CCSS Math Samples — Grade 6

1. The Tully family wants to drive 515 miles to a national park. The gas tank of their car holds 20 gallons and they can drive on average 26 miles per gallon.

   Can the family drive to the national park using just one tank of gas?

2. Look at the following.

   $$3b \quad -3m \quad -3 \quad \frac{m}{3}$$

   Which are like terms?

   a) $3b$ and $\dfrac{m}{3}$ b) $3b$ and -3

   c) $-3m$ and $\dfrac{m}{3}$ d) -3 and $-3m$

3. Using the associative property of multiplication, which of the following expressions is equal to $(7b)c$?

   a) $7b + c$ b) $7b + 7c$

   c) $7 + bc$ d) $7(bc)$

4. A certain stock has a price of $150 per share. If the earnings per share is $10, what is the price to earnings ratio?

5. Wally enjoys hot, fresh french fries. The table shows the rate to process potatoes into french fries at one plant.

   Potato Processing Rate

Minutes	5	10	15	20	25	30
Potatoes (lbs)	150	300	450	600	750	?

   At this rate, how many pounds of potatoes does the plant process into french fries in 30 minutes?

6. How far is the point $(-3, -8)$ from the point $(9, -8)$?

   a) -6 b) -6 c) 12 d) 16

7. The profit on a jacket can be found by the formula $P = \$24x - \$125$, where x is the number of jackets sold. What is the profit if 15 jackets are sold?

   a) $235   b) $240   c) $245   d) $255

8. What point on the graph meets the conditions $x > 0$ and $y < 0$?

   a) B b) C

   c) D d) E
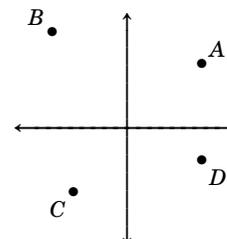
9. Jackson wrote the number while he talked on the phone.

   0

   Which of these could the number describe?

   a) the height in feet of a hockey goal net

   b) the percentage rate of a car loan

   c) the decrease in use of landline telephones

   d) the selling price of a rare work of art at an auction

10. This number line satisfies which of the following conditions?
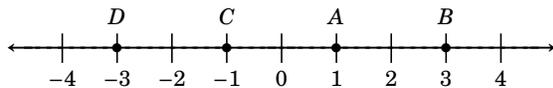
   a) $A = -C$ b) $B = -C$

   c) $A = C$ d) $-A = -C$

11. What is the value of $-(7^0)$?

   a) 1   b) -7 c) -1 d) 0

12. Translate "the quotient of s and four decreased by the square of the difference of t and one."

   a) $(s - 4) - 2(t - 1)$ b) $(s \div 4) - 2(t - 1)$

   c) $(4 \div s) - (t + 1)^2$ d) $(s \div 4) - (t - 1)^2$

13. It took Trudi 6 minutes to complete one math problem. How long will it take her to complete 15 problems?

14. The sixth grade went to the museum for a field trip. There are 75 students in the sixth grade, and 21 students did not go. What percentage of students did not go on the field trip?

   a) 12%   b) 28%   c) 50%   d) 65%

15. Name the point with coordinates $(-4, -2)$.
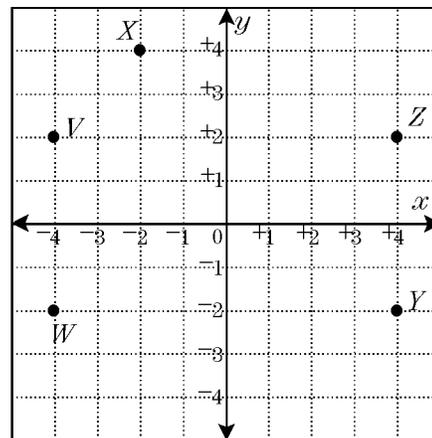
   a) V b) W c) X d) Z

16. Rolf found that the *mean* life expectancy of automobile tires is 50,000 miles for the HotRod brand and 60,000 miles for the Kicks brand. The *median* life expectancy for HotRod is 65,000 miles and for Kicks is 55,000 miles. If Rolf values reliability above all else, which brand of tires should he choose, and why?

17. Insert one pair of parentheses to make each statement true.

   a) $7 \times 8 - 2 \div 2 = 21$

   b) $3 \times 2 + 3 \times 4 = 60$

18. A group of students took a math test with forty multiple-choice questions. The distribution of scores is displayed in the table.

Test Score	Number of Students
0–8	1
8–16	4
16–24	8
24–32	9
32–40	3

Find the mean deviation for the data.

19. Look at the terms and read the descriptions.

$$8x^2$$
$$8y^2$$
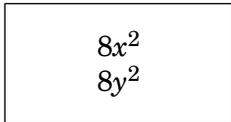
A. like terms because coefficients are the same

B. unlike terms because coefficients are different

C. unlike terms because exponents are different

D. unlike terms because variables are different

Which of the above describes the terms?

a) A   b) B   c) C   d) D

20. Read the questions.

   a. How many tractors are owned per square mile in rural Great Britain?

   b. Which model tractor required repairs most often?

   c. How many tractors does Mrs. Brinson own?

   d. Which model tractor is bought most often in Chile?

