

Directions: Read each problem. Fill in the circle of the best answer.

- 1** In a study, researchers found that for every 3 people who preferred brand A toothpaste 1 person preferred brand B toothpaste. Which ratio describes the result of this study?

(A) 1:3
(B) 1:4
(C) 3:1
(D) 4:1

- 2** Which expression represents the product of z and 7?

(A) $z + 7$
(B) $z - 7$
(C) $z \times 7$
(D) $z \div 7$

- 3** Jonah finished a race in 11.62 seconds. Marco finished the same race in 9.8 seconds. How many seconds faster did Marco finish the race in than Jonah?

(A) 1.82 seconds
(B) 2.22 seconds
(C) 10.64 seconds
(D) 11.36 seconds

- 4** The sales tax in New York State is 4%. Which expression can be used to find the amount of sales tax on a \$50 item?

(A) $\frac{4}{1} \times 50$
(B) $\frac{4}{10} \times 50$
(C) $\frac{4}{100} \times 50$
(D) $\frac{4}{1,000} \times 50$

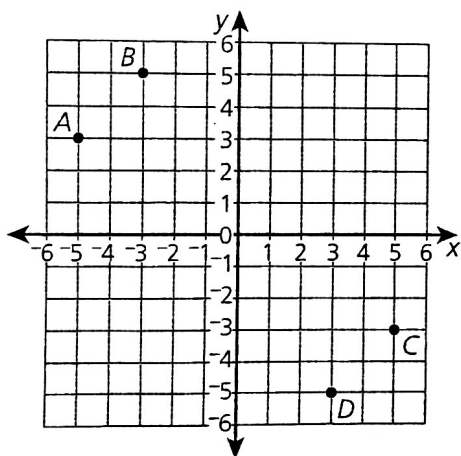
5 Find the quotient: $8,763 \div 69$

- (A) 123
- (B) 127
- (C) 132
- (D) 139

6 What is the product of $3^3 \times 6^2$?

- (A) 108
- (B) 324
- (C) 932
- (D) 972

7 This coordinate plane shows the locations of four points.



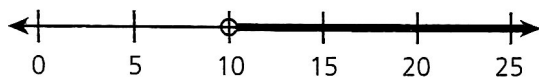
Which point is located at $(-3, 5)$ on this coordinate plane?

- (A) point A
- (B) point B
- (C) point C
- (D) point D

- 8 Jenny walked 2.5 miles in 50 minutes. At this rate, how many minutes did it take her to walk 1 mile?

(A) 15 minutes
(B) 20 minutes
(C) 25 minutes
(D) 30 minutes

- 9 Megan graphed a solution set on this number line.



Which solution set did Megan graph?

- (A) $x < 10$
(B) $x > 10$
(C) $x = 15, 20, \text{ and } 25$
(D) $x = 10, 15, 20, \text{ and } 25$
- 10 Which expression is equivalent to $4 \times 4 \times 4 \times 4 \times 4$?
- (A) 4^5
(B) 5^4
(C) 4×5
(D) 44,444

- 11 In what quadrant on the coordinate plane is the point (5, -2) located?

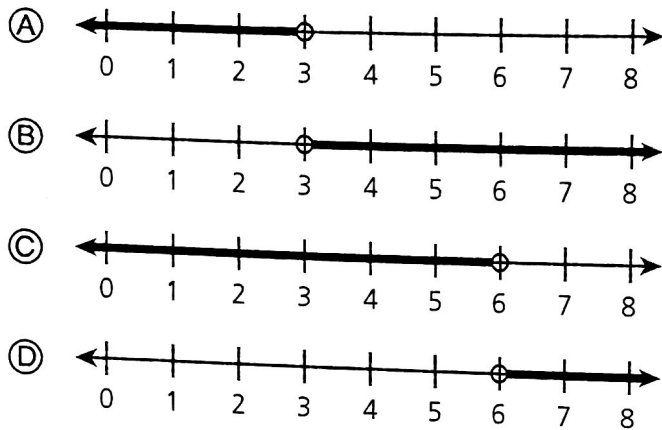
(A) quadrant I
(B) quadrant II
(C) quadrant III
(D) quadrant IV

- 12 The length of a rectangular dance floor is 4.325 meters. The width of the floor is 3.6 meters. What is the area, in square meters, of the dance floor?

