

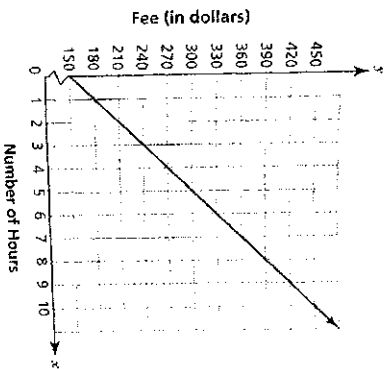
**I.**

The temperature in a city began to decrease at a constant rate once a cold front began to move in. The temperature was 49 °F after 2 hours and 39 °F after 6 hours. Suppose  $x$  is the number of hours since the cold front began to move in, and  $y$  is the temperature in °F.

Which equation models this situation?

- A  $y = -2.5x + 54$
- B  $y = -1.25x + 54$
- C  $y = -2.5x + 56$
- D  $y = -1.25x + 56$

2. The graph below models the cost of holding a banquet at the Tea Room restaurant



What is the fee and cost per hour to hold a banquet at the Tea Room?

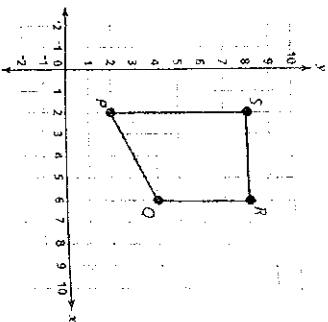
- A fee: \$150, cost per hour: \$30
- B fee: \$30, cost per hour: \$150
- C fee: \$120, cost per hour: \$30
- D fee: \$30, cost per hour: \$120

3. Simplify.

$$3^6 \div 3^4$$

- A  $3^2$
- B  $3^3$
- C  $3^2$
- D 1

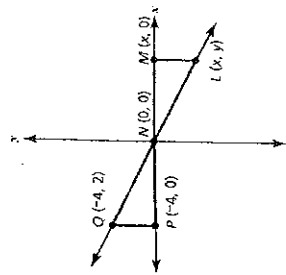
4. Look at the figure PQRS below.



If figure PQRS were dilated using a scale factor of 0.5 with the center of dilation at (0, 0) to produce the image P'Q'R'S', what would be the coordinates of the vertices of the image?

- A P'(1.5, 1.5), Q'(2.5, 1.5), R'(2.5, 3.5), S'(0.5, 3.5)
- B P'(2.5, 2.5), Q'(6.5, 4.5), R'(6.5, 8.5), S'(2.5, 8.5)
- C P'(4, 4), Q'(12, 8), R'(12, 16), S'(4, 16)
- D P'(1, 1), Q'(3, 2), R'(3, 4), S'(1, 4)

5. Toru is deriving the equation of line  $LQ$  by using the similar triangles  $LMN$  and  $QPN$  as shown. He knows the slope of the line from  $L(x, y)$  to  $N(0, 0)$  is equal to the rise over the run, or  $\frac{y}{x}$ .



What proportion should he set up next?

- A  $\frac{y}{x} = \frac{2}{-4}$
- B  $\frac{y}{x} = \frac{4}{-4}$
- C  $\frac{y}{x} = \frac{2}{4}$
- D  $\frac{y}{x} = \frac{4}{2}$

**Go On**

7. In April, an online social networking site had approximately 200 million registered accounts. In August, the number of registered accounts had risen to  $3.62 \times 10^8$ . In scientific notation, how many more users were there in August than in April?
- A  $1.62 \times 10^8$
  - B  $1.62 \times 10^7$
  - C  $1.62 \times 10^6$
  - D  $1.62 \times 10^5$

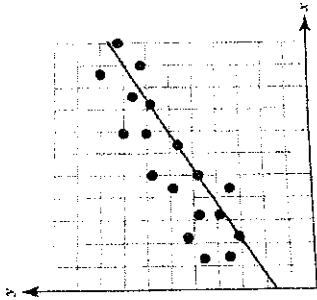
6. Consider the two functions below:
- Function 1:  $y = 2x + 6$
  - Function 2:

x	y
-1	3
1	15
2	21

- How does the rate of change differ for the two functions?
- A Function 1 has a positive rate of change and function 2 has a negative rate of change.
  - B The rate of change for function 2 is greater than the rate of change for function 1.
  - C The rate of change for function 1 is greater than the rate of change for function 2.
  - D There is no difference in the rate of change of the two functions.