   Which of these are statistical questions?

   a) d only   b) b and c only

   c) b, c and d only   d) a, b and d only

21. Alfred has a piece of wrapping paper, as shown in the figure. Two triangular pieces are cut from it. What is the total area, in square inches, of the pieces that he cut out?
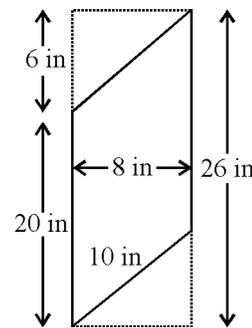
   a) 160 square inches

   b) 96 square inches

   c) 48 square inches

   d) 24 square inches

22. Which of the following is the best representation of 4×4^2?

a)

```
      ┌─────────┐
      │         │
    4 │         │
      │         │
      └─────────┘
          4
```

b)

```
    ┌───────┐
  2 │       │
    └───────┘
        4
```

c)

```
  1 ☐  1 ☐
    1    1
  1 ☐  1 ☐
    1    1
```

d)

```
    ┌─────┬─────┐
    │     │  4  │
    │     ├─────┤
    │  4  │  4  │
    │     │  4  │
    └─────┴─────┘
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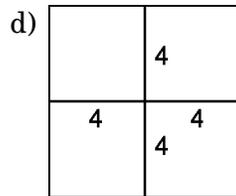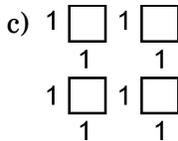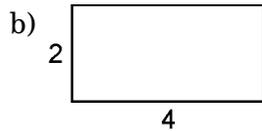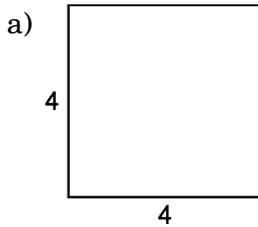
23. What is another way of expressing 5^4?

a) 5×4

b) $4 \times 4 \times 4 \times 4 \times 4$

c) $5 + 4$

d) $5 \times 5 \times 5 \times 5$

24. Write an algebraic expression for the following situation:

"four more than y plus two"

a) $2y + 4$

b) $(y + 2) + 4$

c) $4 - (y + 2)$

d) $4y + 2$

25. Look at the expression.

$$-2 - 3$$

Which of the following describes the expression?

a) the difference of two terms

b) the product of a constant and a variable

c) the product of two terms

d) the quotient of two terms

26. Darla drew the number line in her notebook.

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←─┼─┼─┼─┼─┼─●─┼─┼─┼─┼─┼─┼─┼─┼─┼─┼─┼─●─┼─┼─┼─┼→
      −15      −10      −5       0       5
```
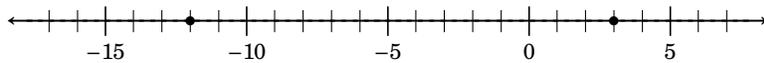
Darla wrote $|3| > |-12|$. Is she correct?

a) No, because -12 is to the right of 3 on the number line.

b) No, because 3 units from zero $<$ 12 units from zero.

c) Yes, because $3 > -12$.

d) Yes, because any positive number is greater than any negative number.

27. Given this data:

26 29 32 35 38 41 44
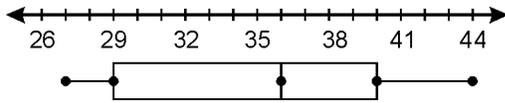
Which statement can you conclude from the box-and-whisker plot?

a) The median of the data is 36.

b) The lower extreme of the data is 29.

c) The upper extreme of the data is 40.

d) The interquartile range makes up 100% of the data.

28. Look at the table.

f	?
6	24
7	28
3	12
2	8

Which expression should go at the top of the second column?

a) $(f + 3) \times 2$ b) $f + 6$

c) $(f + 2) \times 3$ d) $f \times 4$

29. A family went on a bicycle trip. They rode their bicycles for 3 days, and each day they went 34 miles. What equation could the family use to find the total number of miles (m) they rode?

a) $\dfrac{m}{3} = 34$ b) $3m = 34$

c) $m - 3 = 34$ d) $m + 3 = 34$

30. What is the surface area of the box?

1 in   1 in→

10 in

6 in

6 in
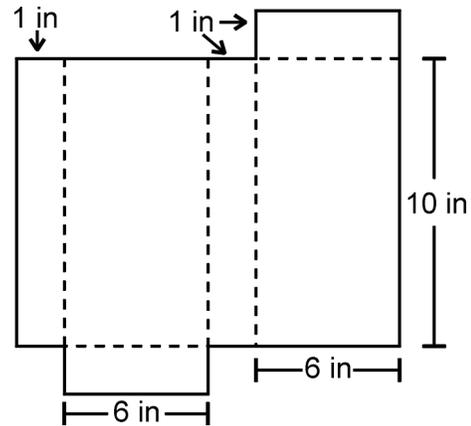
a) 120 in^2 b) 144 in^2

c) 152 in^2 d) 160 in^2

31. Which inequality is displayed on the number line?

−5 −4 −3 −2 −1 0 1 2 3 4 5
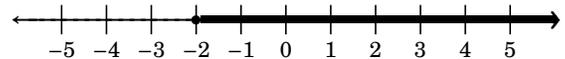
a) $x > -2$ b) $x < -2$

c) $x \geq -2$ d) $x \leq -2$

32. Name the independent and dependent quantities respectively.
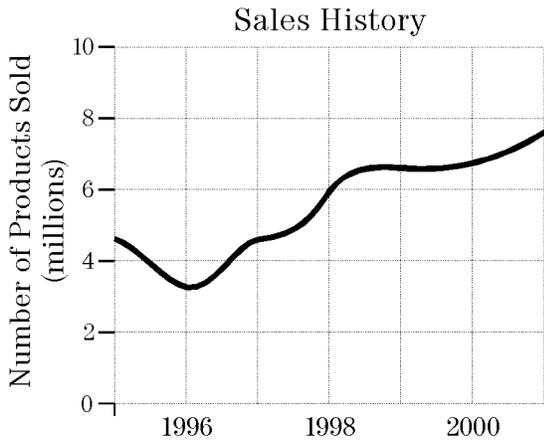
Sales History

a) Year, Sales History

b) Number Sold, Year

c) Sales History, Year

d) Year, Number Sold

33. The scores on a science test were:

81, 68, 88, 76, 80, 69, 85, 93, 70, 90,
70, 69, 70, 78, 82, 74, 82, 90, 74, 98

a) Construct a frequency table using the intervals 95–100, 91–94, 87–90, 83–86, 79–82, 75–78, 71–74, 67–70

b) Using the table completed in part a, construct a frequency histogram and a cumulative frequency histogram.

c) Which interval contains the 80th percentile?

d) Which interval contains the upper quartile?