(A) 14.45 square meters
(B) 15.57 square meters
(C) 1,445 square meters
(D) 1,557 square meters

13

Which number line shows the solution to $2x < 6$?

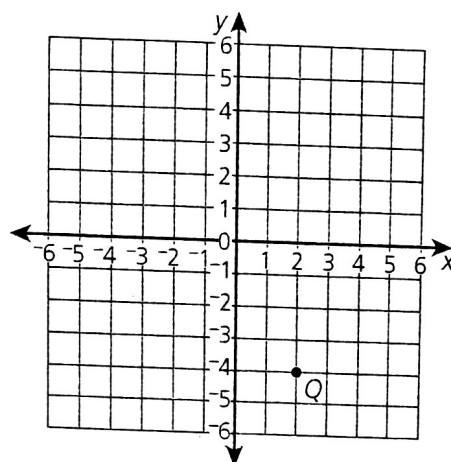


14

What are the coefficients in the expression $6p^2 + 4p$?

- (A) p
- (B) 6 and 4
- (C) p and p^2
- (D) $6p^2$ and $4p$

- 15 Kimiko plotted point Q on the coordinate plane below.

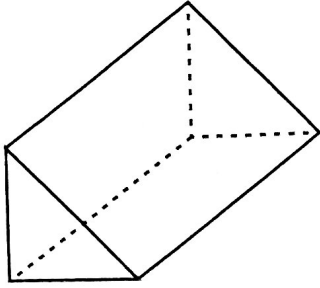


Kimiko is drawing right triangle PQR , with right angle Q . The length of side \overline{PQ} is 6 units and the length of side \overline{QR} is 7 units. Which of the following could be the coordinates of points P and R ?

- (A) $P(-4, -4)$ and $R(2, 2)$
 - (B) $P(-4, -4)$ and $R(2, 3)$
 - (C) $P(-5, 4)$ and $R(2, 3)$
 - (D) $P(-5, 4)$ and $R(2, 2)$
- 16 What is the opposite of the opposite of $-\frac{3}{8}$?

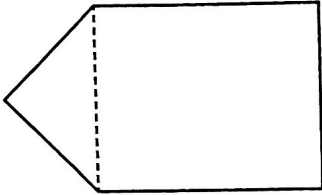
- (A) $\frac{3}{8}$
- (B) $\frac{8}{3}$
- (C) $-\frac{3}{8}$
- (D) $-\frac{8}{3}$

- 17 A triangular prism is shown below.

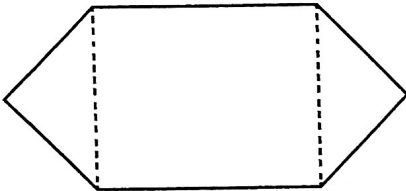


Which net could be used to represent this triangular prism?

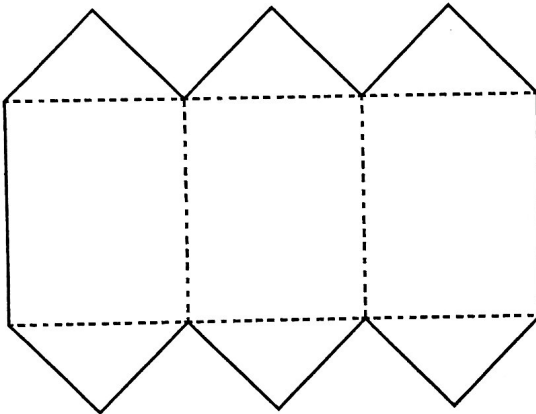
(A)



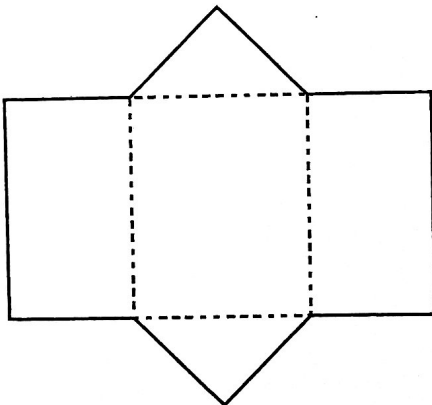
(B)



(C)



(D)



- 18** The perimeter of a rectangle is the sum of twice its length and twice its width. It can be represented by the expression $2l + 2w$. What is the perimeter, in inches, of a rectangle with a length of 8.5 inches and a width of 5.75 inches?

