PRA.1  
Reporting Category: Patterns, Relations & Algebra



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Deshawn made the number pattern below.

5, 8, 13, 20, . . .

If Deshawn continues his pattern, what will be the next number?

- F** 23
- G** 27
- H** 29
- J** 33

---

Content: Mathematics  
Item Number: 62  
Item ID: 00881636  
Item Type: Multiple Choice

Answer Key: H  
Max. score points: 1  
Standard: 7.PRA.1  
Reporting Category: Patterns, Relations & Algebra



Nicholas made a number pattern by adding the same amount to the previous number each time. Which number pattern could Nicholas have made?

- A** 2.84, 28.4, 284, . . .
- B** 3.45, 5.67, 6.78, . . .
- C** 4.01, 5.51, 8.01, . . .
- D** 5.72, 6.97, 8.22, . . .

---

Content: Mathematics  
Item Number: 37  
Item ID: 01007834  
Item Type: Multiple Choice

Answer Key: D  
Max. score points: 1  
Standard: 7.PRA.1  
Reporting Category: Patterns, Relations & Algebra



If  $a = 4$  and  $b = 2$ , what is the value of  $5b^2 - a^2$ ?

**F** 4

**G** 16

**H** 36

**J** 76

---

Content: Mathematics  
Item Number: 2  
Item ID: 01007836  
Item Type: Multiple Choice

Answer Key: F  
Max. score points: 1  
Standard: 7.PRA.2  
Reporting Category: Patterns, Relations & Algebra



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Look at the expression below.

$$-2a^2 + 4b$$

What is the value of the expression if  $a = 6$  and  $b = -8$ ?

- A** -104
- B** -40
- C** 40
- D** 104

---

Content: Mathematics  
Item Number: 3  
Item ID: 00881626  
Item Type: Multiple Choice

Answer Key: A  
Max. score points: 1  
Standard: 7.PRA.2  
Reporting Category: Patterns, Relations & Algebra



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What is the value of the expression below?

$$10 - (4 - 2) + 7$$

- F** 1
- G** 11
- H** 15
- J** 19

---

Content: Mathematics  
Item Number: 24  
Item ID: 01007862  
Item Type: Multiple Choice

Answer Key: H  
Max. score points: 1  
Standard: 7.PRA.3  
Reporting Category: Patterns, Relations & Algebra



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What is the value of the expression below?

$$5 + 4 \times (3 + 2) - 24 \div 2$$

- F** 2.5
- G** 7
- H** 7.5
- J** 13

---

Content: Mathematics  
Item Number: 26  
Item ID: 00880316  
Item Type: Multiple Choice

Answer Key: J  
Max. score points: 1  
Standard: 7.PRA.3  
Reporting Category: Patterns, Relations & Algebra



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What is the value of the expression  $4 + 12x \div x^2 - 2$  when  $x = 2$ ?

- F** 6
- G** 8
- H** 14
- J** 16

---

Content: Mathematics  
Item Number: 34  
Item ID: 01173049  
Item Type: Multiple Choice

Answer Key: G  
Max. score points: 1  
Standard: 7.PRA.3  
Reporting Category: Patterns, Relations & Algebra

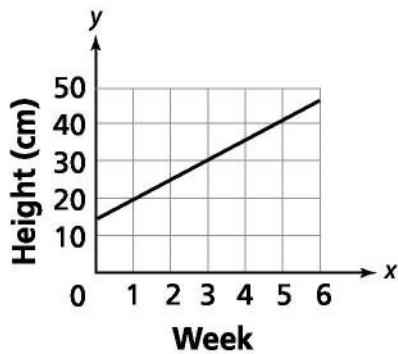


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The graph below shows the height of a plant over a period of 6 weeks.



Which expression can be used to show the height of this plant at week  $w$ ?

- A**  $5w + 15$
- B**  $5w + 20$
- C**  $15w + 5$
- D**  $20w + 5$

Content: Mathematics  
Item Number: 31  
Item ID: 01007858  
Item Type: Multiple Choice

Answer Key: A  
Max. score points: 1  
Standard: 7.PRA.4  
Reporting Category: Patterns, Relations & Algebra



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Alpine Telecom Services always orders business cards from an online printing company. The table below shows  $y$ , the amount spent on shipping for ordering  $x$  pounds of business cards.

### Shipping Cost

Weight of Business Cards (in pounds) $x$	Cost of Shipping (in dollars) $y$
2	9
4	12
6	15

Which of these equations shows the relationship between  $x$  and  $y$ ?