34. Which box-and-whisker plot represents the following information?

Temperatures: 90, 65, 78, 70, 100, 80, 60

a)

b)

c)

d)
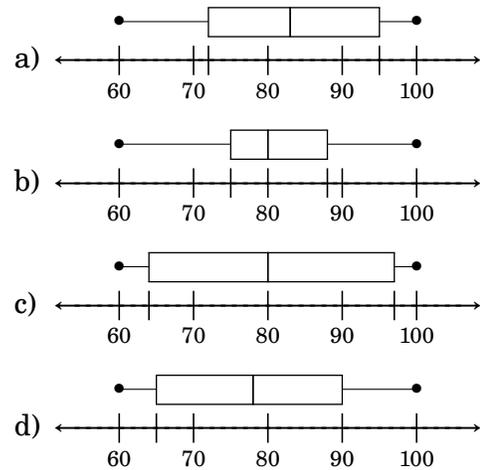
35. Look at isosceles trapezoid *FLED* and Parallelogram *STAR*.
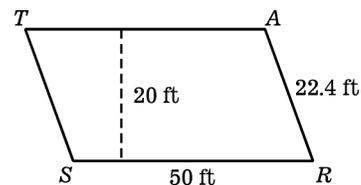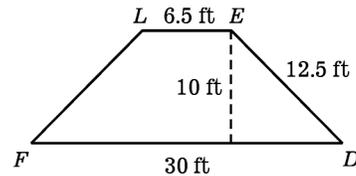
a) Compare the two shapes. Describe at least four similarities or differences.

b) Find the area and perimeter of each figure.

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Grade 6

Num	Scoring	Standard	Answer
1		6.RP.03B	yes, because $20 \times 26 = 520$ so they can drive at most 520 miles on one tank
2	c	6.EE.04	$-3m$ and $\dfrac{m}{3}$
3	d	6.EE.03	$7(bc)$
4		6.RP.01	$15:1$
5		6.RP.03A	900
6	c	6.G.03	12
7	a	6.EE.02C	$235
8	c	6.NS.06B	D
9	b	6.NS.05	the percentage rate of a car loan
10	a	6.NS.06A	$A = -C$
11	c	6.EE.01	-1
12	d	6.EE.02A	$(s \div 4) - (t - 1)^2$
13		6.RP.03B	1 hour 30 minutes
14	b	6.RP.03C	28%
15	b	6.NS.06C	W
16		6.SP.05D	HotRod
17		6.EE.02C	$7 \times (8 - 2) \div 2 = 21$; $3 \times (2 + 3) \times 4 = 60$
18		6.SP.05C	6.84
19	d	6.EE.04	D
20	d	6.SP.01	a, b and d only
21	c	6.G.01	48 square inches
22	d	6.EE.01	
23	d	6.EE.01	$5 \times 5 \times 5 \times 5$
24	b	6.EE.02A	$(y + 2) + 4$
25	a	6.EE.02B	the difference of two terms
26	b	6.NS.07D	No, because 3 units from zero < 12 units from zero.
27	a	6.SP.05C	The median of the data is 36.
28	d	6.EE.05	$f \times 4$
29	a	6.EE.07	$\dfrac{m}{3} = 34$

30	c	6.G.04	152 in^2
31	c	6.EE.08	$x \geq -2$
32	d	6.EE.09	Year, Number Sold
33		6.SP.04	[table]; [graph]; 87–90; 83–86
34	d	6.SP.04	
35		6.G.01	Similarities and differences may vary. Area of trapezoid: 182.5 ft^2, Perimeter: 61.5 ft Area of parallelogram: 1000 ft^2, Perimeter: 144.8 ft.
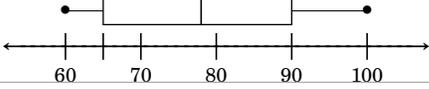
1. Look at the map in the picture below.
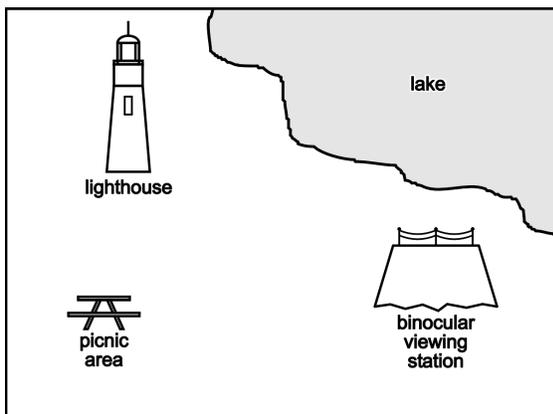
On the map, 2 cm equals 1 m. The distance between the picnic area and the binocular viewing station is 6.8 cm on the map. What is the actual distance from the picnic area to the binocular viewing station?

a) 13.6 meters

b) 12.6 meters

c) 3.4 meters

d) 12.4 meters

2. Given these inequalities:

    I. $3x - y < 5$

    II. $2x - 3y > -2$

    III. $x - 6y \geq -28$

$(2, 5)$ is a solution to:

a) I only

b) II only

c) I and III

d) I, II and III

3. Write a real life problem that can be solved using the following equation. Then solve the equation and explain your method.

$$b + 8 = 23$$

Write a real life problem that can be solved using the following equation. Then solve the equation and explain your method.

$$\frac{t}{9} = 6$$

4. In the diagram shown, $ABCD$ is a trapezoid. $\overline{AB}$ is perpendicular to $\overline{AD}$ and is the diameter of the semicircle with centre O. $AB = 16$, $BC = 17$, $ED = 14$, and $BE = 20$. Find, to the nearest tenth of a square unit, the area of the entire figure.

a) 364.5 units^2

b) 524.8 units^2

c) 545.1 units^2

d) 746.1 units^2
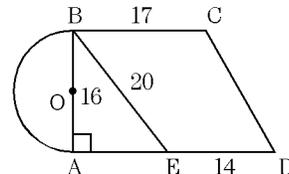
5. Based on the pattern in the chart shown, which of the following numbers should appear beneath 10?

9	12	15	18	21		10
15	21	27	33	39		?

a) 16   b) 17   c) 21   d) 150

6. Complete the table.

x	8	-12			
$-3x + 5$			-13	32	-2

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7. Victoria lives in Vermont and her cousin, NaDalia lives in North Dakota. The girls researched population distribution in the two states and displayed the data in a graph.

