

**Part III:  
(Functions and Linear  
Relationships)**

**Saturday Tutoring  
Mathematics Program**

**Name:** \_\_\_\_\_

**8<sup>th</sup> Grade**

1. Tony joined a book club. He received 8 free books when he joined. The table below shows the total number of books,  $n$ , he had each month,  $t$ , since joining the club.

TONY'S BOOKS

Month ( $t$ )	Total Number of Books ( $n$ )
0	8
1	11
2	14
3	17
4	20

Which equation can be used to find the total number of books,  $n$ , Tony will have from the book club after  $t$  months?

- A  $n = 8t$
- B  $n = 3t$
- C  $n = 8t + 3$
- D  $n = 3t + 8$

2. The table below shows a relationship between  $x$  and  $y$ .

$x$	$y$
2	8
4	10
6	12
8	14
10	16

What equation represents the relationship between  $x$  and  $y$ ?

- A  $y = 2x$
- B  $y = 4x$
- C  $y = x + 6$
- D  $y = 2x + 2$

3. Complete the table below with the missing values for  $y$ .

$x$	$y$
-1	1
0	4
1	7
2	10
3	
4	

Based on the data in the table, write the equation that represents the relationship between  $x$  and  $y$ .

**Answer**  $y =$  \_\_\_\_\_

4. Complete the table below with the missing values for  $y$ .

$x$	$y$
-4	14
-3	11
-2	8
-1	5
0	
1	

On the line below, write a function rule that shows the relationship between  $x$  and  $y$  in the table.

**Answer** \_\_\_\_\_

5. The table below shows the number of chaperones,  $y$ , needed for a certain number of students,  $x$ , at a school dance.

SCHOOL DANCE

Number of Students ( $x$ )	32	48	64	96
Number of Chaperones ( $y$ )	4	6	8	12

Write an equation that represents the relationship between the number of chaperones needed and the number of students attending a dance.

**Equation** \_\_\_\_\_

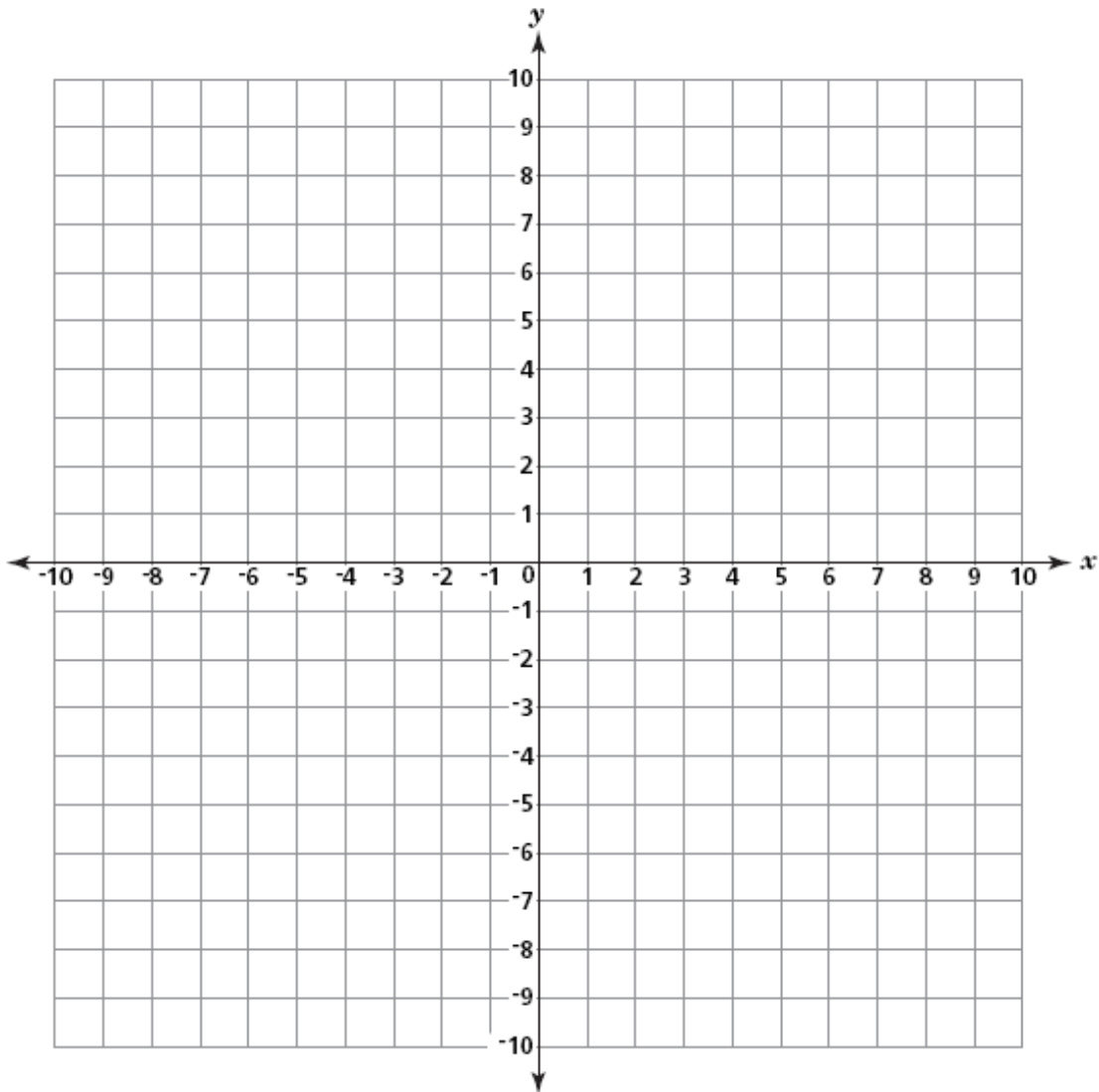
How many chaperones will be needed for a dance that has 240 students?