- A**  $y = x + 7$
- B**  $y = 3x$
- C**  $y = 6 + 1.5x$
- D**  $y = 2x + 3$

Content: Mathematics  
Item Number: 15  
Item ID: 01173041  
Item Type: Multiple Choice

Answer Key: C  
Max. score points: 1  
Standard: 7.PRA.4  
Reporting Category: Patterns, Relations & Algebra



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An apartment rule states that the area of a garden,  $g$ , must be no more than  $\frac{1}{4}$  the total area of the property,  $p$ . Which inequality can be used to show this relationship?

**A**  $g \leq \frac{1}{4} p$

**B**  $g \geq \frac{1}{4} p$

**C**  $g \leq \frac{1}{4} + p$

**D**  $g \geq \frac{1}{4} + p$

---

Content: Mathematics  
Item Number: 57  
Item ID: 01007846  
Item Type: Multiple Choice

Answer Key: A  
Max. score points: 1  
Standard: 7.PRA.5  
Reporting Category: Patterns, Relations & Algebra



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Jeremy and Natasha took part in a singing competition in which an audience vote would decide the winner. The person who received the most votes would win the competition. Natasha received 14 less than 2 times the number of votes Jeremy received. Which of these equations shows the relationship between  $n$ , the number of votes Natasha received, and  $j$ , the number of votes Jeremy received?

- A**  $n = j^2 - 14$
- B**  $n = 14 - j^2$
- C**  $n = 2j - 14$
- D**  $n = 14 - 2j$

---

Content: Mathematics  
Item Number: 67  
Item ID: 01173031  
Item Type: Multiple Choice

Answer Key: C  
Max. score points: 1  
Standard: 7.PRA.5  
Reporting Category: Patterns, Relations & Algebra



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Solve:  $2x - 4 = 8$

**A**  $x = 2$

**B**  $x = 6$

**C**  $x = 8$

**D**  $x = 12$

---

Content: Mathematics  
Item Number: 13  
Item ID: 01007850  
Item Type: Multiple Choice

Answer Key: B  
Max. score points: 1  
Standard: 7.PRA.6  
Reporting Category: Patterns, Relations & Algebra



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The birth weight of a baby elephant seal is 47 kilograms. A scientist uses the equation below to calculate the approximate weight of a baby elephant seal at any number of days after its birth.

$$47 + 4x = w$$

<p><math>x</math> = the number of days after its birth <math>w</math> = weight, in kilograms</p>
--

What is the approximate weight of a baby elephant seal when it is 12 days old?

- A** 47 kilograms
- B** 63 kilograms
- C** 85 kilograms
- D** 95 kilograms

---

Content: Mathematics  
Item Number: 39  
Item ID: 00789557  
Item Type: Multiple Choice

Answer Key: D  
Max. score points: 1  
Standard: 7.PRA.6  
Reporting Category: Patterns, Relations & Algebra



Solve for  $x$ .

$$-4x + 8 = 16$$

- A**  $x = -6$
- B**  $x = -2$
- C**  $x = 2$
- D**  $x = 8$

---

Content: Mathematics  
Item Number: 47  
Item ID: 00880342  
Item Type: Multiple Choice

Answer Key: B  
Max. score points: 1  
Standard: 7.PRA.6  
Reporting Category: Patterns, Relations & Algebra



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Item Number: 39  
Item ID: 00789557  
Item Type: Multiple Choice

Answer Key: D  
Max. score points: 1  
Standard: 7.PRA.6  
Reporting Category: Patterns, Relations & Algebra



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Content: Mathematics  
Item Number: 47  
Item ID: 00880342  
Item Type: Multiple Choice

Answer Key: B  
Max. score points: 1  
Standard: 7.PRA.6  
Reporting Category: Patterns, Relations & Algebra



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Which of these expressions is equivalent

to  $\frac{2}{3}(12x - 9) + 11$ ?