8. The length of a rectangular dining hall is 8 feet less than twice its width. The perimeter of the room will be 134 feet. What are the dimensions of the dining hall?
- A 25 feet wide and 42 feet long
  - B 35.5 feet long and 55.2 feet wide
  - C 40 feet wide and 72 feet long
  - D 47.3 feet wide and 86.6 feet long

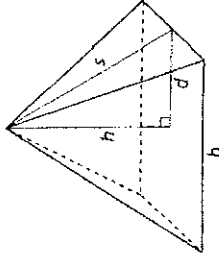
9. Todd drew the line on the scatter plot below. He says that this is the line of best fit for the data because it passes through 4 of the data points exactly.



Which describes how to change the line to make it a line of best fit for the data?

- A Increase the slope, but keep the same  $y$ -intercept.
- B Increase the slope and increase the  $y$ -intercept.
- C Decrease the slope and decrease the  $y$ -intercept.
- D Keep the same slope, but increase the  $y$ -intercept.

11. In the square pyramid shown below,  $h = 8$  m and  $b = 24$  m.



What is the length of the slant height,  $s$ ?

- A  $\sqrt{640}$  m
- B  $\sqrt{208}$  m
- C 208 m
- D 640 m

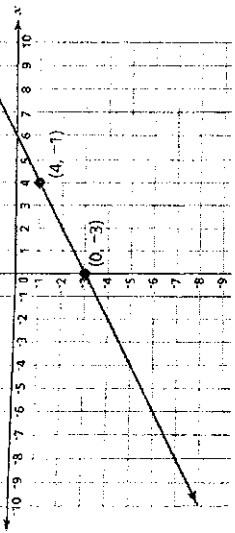
10. Where do the lines modeled by the equations  $y = -\frac{7}{8}x + \frac{1}{4}$  and  $y = -\frac{3}{4}x + \frac{1}{2}$  intersect?

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

12. A cylindrical water tank near the town library is 15 meters high and has a circumference of 85 meters. What is the *approximate* volume of the water tank? Use the formula below.

- A 1,275  $\text{m}^3$
- B 2,875  $\text{m}^3$
- C 8,624  $\text{m}^3$
- D 34,497  $\text{m}^3$

15.



What are the rate of change and initial value of the function represented by the line on the graph?

- A rate of change:  $\frac{1}{2}$ ; initial value:  $-3$
- B rate of change:  $\frac{1}{2}$ ; initial value:  $-8$
- C rate of change:  $2$ ; initial value:  $-3$
- D rate of change:  $2$ ; initial value:  $-8$

16. Which statement is true?

- A The values of  $\sqrt{30}$  and  $\sqrt{37}$  are between 5 and 6.
- B The value of  $\sqrt{30}$  is greater than the value of  $\sqrt{37}$ .
- C The value of  $\sqrt{30}$  is between 4 and 5 and the value of  $\sqrt{37}$  between 7 and 8.
- D The value of  $\sqrt{30}$  is between 5 and 6 and the value of  $\sqrt{37}$  between 6 and 7.

13. The table below shows the hours worked last week by employees at an insurance company.

	30 hours	30 — 40 hours	40 hours
Managers	5	15	8
Office Staff	35	15	8

Of all the employees, what is the approximate relative frequency of managers who worked more than 40 hours?

- A 8%
- B 9.3%
- C 28.8%
- D 40%

14. What is the distance between points  $(-1, 4)$  and  $(3, -8)$ ?

- A 128
- B 160
- C  $\sqrt{128}$
- D  $\sqrt{160}$

17. Which number is irrational?

A  $\frac{5}{19}$

B  $-4$

C  $0.\overline{573}$

D  $\sqrt{11}$

18. The distances of two trains from a station can be represented by the equations shown, with  $t$  being the time in hours since a dispatcher last checked on them and  $d$  being the distance in miles.

Train	Equation
Train A	$d = 40t + 400$
Train B	$d = 80t + 200$

How many hours after the dispatcher last checked on the trains will the two trains be the same distance from the station, and what will that distance be?

A 5 hours; 600 miles

B 5 hours; 800 miles

C 10 hours; 800 miles

D 10 hours; 900 miles