(A) 14.25 inches
(B) 18.25 inches
(C) 22.75 inches
(D) 28.5 inches

- 19** Which expression is equivalent to $45 + 72$?

(A) $8(5 + 7)$
(B) $8(5 + 9)$
(C) $9(5 + 7)$
(D) $9(5 + 8)$

- 20** The ratio of feet to yards is 3 to 1. Reyna threw a ball 30 feet. How many yards did she throw it?

(A) 10 yards
(B) 27 yards
(C) 33 yards
(D) 90 yards

- 21** Which expression is equivalent to $7(6 - y)$?

(A) $42 - y$
(B) $76 - y$
(C) $42 - 7y$
(D) $76 - 7y$

- 22** A storage unit shaped like a rectangular prism is $10\frac{1}{2}$ feet wide, 12 feet deep, and $10\frac{1}{2}$ feet tall. What is the volume, in cubic feet, of the storage unit?

(A) 33 cubic feet
(B) 252 cubic feet
(C) 1,200 cubic feet
(D) 1,323 cubic feet

- 23** What are the factors in the expression $2(5 - 1)$?

(A) $(5 - 1)$
(B) 5 and -1
(C) 2 and $(5 - 1)$
(D) 2, 5, and -1

- 24** Jessica paid \$15 for 12 pounds of apples. What unit rate did Jessica pay for the apples?

(A) \$0.80 per apple
(B) \$1.25 per apple
(C) \$0.80 per pound of apples
(D) \$1.25 per pound of apples

- 25** What is the value of the expression $(x + 3)^3$ when $x = 2$?

(A) 15
(B) 29
(C) 125
(D) 243

- 26** Tickets for an all-you-can-eat pancake breakfast cost \$10 each. Which equation shows the relationship between t , the number of breakfast tickets bought, and c , the total cost of the breakfast tickets?

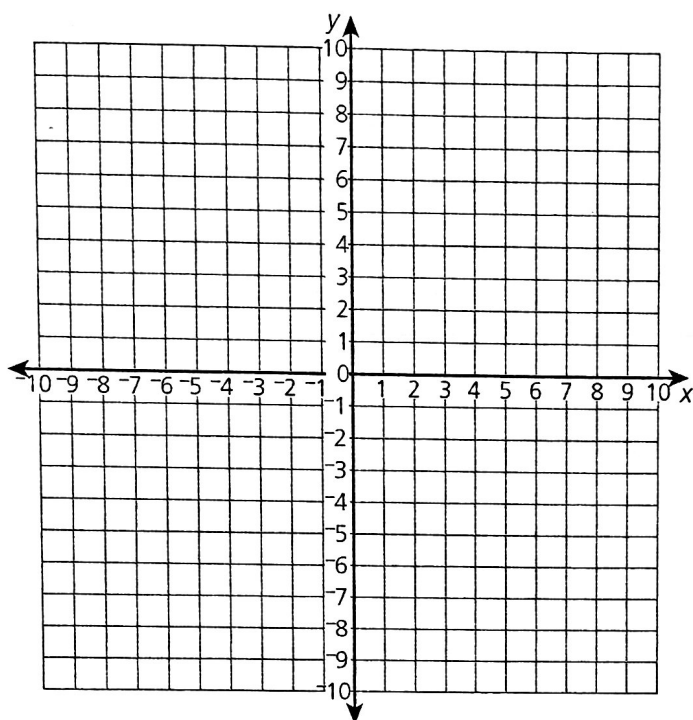
(A) $c = 10t$
(B) $t = 10c$
(C) $c = t + 10$
(D) $t = c + 10$

- 27** A powdered drink mix is added to water at a rate of 32 scoops of mix per gallon of water. What is the unit rate of scoops of mix per cup of water?

(A) 2:1
(B) 4:1
(C) 1:2
(D) 1:4

28

Use this coordinate plane to help you solve this problem.



Rectangle $PQRS$ has these coordinates:

$$P(1, -2) \quad R(6, -5)$$

$$Q(1, -5) \quad S(6, -2)$$

What is the perimeter of rectangle $PQRS$?

- (A) 8 units
- (B) 12 units
- (C) 16 units
- (D) 24 units

29

Which expression is equivalent to $\frac{4}{9} \div \frac{2}{3}$?

