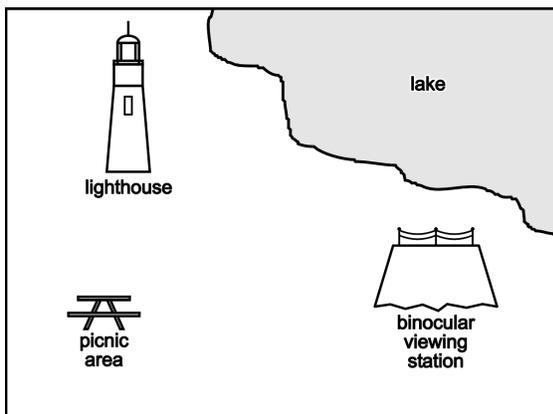


1. Look at the map in the picture below.



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.

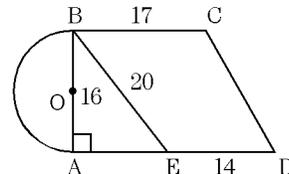
$$b + 8 = 23$$

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<sup>2</sup>  
b) 524.8 units<sup>2</sup>  
c) 545.1 units<sup>2</sup>  
d) 746.1 units<sup>2</sup>



5. Based on the pattern in the chart shown, which of the following numbers should appear beneath 10?

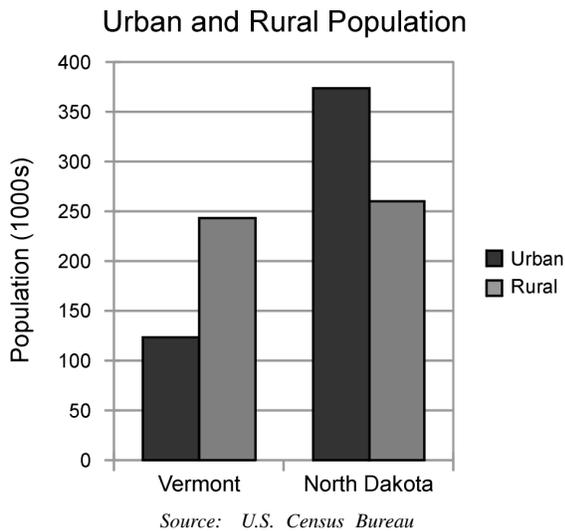
9	12	15	18	21	10
15	21	27	33	39	?

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

6. Complete the table.

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

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.



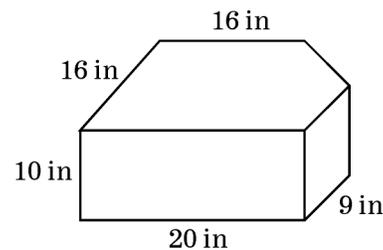
Compare the data sets.

- The urban population of Vermont is about 2 times the urban population of North Dakota.
- The urban population of Vermont is about the same as the urban population of North Dakota.
- The rural population of Vermont is about half the rural population of North Dakota.
- 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?



- 3200 cubic inches
  - 2920 cubic inches
  - 2740 cubic inches
  - 3060 cubic inches
10. During one year the highest temperature was recorded in July at a record  $106^\circ\text{F}$ . The lowest temperature recorded was in January at a low of  $-17^\circ\text{F}$ . What was the difference between the recorded high and recorded low temperatures?
- $89^\circ\text{F}$
  - $99^\circ\text{F}$
  - $123^\circ\text{F}$
  - $133^\circ\text{F}$

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

13. Complete:  $\underline{\quad} \cdot 15x = 1$

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

14. Which of the following statements is true?

- a)  $\frac{3}{8} = 0.375$                       b)  $20\% = 0.05$   
c)  $\frac{2}{5} = 60\%$                       d)  $\frac{5}{8} = 83.3\%$

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, bob and swing their way across spongy foam pieces to advance to the next level. Points are awarded as follows:

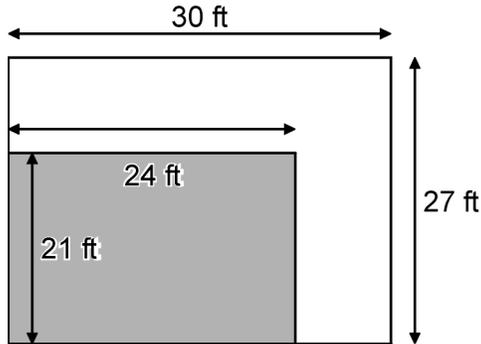
- Contestants who complete a level on one try earn 7 points.
- Contestants who complete a level on two or three tries earn 5 points.
- Contestants who do not complete a level (after a maximum of three tries) still advance but lose 2 points.

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.



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:  $\frac{\frac{n+2}{n-6}}{\frac{10-n}{n-4}}$  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?

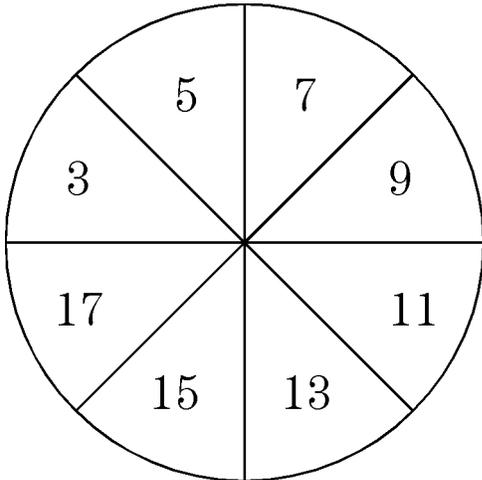
22. A basket of tomatoes costs \$3.59. If the basket contains 9 tomatoes, approximately how much would 2 tomatoes cost?

- 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  $\geq 7$ ?



- 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

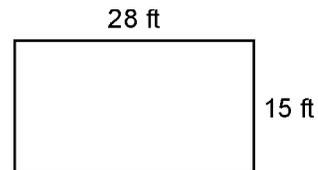
27. A triangle has an area of  $30 \text{ cm}^2$ . By what scale factor must each of the dimensions of the triangle be multiplied to give a similar triangle so that the area is increased by  $90 \text{ cm}^2$ ?

- a) 2    b) 3    c) 4    d) 9

28. A spinner is divided into a black sector that has an angle measure of  $270^\circ$  and a white sector that has an angle measure of  $90^\circ$ . 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	$364.5 \text{ units}^2$
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	$123^\circ \text{F}$
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