Urban and Rural Population

Source: U.S. Census Bureau
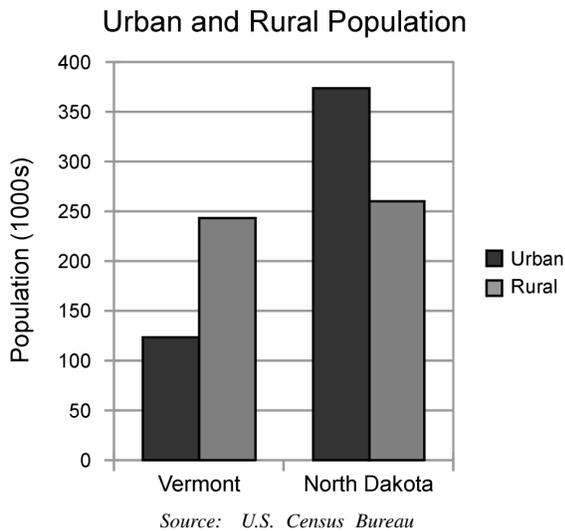
Compare the data sets.

a) The urban population of Vermont is about 2 times the urban population of North Dakota.

b) The urban population of Vermont is about the same as the urban population of North Dakota.

c) The rural population of Vermont is about half the rural population of North Dakota.

d) The rural population of Vermont is about $1\frac{1}{2}$ times the rural population of North Dakota.

8. Use a sample space to determine the probability of rolling two dice and getting a sum of more than 10.

a) $\frac{1}{12}$ b) $\frac{1}{18}$ c) $\frac{3}{18}$ d) $\frac{8}{9}$

9. Alonzo makes an odd shaped sofa cushion by starting with a $10 \times 20 \times 16$-inch block of foam and cutting one corner off to get the dimensions shown in the diagram. What is the volume of the finished piece of foam?
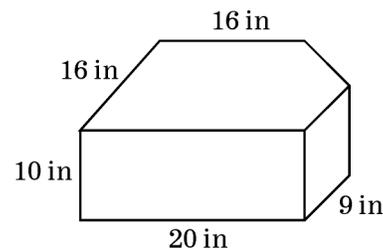
a) 3200 cubic inches   b) 2920 cubic inches

c) 2740 cubic inches   d) 3060 cubic inches

10. During one year the highest temperature was recorded in July at a record $106°\,$F. The lowest temperature recorded was in January at a low of $-17°\,$F. What was the difference between the recorded high and recorded low temperatures?

a) $89°\,$F   b) $99°\,$F

c) $123°\,$F   d) $133°\,$F

11. Bryan and Kayla took alpine ski lessons. The teens found that the ratio of Bryan's falls to attempts on the Sunshine Ski Run was the same as the ratio of Kayla's falls to attempts on the Panarama Hill.

Write a proportion to show the ratios are equivalent. Use the following variables to represent each the situation.

- Bryan's falls, b

- Bryan's attempts on Sunshine Ski Run, s

- Kayla's falls, k

- Kayla's attempts on Panarama Hill, p

Write another equation that is equivalent to the one you wrote.

12. There are nearly 300,000 birds in a wooded area. About 100,000 of these birds are migratory. If a bird is spotted in the area, what is the probability that it will be migratory?

a) 6   b) $\dfrac{1}{3}$

c) $\dfrac{1}{30}$ d) $\dfrac{3}{100,000}$

13. Complete: _?_ $\cdot 15x = 1$

a) $-\dfrac{15}{x}$ b) $\dfrac{1}{15x}$ c) $\dfrac{x}{15}$ d) $15x$

14. Which of the following statements is true?

a) $\dfrac{3}{8} = 0.375$ b) $20\% = 0.05$

c) $\dfrac{2}{5} = 60\%$ d) $\dfrac{5}{8} = 83.3\%$

15. A bathtub measures 72 inches long, 30 inches wide, and 24 inches deep. If each cubic foot of water is equal to about $7\frac{1}{2}$ gallons, what is the maximum capacity of the bathtub?

a) $162\frac{1}{2}$ gallons   b) 225 gallons

c) $384\frac{1}{2}$ gallons   d) 400 gallons

16. Swamp Jump is a TV game show. The objective is to complete each level of an obstacle course that is constructed over a pond. Contestants wear helmets and jump, kick, bop and swing their way across spongey foam pieces to advance to the next level. Points are awarded as follows:

- Contestants who complete a level on one try earn 7 points.

- Contestants who complete a level on two or three tries earn 5 points.

- Contestants who do not complete a level (after a maximum of three tries) still advance but lose 2 points.

If there are six levels altogether, what are the highest and lowest possible scores?

Brianna was a contestant on the show. She did not complete two levels and earned a total of 20 points. What conclusion can be drawn?

Is there a way to earn exactly 13 points? Explain.

17. Look at the diagram of a room. The shaded area represents a carpet.

30 ft

24 ft

27 ft

21 ft
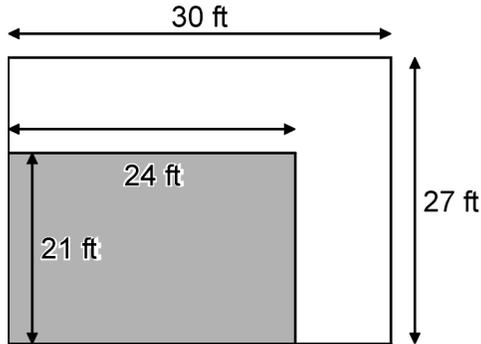
How many square feet of floor space does *not* have carpet?

18. A poll of university students reveals that 11 out of every 12 first year students returns for their second year. A guidance counselor would like a survey of 5 first year students to determine the probability of at least 3 of them coming back, and performs a simulation in order to find this probability. Which of the following simulation tool(s) could be used to determine this probability?