**Answer** \_\_\_\_\_ chaperones

6. Part A:

For a homework assignment, Sarah must draw a line passing through the points  $(-3, -3)$  and  $(3, 3)$ .

Graph Sarah's line on the grid below.

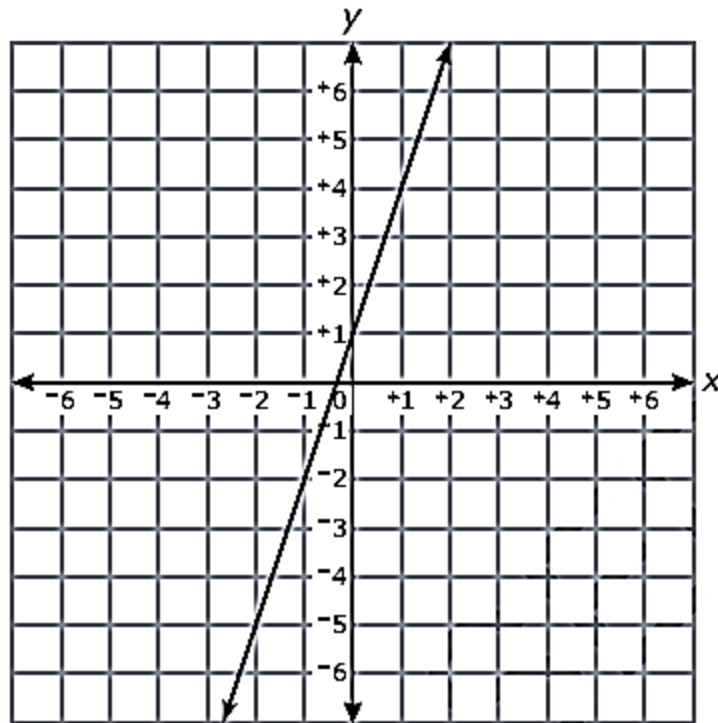


**Part B:** What is the y-intercept of the line?  $b =$  \_\_\_\_\_

**Part C:** What is the slope of the line?  $m =$  \_\_\_\_\_

**Part D:** What is the equation of the line? \_\_\_\_\_

7. Which choice is a correct equation for the line graphed below?



A  $y = 3x + 1$

B  $y = 2x + 1$

C  $y = \frac{1}{2}x + 1$

D  $y = \frac{1}{3}x + 1$



8. In which choice do all the points lie on the same line?

A  $(0, -2), (1, -1), (2, 2), (3, 7)$

B  $(0, 0), (1, 1), (2, 4), (3, 9)$