**A**  $8x + 5$

**B**  $8x + 1\frac{4}{3}$

**C**  $4x + 4\frac{1}{3}$

**D**  $4x + 5$

---

Content: Mathematics  
Item Number: 21  
Item ID: 00789547  
Item Type: Multiple Choice

Answer Key: A  
Max. score points: 1  
Standard: 7.PRA.7  
Reporting Category: Patterns, Relations & Algebra

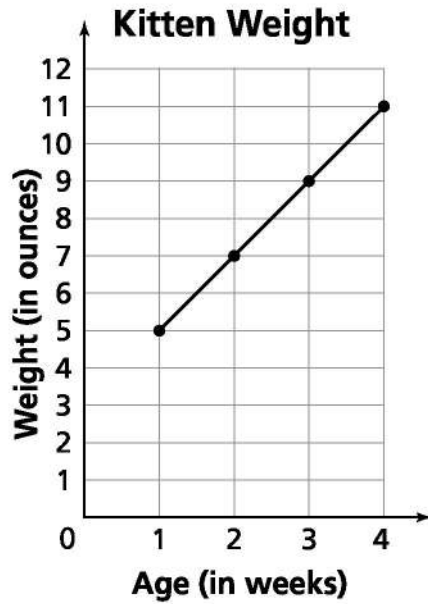


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The graph below shows the weight of a kitten.



At what rate is the kitten's weight increasing?

- F** 2 ounces per week
- G** 3 ounces per week
- H** 5 ounces per week
- J** 6 ounces per week

Content: Mathematics  
Item Number: 52  
Item ID: 01007874  
Item Type: Multiple Choice

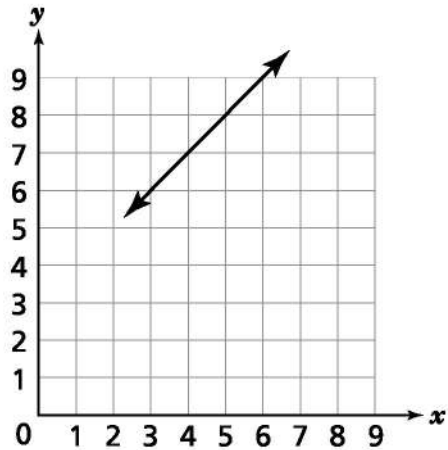
Answer Key: F  
Max. score points: 1  
Standard: 7.PRA.7  
Reporting Category: Patterns, Relations & Algebra



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Dennis graphed a line on a coordinate grid, as shown.



Which of these describes the relationship between the  $x$  and  $y$  coordinates the line passes through?

- F**  $x$  is 3 more than  $y$
- G**  $y$  is 3 more than  $x$
- H**  $y$  is 3 times  $x$
- J**  $x$  is 3 times  $y$

Content: Mathematics  
Item Number: 68  
Item ID: 01173033  
Item Type: Multiple Choice

Answer Key: G  
Max. score points: 1  
Standard: 7.PRA.7  
Reporting Category: Patterns, Relations & Algebra



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Harold works at a pizza parlor for an hourly wage. For 3.5 hours, Harold earns \$21.

- A What is Harold's hourly wage? Show your work in the box in the answer booklet and write your answer on the line.
- B On the coordinate grid in the answer booklet, plot how much money Harold earns for 3.5 hours, 4 hours, and 9 hours.

**A**

\$ \_\_\_\_\_

**B**

**Harold's Wages**

Hours Worked (x)	Wages Paid (in dollars) (y)
3.5	21
4	28
9	63

Content: Mathematics  
Item Number: 29  
Item ID: 00881614  
Item Type: Constructed Response

Answer Key:  
Max. score points: 3  
Standard: 7.PRA.8  
Reporting Category: Patterns, Relations & Algebra

Satellite data shows that 180 cubic miles of ice is melting in the Antarctic every 5 years. If the rate at which the ice melts in the Antarctic remains the same, which equation can be used to find the volume of ice, in cubic miles, that will melt in the next 7 years?

**F**  $\frac{x}{7} = \frac{5}{180}$

**G**  $\frac{x}{7} = \frac{180}{5}$

**H**  $\frac{5}{x} = \frac{7}{180}$

**J**  $\frac{5}{x} = \frac{180}{7}$

---

Content: Mathematics  
Item Number: 34  
Item ID: 01173027  
Item Type: Multiple Choice

Answer Key: G  
Max. score points: 1  
Standard: 7.PRA.8  
Reporting Category: Patterns, Relations & Algebra



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Which of the following expressions is equivalent to  $3\left(\frac{16}{3} - 2\right)$ ?

**F**  $3 \cdot \frac{16}{3} - 2$

**G**  $3\left(2 - \frac{16}{3}\right)$

**H**  $3 \cdot \frac{16}{3} - 2 \cdot \frac{16}{3}$

**J**  $3 \cdot \frac{16}{3} - 3 \cdot 2$

---

Content: Mathematics  
Item Number: 70  
Item ID: 01173059  
Item Type: Multiple Choice

Answer Key: J  
Max. score points: 1  
Standard: 7.PRA.9  
Reporting Category: Patterns, Relations & Algebra



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What is the coefficient in the expression  
 $-20x + 5$ ?