    I. a die

    II. twelve cards

    III. a random number generator

    IV. a coin

    V. a spinner

    a) I only

    b) I and II only

    c) II, III and V only

    d) I, II, III and V only

19. Evaluate: $\dfrac{\frac{n+2}{n-6}}{\frac{10-n}{n-4}}$ for $n = 8$

    a) 0.1   b) 1   c) 2.5   d) 10

20. If -2 is added to any number, the result is always—

    a) even

    b) less than the original number

    c) greater than the original number

    d) a positive number

21. The drama club is ordering pizza. There are 7 in the club, and each member usually eats about $\frac{3}{8}$ of a pizza. How many pizzas should they order?

22. A basket of tomatoes costs $3.59. If the basket contains 9 tomatoes, approximately how much would 2 tomatoes cost?

    a) $0.40   b) $0.80   c) $1.20   d) $1.50

23. Suppose 10 is a factor of ab, and 8 is a factor of bc, where a, b, and c are integers. What is the largest number that *must* be a factor of abc?

    a) 2   b) 20   c) 40   d) 80

24. What is the probability that the spinner will land on a number ≥ 7?
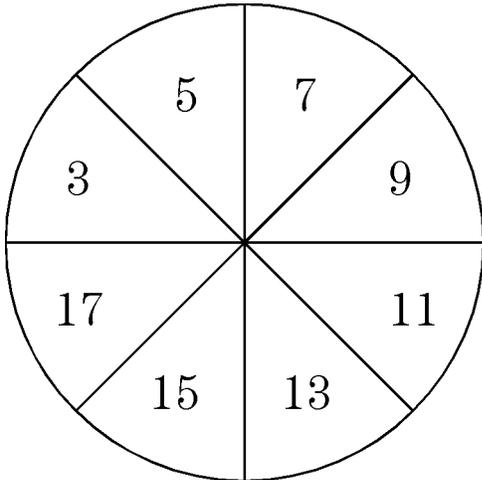
   a) $\frac{5}{8}$ b) $\frac{3}{8}$ c) $\frac{3}{4}$ d) $\frac{1}{4}$

25. Given: $4x + 7 = y$, solve for x if $y = 15$

   a) $\frac{4}{7}$ b) $\frac{7}{4}$ c) 2   d) 4

26. How could you use a number cube to simulate tossing a coin?

   a) Rolling a prime number is heads and anything is tails

   b) Rolling an odd number is heads and an even number is tails

   c) Rolling a six is heads and anything else is tails

   d) Rolling less than a three is heads and anything else is tails

27. A triangle has an area of $30\,\text{cm}^2$. By what scale factor must each of the dimensions of the triangle be multiplied to give a similar triangle so that the area is increased by $90\,\text{cm}^2$?

   a) 2   b) 3   c) 4   d) 9

28. A spinner is divided into a black sector that has an angle measure of $270°$ and a white sector that has an angle measure of $90°$. It is spun 100 times and lands on the black sector 70 times. What is the experimental probability of the spinner landing on the black sector?

   a) 0.25   b) 0.7   c) 0.30   d) 0.5

29. Sam's $15\,\text{ft} \times 28\,\text{ft}$ rectangular fenced backyard is shown in the diagram below.
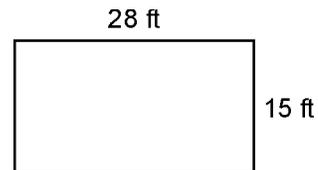
Sam tied his dog on a 10-foot rope attached to a one of the corner post on the fence. Which expression can be used to find how many square feet the dog has to roam?

   a) $\frac{3}{4}(\pi)(20)$

   b) $\frac{16(10)}{2}$

   c) $\frac{\pi(10^2)}{4}$

   d) $(28 \cdot 15) - (\pi \cdot 10^2)$

30. One summer, Harold traveled to Europe for business. Since he was going to shop and needed to buy gas, he exchanged United States dollars (USD) for Euros (EUR). Europe uses a monetary system similar to the United States and the euro is divided into 100 cents. At the time of his trip, the exchange rate was 1.3396 Euro for each U.S. dollar.

a) Harold exchanged $1200.00 (USD) for Euros. How many Euros did he receive?

b) In Italy, Harold filled his rental car with gas. The price for unleaded gas was $1.77 per liter (EUR). At the same time in the United States, unleaded gas sold for $3.25 per gallon. Harold did not know the exact conversion between gallons and liters, but he knew that a liter is a little more than a quart. Use this information to compare the cost of gas in Italy and the U.S.

c) While in Florence, Harold bought a handpainted vase for his wife. It cost $69.00 (EUR). How much is that in U.S. dollars?

d) When Harold returned to the United States, he was required to pay duty on his purchases. (Duty is a tax on goods purchased in another country.) There was 8% duty on purchases over $200.00 (USD). The total of Harold's purchases was $487.30 (EUR). How much duty was Harold required to pay in the United States? Show how you found your answer.

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Grade 7

Num	Scoring	Standard	Answer
1	a	7.G.01	13.6 meters
2	c	7.EE.04B	I and III
3		7.EE.04A	[answers vary], $b = 15$; [answers vary], $t = 54$
4	a	7.G.04	364.5 units^2
5	b	7.EE.04A	17
6		7.NS.03	-19, 41, 6, -9, $\frac{7}{3}$
7	d	7.SP.03	The rural population of Vermont is about $1\frac{1}{2}$ times the rural population of North Dakota.
8	a	7.SP.08A	$\frac{1}{12}$
9	d	7.G.06	3060 cubic inches
10	c	7.NS.01D	$123°$ F
11		7.RP.02C	$\frac{b}{s} = \frac{k}{p}$; $bp = sk$
12	b	7.SP.05	$\frac{1}{3}$
13	b	7.EE.01	$\frac{1}{15x}$
14	a	7.NS.02D	$\frac{3}{8} = 0.375$
15	b	7.G.06	225 gallons
16		7.EE.03	42 and -12. She completed two levels on one try, and two levels on two or three tries. Yes, $2 \times 7 + 1 \times 5 - 3 \times 2 = 13$
17		7.G.06	306 sq feet
18	c	7.SP.08C	II, III and V only
19	d	7.NS.03	10
20	b	7.EE.01	less than the original number
21		7.NS.03	3 pizzas
22	b	7.RP.01	$0.80
23	b	7.EE.01	20
24	c	7.SP.07A	$\frac{3}{4}$
25	c	7.EE.04A	2
26	b	7.SP.07B	Rolling an odd number is heads and an even number is tails
27	a	7.G.01	2
28	b	7.SP.06	0.7
29	c	7.G.04	$\frac{\pi(10^2)}{4}$
30		7.RP.03	$1607.52; gas about $2.04 (USD) more per gallon in Italy; US$51.50; US$13.10