- (A) $\frac{4 \cdot 2}{9 \cdot 3}$
- (B) $\frac{4 \cdot 3}{9 \cdot 2}$
- (C) $\frac{9 \cdot 2}{4 \cdot 3}$
- (D) $\frac{9 \cdot 3}{4 \cdot 2}$

30

In one school district, the number of computers in the computer lab is proportional to the number of students in the school. The table below shows the number of computers and the number of students in three schools.

School	Number of Students	Number of Computers
Harper Elementary	432	18
Greenburg Elementary	648	27
Jones Elementary	288	12

Campbell Middle School has 912 students. How many computers are in this school's computer lab?

- (A) 38
- (B) 50
- (C) 76
- (D) 90

31

Which of the following is equivalent to $3(y + 4) - 7$?

- (A) $3y - 5$
- (B) $3y - 3$
- (C) $3y + 5$
- (D) $3y + 6$

- 32 A plumber charges \$25 per hour for his services. In an expression to find the total charge for a plumber's services, what will the variable represent?

(A) the number of repairs the plumber made
(B) the number of hours the plumber worked
(C) the number of hours the plumber traveled
(D) the number of materials the plumber used

- 33 A sixth-grade class made a cookbook containing the students' favorite recipes. The teacher printed 48 copies of the book for a total of 1,152 pages. How many pages were in each cookbook?

(A) 21
(B) 22
(C) 24
(D) 26

- 34 Look at the two inequalities below.

$$3x + 2 > 14 \qquad 10 - x \leq 7$$

Which value of x makes both inequalities true?

(A) 2
(B) 3
(C) 4
(D) 5

SESSION 2

This session contains 34 multiple-choice questions. Fill in the circle for your answer to each multiple-choice question.

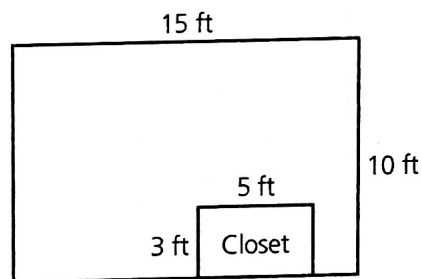
You may use a calculator during this session.

Directions: Read each problem. Fill in the circle of the best answer.

- 35** Last week, Jackson baby-sat $1\frac{1}{2}$ times as many hours as he baby-sat this week. Last week, Jackson baby-sat 12 hours. How many hours did he baby-sit this week?

(A) 8 hours
(B) $10\frac{1}{2}$ hours
(C) $13\frac{1}{2}$ hours
(D) 18 hours

- 36** Maggie's bedroom has a 3-foot-by-5-foot closet, as shown in this diagram.



What is the area, in square feet, of Maggie's bedroom, not including the closet?

(A) 50 square feet
(B) 70 square feet
(C) 135 square feet
(D) 165 square feet

37 Which statement is true of $\frac{1}{2} \div \frac{2}{3}$?

- (A) Its quotient is less than $\frac{1}{2}$.
- (B) Its quotient is between $\frac{1}{2}$ and $\frac{2}{3}$.
- (C) Its quotient is greater than $\frac{2}{3}$.
- (D) Its quotient is equal to either $\frac{1}{2}$ or $\frac{2}{3}$.

38 The years of each half-dollar in Melinda's coin collection are listed below.

1984	1987	2002	1996	2000
1998	1992	1975	1978	1988

What is the ratio of half-dollars from the 1990s to all the half-dollars in Melinda's collection?

- (A) 3:10
- (B) 3:7
- (C) 10:3
- (D) 7:3

39 Which expression represents the product of 8 and the sum of 3 and k ?

- (A) $8 \times 3 + k$
- (B) $8 + 3 \times k$
- (C) $8 \times (3 + k)$
- (D) $(8 + 3) \times k$

40 Tyrell read 72 pages in 2 hours. At this rate, how many hours will it take him to read 288 pages?

- (A) 4 hours
- (B) 6 hours
- (C) 7 hours
- (D) 8 hours

41 Which set shows some of the solutions to $4y > 12$?

- (A) {0, 1, 2}
- (B) {1, 2, 3}
- (C) {3, 4, 5}
- (D) {5, 6, 7}

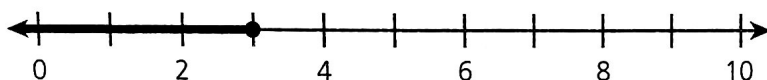
42

What is the value of the expression $(6 - 4)^3 \div 2$?