- A** -20
- B** -5
- C** 20
- D** 5

---

Content: Mathematics  
Item Number: 55  
Item ID: 00880314  
Item Type: Multiple Choice

Answer Key: A  
Max. score points: 1  
Standard: 7.PRA.10  
Reporting Category: Patterns, Relations & Algebra



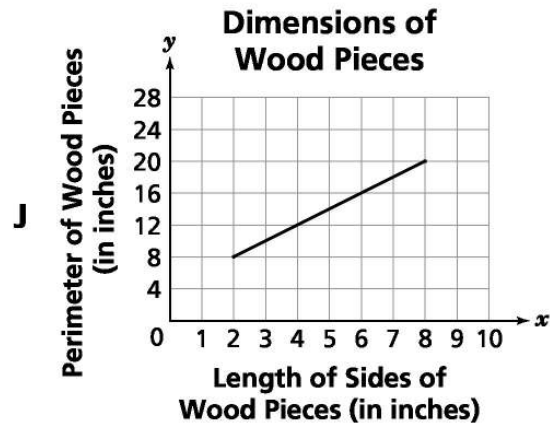
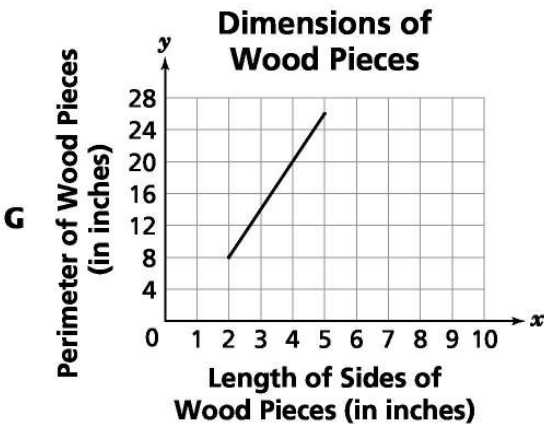
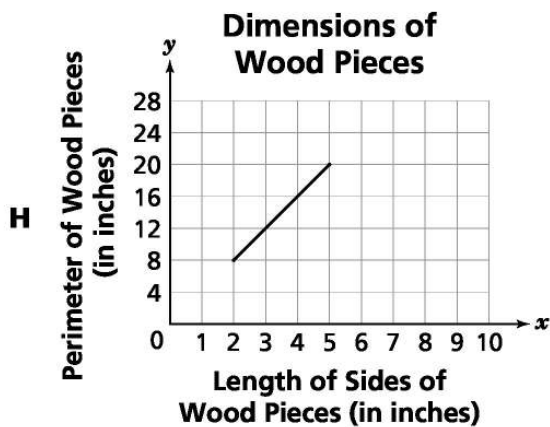
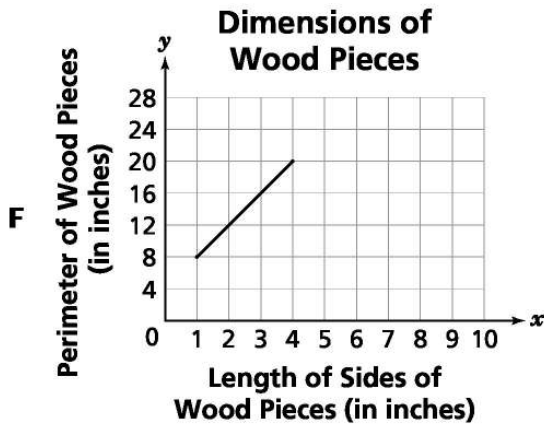


Paula made different-sized squares from pieces of wood. The table below shows the relationship between the lengths of the sides of the squares ( $x$ ) and their perimeters ( $y$ ).

**Dimensions of Wood Pieces**

Length of Sides of Wood Pieces (in inches) $x$	Perimeter of Wood Pieces (in inches) $y$
2	8
3	12
4	16
5	20

Which of these graphs best represents the relationship between  $x$  and  $y$ ?



Content: Mathematics  
 Item Number: 16  
 Item ID: 01173043  
 Item Type: Multiple Choice

Answer Key: H  
 Max. score points: 1  
 Standard: 7.PRA.11  
 Reporting Category: Patterns, Relations & Algebra