1. Separate the numbers below into the most specific of these groups:

   integers

   rational numbers

   irrational numbers

   real numbers

$\frac{8}{2}$	$\lvert -7.3 \rvert$	$5\frac{2}{7}$
$0.303003000\ldots$		π
$\sqrt{25}$	0.4	$-3\sqrt{8}$

2. Rory's uncle, a math teacher, will give Rory a $5 bill if Rory can figure out which of these has a value closest to 5. Which one should Rory choose?

   A. $\sqrt[4]{626}$ B. $\sqrt[5]{3179}$

   C. $\sqrt[3]{130}$ D. $\sqrt[6]{1490}$

3. Use scientific notation to simplify the expression.

   $$\frac{6.4 \times 10^4}{(8.0 \times 10^4)(2.0 \times 10^3)}$$

   A. 1.6×10^{-1} B. 4.0×10^{-2}

   C. 4.0×10^{-3} D. 4.0×10^{-4}

4. Solve: $5[x - 2(x - 1)] = x + 13$

   A. $x = -2$ B. $x = -\frac{1}{2}$

   C. $x = \frac{1}{2}$ D. $x = 1$

5. Which of the following is the graph of $-2x + 4y = 8$?

   A.

   B.

   C.

   D.
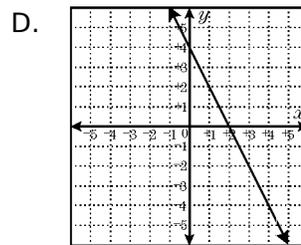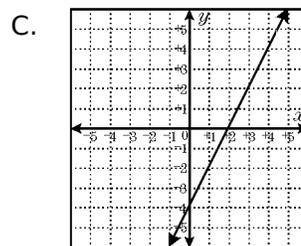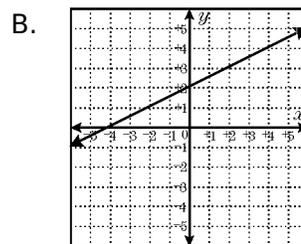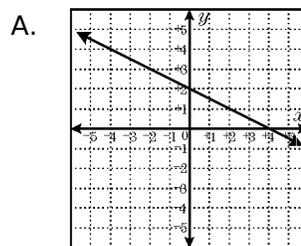
6. Erik has 8 sacks of flour. Some of his sacks weigh 3 pounds, and the others weigh 7 pounds. The total weight of his flour is 36 pounds. How many 7-pound sacks does he have?

   A. 3 sacks   B. 4 sacks

   C. 5 sacks   D. 6 sacks

7. For the equation $y = x + 3$, fill the table with ordered pairs, then graph.

x	y
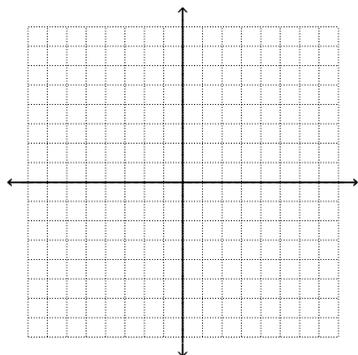
8. Determine the equation of the line.

   A. $2y - x = -4$

   B. $2y - x = 4$

   C. $y - 4x = 2$

   D. $y + 2x = -2$
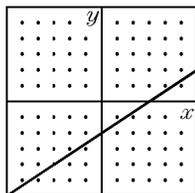
9. If the y-intercept of the graph of $y = -4x - 2$ is changed to 5 but the x-intercept remains the same, what is the equation of the new graph?

   A. $y = 5x - 2$ B. $y = \frac{1}{2}x + 5$

   C. $y = 10x + 5$ D. $y = -\frac{4}{5}x - 5$

10. Plot the following points: $A(2, 3)$, $B(7, 3)$, $C(7, 8)$ and $D(2, 8)$

   a) What is the equation of the line joining points A and C?

   b) What is the equation of the line joining points B and D?

   c) Are the lines in parts (a) and (b) perpendicular?

   d) At what point do the diagonals intersect?

11. Jack's Table Rental charges a $25.00 deposit and then $6.00 per table. Party Company charges a $35.00 deposit but only $4.50 per table. Which company should be used if 9 tables need to be rented? Show your solution by drawing a graph, solving an equation, or making a table.

12. Consider the following points in the x and y plane:

   $(2, 3)$, $(4, 1)$, $(-1, 2)$, $(3, 3)$, $(-2, 4)$

   Which statement is true about the relation between x and y?

   A. x is a function of y

   B. y is a function of x

   C. x is a function of y and y is a function of x

   D. x is not a function of y and y us not a function of x

13. The table shows recommended heart rates during exercise. In the table, a is a person's age (years) and R is the recommended heart rate (beats per minute):

a	R
10	180
20	170
30	160
40	150

   Which equation shows the relationship between age and recommended heart rate?

   A. $R = -10a + 190$

   B. $R = -a + 190$

   C. $R = a + 160$

   D. $R = 10a + 60$

14. The diagram shows a triangle that has been reflected about the *y*-axis from the fourth quadrant to the third quadrant.

a) On the graph, draw a reflection of the triangle about the *x*-axis from the fourth quadrant to the first quadrant.

b) Now rotate the triangle in the third quadrant 90° clockwise around the origin. Repeat the operation with the new triangle: rotate it 90° clockwise around the origin. How many different triangles show up in the first quadrant?

c) Show or explain why the two 90° rotations have the same result as the two reflections. Since rotations and reflections do not always have the same result, what is special about this particular triangle?