- (A) -29
- (B) -26
- (C) 3
- (D) 4

43

What inequality is graphed on the number line below?



- (A) $b \leq 2\frac{1}{2}$
- (B) $b < 2\frac{1}{2}$
- (C) $b \leq 3$
- (D) $b < 3$

44

Jack has 5 toy trucks. Each truck has 2 doors and 4 tires. Which statement describes the ratio of doors to tires on each truck?

- (A) The ratio is 2 to 4 because for every 2 doors there are 4 tires.
- (B) The ratio is 4 to 2 because for every 4 tires there are 2 doors.
- (C) The ratio is 5 to 6 because there are 5 toy trucks and a total of 6 doors and tires on each.
- (D) The ratio is 6 to 5 because there are a total of 6 doors and tires on each of the 5 toy trucks.

- 45** A baker has 80 rolls and 64 muffins to put into gift baskets. He wants each gift basket to have the same number of rolls and the same number of muffins. He also wants to use all of the rolls and all of the muffins. What is the greatest number of gift baskets the baker can make?

(A) 8
(B) 16
(C) 20
(D) 32

- 46** Gavin is 9 years older than Theo. Gavin is 21 years old. How many years old is Theo?

(A) 12 years old
(B) 13 years old
(C) 29 years old
(D) 30 years old

- 47** The ratio of boys to girls in three art classes at Chester Middle School is the same.

CHESTER MIDDLE SCHOOL ART CLASSES

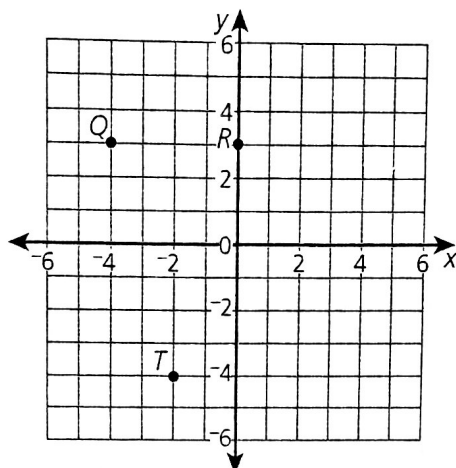
Art Class	Boys	Girls
Drawing	8	12
Painting	12	18
Sculpting	?	9

How many boys are in the sculpting class?

(A) 3
(B) 6
(C) 15
(D) 18

48

Three vertices of parallelogram $QRST$ are shown on this coordinate plane.

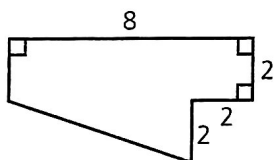


What will be the coordinates of vertex S of this parallelogram?

- (A) $(2, -4)$
- (B) $(-4, 2)$
- (C) $(4, -4)$
- (D) $(-4, 4)$

49

Look at the figure below.



Which expression can be evaluated to find the area of this figure?

- (A) $(8 \times 2) + (2 \times 2)$
- (B) $(8 \times 2) + (6 \times 2)$
- (C) $(8 \times 2) + \frac{1}{2}(2 \times 2)$
- (D) $(8 \times 2) + \frac{1}{2}(6 \times 2)$

- 50 The distance, d , a car travels in an hour depends on the average rate, r , it travels. Michaela wants to draw a graph to show the relationship between d and r . Which statement must be true of the axis represented by d ?

(A) It is the vertical axis because d is the dependent variable.
(B) It is the vertical axis because d is the independent variable.
(C) It is the horizontal axis because d is the dependent variable.
(D) It is the horizontal axis because d is the independent variable.

- 51 Which expression is equivalent to $\frac{10n - 50}{20}$?

(A) $\frac{n - 5}{2}$
(B) $\frac{n - 50}{2}$
(C) $\frac{1}{2}n - 5$
(D) $\frac{1}{2}n - 50$

- 52 There are maps on 30 pages of a book. This represents 20% of the total pages in the book. How many total pages are in the book?