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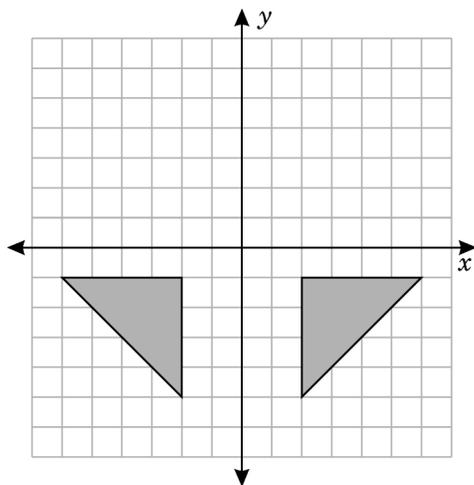
15. Each packing-crate in a warehouse contains 16 basketballs, and there are 4 basketballs that are not in a crate. Which equation shows the relationship between the number of basketballs, *b*, and the number of crates in the warehouse, *c*?

A. $c = \dfrac{4}{b}$

B. $c = \dfrac{b}{16} + 4$

C. $b = c + 4$

D. $b = 16c + 4$

16. Study the diagram.
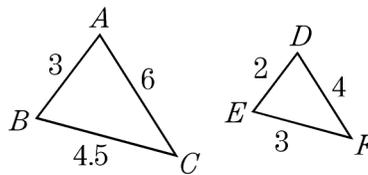
Select the statement that is *incorrect*.

A. $\dfrac{DE}{AB} = \dfrac{EF}{AC}$

B. $\dfrac{AC}{DF} = \dfrac{3}{2}$

C. $\dfrac{EF}{BC} = \dfrac{2}{3}$

D. $\dfrac{AB}{BC} = \dfrac{DE}{EF}$

17. The total cost to manufacture buttons involves a one-time setup cost plus a charge for each button produced. The graph shows the total cost for various numbers of buttons.

What is the cost to manufacture each button after the setup cost has been covered (paid off)?
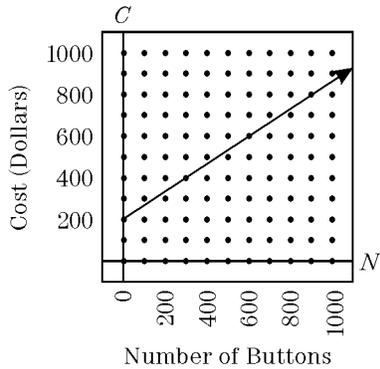
A. $0.50
B. $0.67
C. $1.00
D. $1.33

18. Make up a word problem that the following setup could represent.

smaller number → x
larger number → $2x + 9$

Therefore: $5(2x + 9) - (4x) = 21$

19. The figure shows a congruence transformation for trapezoid $ABCD$, where $A = (-4, 6)$ and $A' = (8, -3)$.
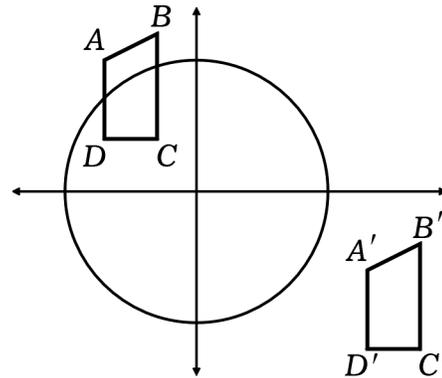
If the circle, whose center O is at the origin, is transformed the same way as the trapezoid, what are the coordinates of O'?

A. $(12, -9)$
B. $(-4, -3)$
C. $(6, 8)$
D. $(4, 3)$

20. In the figure, the two rectangles are similar.

If $a = 20$, $b = 32$ and $x = 12$, what is the value of y?
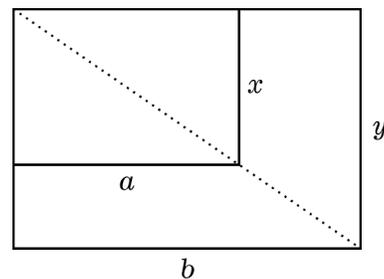
A. 7.5   B. 16   C. 19.2   D. $53\frac{1}{3}$

21. Quadrilateral $A'B'C'D'$ is the image of quadrilateral $ABCD$ after a translation of 4 units left and 3 units down. What are the coordinates of quadrilateral $A'B'C'D'$?
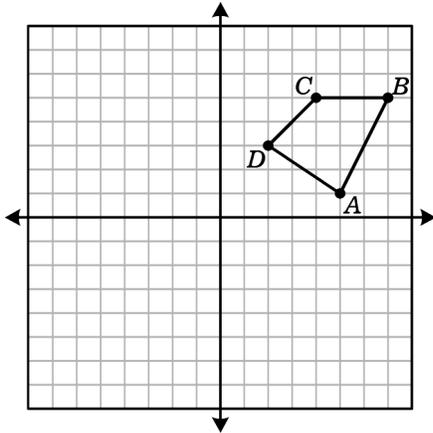
A. $(1, 4)$, $(3, 8)$, $(0, 8)$, $(-2, 6)$

B. $(5, -2)$, $(7, 2)$, $(4, 2)$, $(2, 0)$

C. $(1, -2)$, $(3, 2)$, $(0, 2)$, $(-2, 0)$

D. $(1, 1)$, $(3, 5)$, $(0, 5)$, $(-2, 3)$

22. In triangle ABC, the measure of $\angle A$ is y, the measure of $\angle B$ is $y + 20$, and the measure of an exterior angle at C is $120°$. Find y.

A. $100°$ B. $50°$

C. $30°$ D. $60°$

23. Use the known lengths of the squares that form the right triangle to find the length x of the third square.
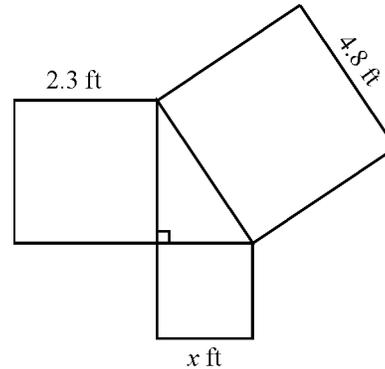
A. 4.2 ft   B. 5.3 ft

C. 5.9 ft   D. 6.2 ft

24. Find the shortest distance from the center of the circle, C, to the line RS. The length of segment RS is 8 in. The diameter of the circle is 20 in.

A. 2   B. $2\sqrt{7}$

C. $2\sqrt{21}$ D. 10
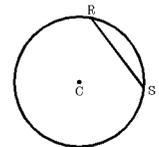
25. Monica and Jan take part in a scavenger hunt. They begin the hunt at the same starting point. Monica walks 30 m north, then 70 m east to find her first treasure. Jan walks 50 m south, then 20 m west and stops. How far are the girls from each other?

A. $\sqrt{500}$ m   B. $\sqrt{8700}$ m

C. $\sqrt{14500}$ m   D. $\sqrt{16900}$ m

26. A solid hemisphere $\left(V = \frac{2}{3}\pi r^3\right)$, and a solid cone $\left(V = \frac{1}{3}(\text{Area of base} \times \text{height})\right)$ are on one side of a balance. A solid cylinder $(V = \text{Area of Base} \times \text{height})$ is on the other side. All have the same radius and are made of the same material. The cone and the cylinder are the same height. Which side is heavier?
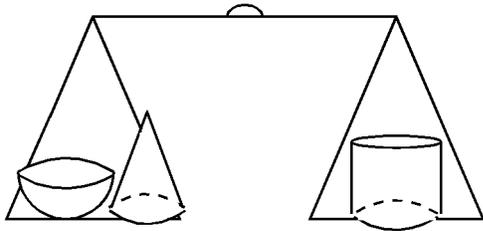
A. The cylinder side is much heavier.

B. The cylinder side is slightly heavier.

C. The cylinder side is lighter.

D. The weights are the same.

27. The scatterplot needs its line of best fit to be adjusted. If the line shown has a slope of $\frac{7}{6}$, what should the slope be changed to in order to get the best-fitting line?
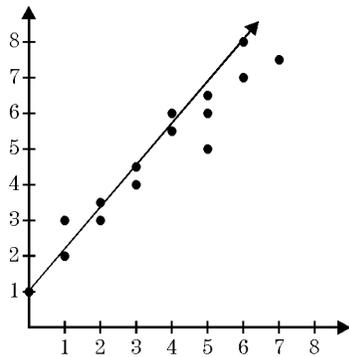
A. $-\frac{7}{6}$ B. $-\frac{1}{2}$ C. $\frac{1}{3}$ D. 1

28. A teacher graphed the weights and heights of students in the class. Which of these is the *most probable* scatterplot the teacher created?
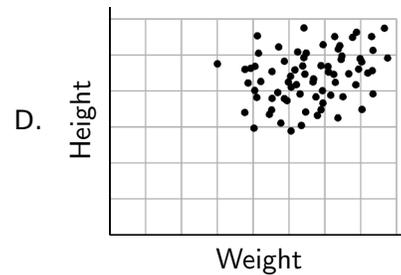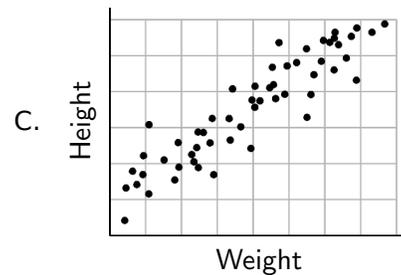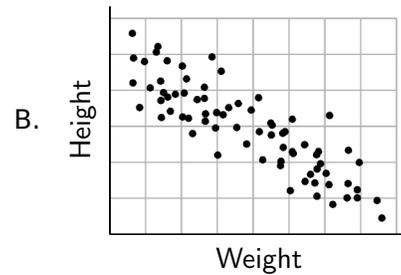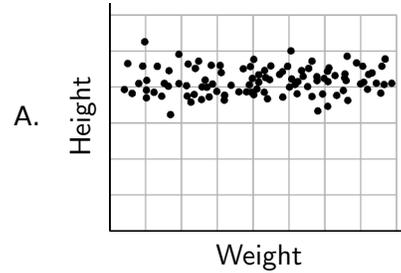
A.

Weight

B.

Weight

C.

Weight

D.

Weight

Grade 8

Num	Scoring	Standard	Answer
1		8.NS.01	[task]
2	A	8.NS.02	$\sqrt[4]{626}$
3	D	8.EE.04	4.0×10^{-4}
4	B	8.EE.07B	$x = -\frac{1}{2}$
5	B	8.F.03	
6	A	8.EE.08C	3 sacks
7		8.F.03	[answers vary]
8	A	8.F.04	$2y - x = -4$
9	C	8.EE.06	$y = 10x + 5$
10		8.EE.08A	$y = x + 1$; $y = -x + 10$; yes; $(4.5, 5.5)$
11		8.EE.08C	Party Company
12	B	8.F.01	y is a function of x
13	B	8.F.04	$R = -a + 190$
14		8.G.01	Triangle is isoceles.
15	D	8.F.04	$b = 16c + 4$
16	A	8.G.04	$\dfrac{DE}{AB} = \dfrac{EF}{AC}$
17	B	8.SP.03	$0.67
18		8.EE.07B	[answers vary]
19	A	8.G.03	$(12, -9)$
20	C	8.G.04	19.2
21	C	8.G.03	$(1, -2), (3, 2), (0, 2), (-2, 0)$
22	B	8.G.05	$50°$
23	A	8.G.07	4.2 ft
24	C	8.G.07	$2\sqrt{21}$
25	C	8.G.08	$\sqrt{14500}$ m
26	D	8.G.09	The weights are the same.
27	D	8.SP.03	1
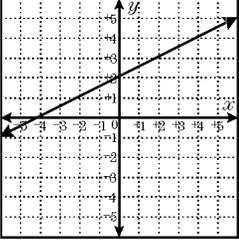
28   D   8.SP.01