(A) 50 pages
(B) 60 pages
(C) 150 pages
(D) 600 pages

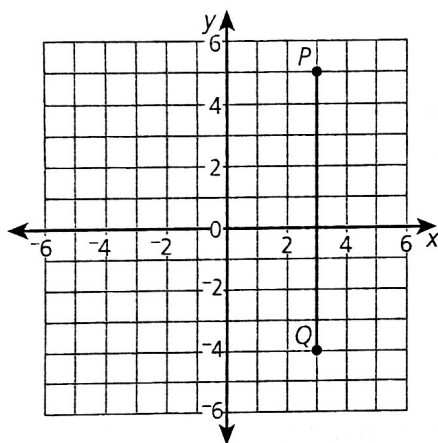
53

At the start of the month, Carter had a total of \$50 in his bank account. During the month, he made deposits totaling \$150. At the end of the month, Carter still had a total of \$50 in his bank account. Based on this, which statement must be true?

- (A) During the month, Carter made deposits totaling \$50.
- (B) During the month, Carter made deposits totaling \$100.
- (C) During the month, Carter made withdrawals totaling \$50.
- (D) During the month, Carter made withdrawals totaling \$150.

54

Line segment \overline{PQ} is shown on the coordinate plane below.



Which expression can be used to find the length of line segment \overline{PQ} ?

- (A) $|5 + (-4)|$
- (B) $|5 - (-4)|$
- (C) $|-5 + 4|$
- (D) $|5 - 4|$

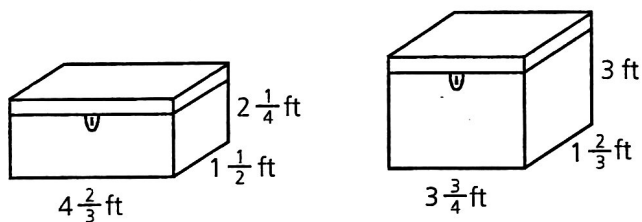
- 55** DeShawn spent \$12 on some magazines. Each magazine cost the same amount. Which expression can be used to find the number of magazines DeShawn bought?

(A) $12m$
 (B) $\frac{m}{12}$
 (C) $\frac{12}{m}$
 (D) $m + 12$

- 56** Danielle drank $\frac{2}{3}$ liter of water in $\frac{1}{4}$ hour. Which equation shows how to find the rate, in liters per hour, that Danielle drank?

(A) $\frac{2}{3} \cdot \frac{1}{4} = \frac{2}{12} = \frac{1}{6}$
 (B) $\frac{3}{2} \cdot \frac{4}{1} = \frac{12}{2} = \frac{6}{1}$
 (C) $\frac{1}{4} \div \frac{2}{3} = \frac{1}{4} \cdot \frac{3}{2} = \frac{3}{8}$
 (D) $\frac{2}{3} \div \frac{1}{4} = \frac{2}{3} \cdot \frac{4}{1} = \frac{8}{3}$

- 57** Mia is deciding between two storage trunks. The dimensions of the trunks are shown below.



What is the difference, in cubic feet, between the volumes of these two storage trunks?

(A) 3 cubic feet
 (B) $3\frac{1}{4}$ cubic feet
 (C) $4\frac{3}{4}$ cubic feet
 (D) $10\frac{1}{12}$ cubic feet

58

Which inequality shows the relationship between -9° Fahrenheit and -7° Fahrenheit?

- (A) $-7 > -9$, because -9°F is colder than -7°F .
- (B) $-9 > -7$, because -7°F is colder than -9°F .
- (C) $|-7| > |-9|$, because -9°F is colder than -7°F .
- (D) $|-9| < |-7|$, because -7°F is colder than -9°F .

59

The numbers of students playing certain instruments in an orchestra are shown in this table.

ORCHESTRA INSTRUMENTS	
Instrument	Number of Students
Flute	9
Violin	12
Viola	4
Oboe	3
Clarinet	6
Trumpet	2

Which statement is true of the ratio of flutes to violins in the orchestra?

- (A) It is the same as the ratio of violas to oboes.
- (B) It is greater than the ratio of oboes to violas.
- (C) It is the same as the ratio of clarinets to trumpets.
- (D) It is greater than the ratio of trumpets to clarinets.

60

Which of the following equations is true?

- (A) $k + 3k = 3k$
- (B) $k + 3k = 3k^2$
- (C) $m^2 + m^2 = 2m^2$
- (D) $m^2 + m^2 = 2m^4$

61

These inequalities refer to points on a horizontal number line.

$$-6.4 < -2.9 \text{ and } -2.9 > -4.7$$

Which statement must be true?

- (A) The point at -4.7 is farthest to the left on the number line.
- (B) The point at -6.4 is farthest to the left on the number line.
- (C) The point at -4.7 is farthest to the right on the number line.
- (D) The point at -6.4 is farthest to the right on the number line.

62

The length of a rectangle is $\frac{4}{5}$ of the width. The length of the rectangle is $\frac{3}{5}$ meter. Which equation can be used to find w , the width of the rectangle in meters?

- (A) $\frac{3}{5}w = \frac{4}{5}$
- (B) $\frac{4}{5}w = \frac{3}{5}$
- (C) $\frac{3}{5} + w = \frac{4}{5}$
- (D) $\frac{4}{5} + w = \frac{3}{5}$

63

Points P and Q are on a number line. Point P is located at 7. Point Q is located at -7 . Which statement must be true?

- (A) The value of $|7|$ is greater than the value of $|-7|$ because point P is farther from 0 than point Q .
- (B) The value of $|7|$ is equal to the value of $|-7|$ because point P is the same distance from 0 as point Q .
- (C) The value of $|7|$ is greater than the value of $-|-7|$ because point P is farther from 0 than point Q .
- (D) The value of $-|7|$ is equal to the value of $|-7|$ because point P is the same distance from 0 as point Q .

64

Which pair of inequalities are both true?

- (A) $|-5| < |-20|$ and $-5 < -20$
- (B) $|-5| > |-20|$ and $-5 > -20$
- (C) $|-5| < |-20|$ and $-5 > -20$
- (D) $|-5| > |-20|$ and $-5 < -20$

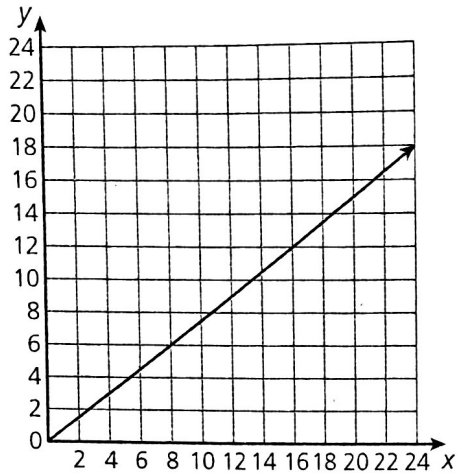
65

Edmund printed 36 photos at a photo kiosk. He paid a total of \$10.08. What was the cost per photo?

- (A) \$0.28
- (B) \$0.29
- (C) \$0.31
- (D) \$0.36

66

The graph below shows the relationship between x , the weight in pounds of a package, and y , the cost a company charges to ship the package.



What equation describes the relationship shown in this graph?

- (A) $y = 0.75x$
- (B) $y = x$
- (C) $y = 1.25x$
- (D) $y = 1.33x$

67

Look at the expressions in the table below.

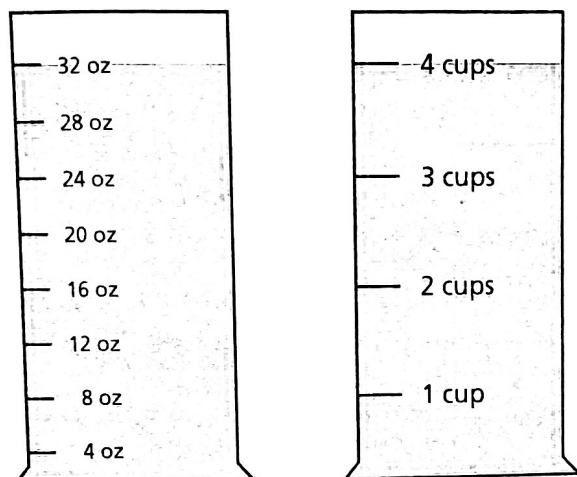
A	$2(-4x + 1) - 5$
B	$-6 + -(8x - 3)$
C	$9x + 3 - x - 6$
D	$\frac{-24x + 27}{3x}$
E	$-4(2x + \frac{3}{4})$
F	$-10x - (4 + 2x)$
G	$\frac{18x + 9}{-3} - 2x$

Which of the expressions in the table above are equivalent?

- (A) A, B, and C
- (B) A, C, E, and G
- (C) B, C, D, and F
- (D) A, B, E, and G

68

These two measuring cups contain the same amount of water.



How many fluid ounces of water will a 6-cup measuring cup hold?

- Ⓐ 32 fluid ounces
- Ⓑ 38 fluid ounces
- Ⓒ 48 fluid ounces
- Ⓓ 56 fluid ounces