C  $(0, 0), (1, 1), (2, 8), (3, 27)$

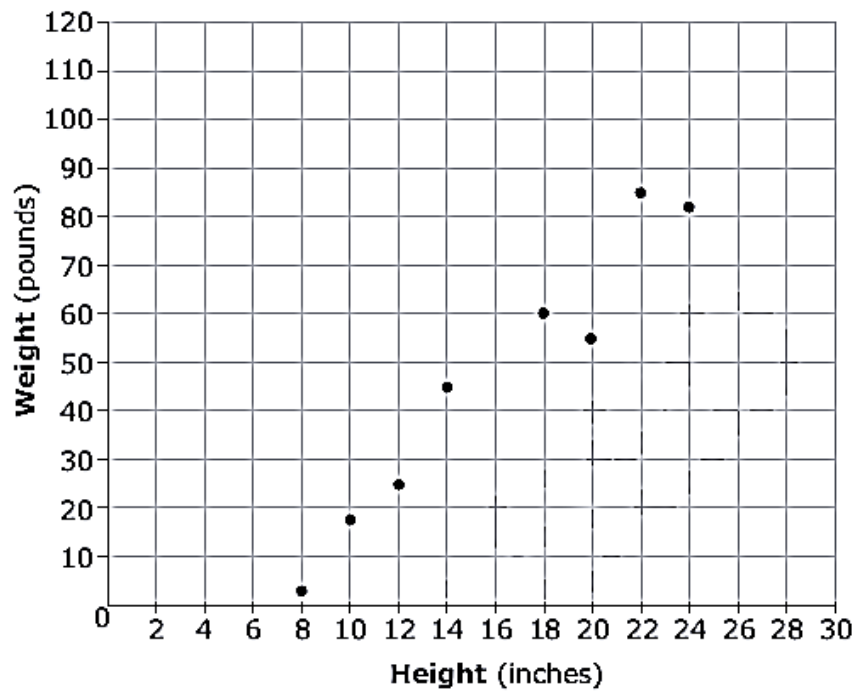
D  $(0, 0), (1, 2), (2, 4), (3, 6)$

9. In the table below,  $y$  is a linear function of  $x$ .

$x$	$y$
3	5
5	-3
7	-11

What is the value of  $y$  when  $x = 0$ ?

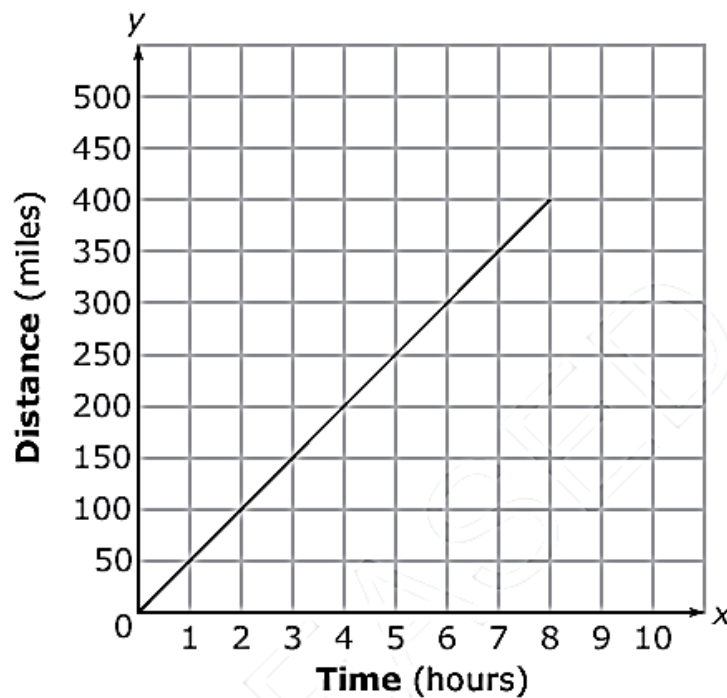
10. Sharon made a scatterplot comparing the shoulder heights of dogs to their weights.



Sharon's dog has a shoulder height of 28 inches. Using a linear model, which is the *best* prediction of her dog's weight?

- A 85 pounds
- B 90 pounds
- C 105 pounds
- D 120 pounds

11. On Monday, Mr. James made an eight-hour trip to his mother's house in his car. The graph below shows the distance he had traveled at different times.

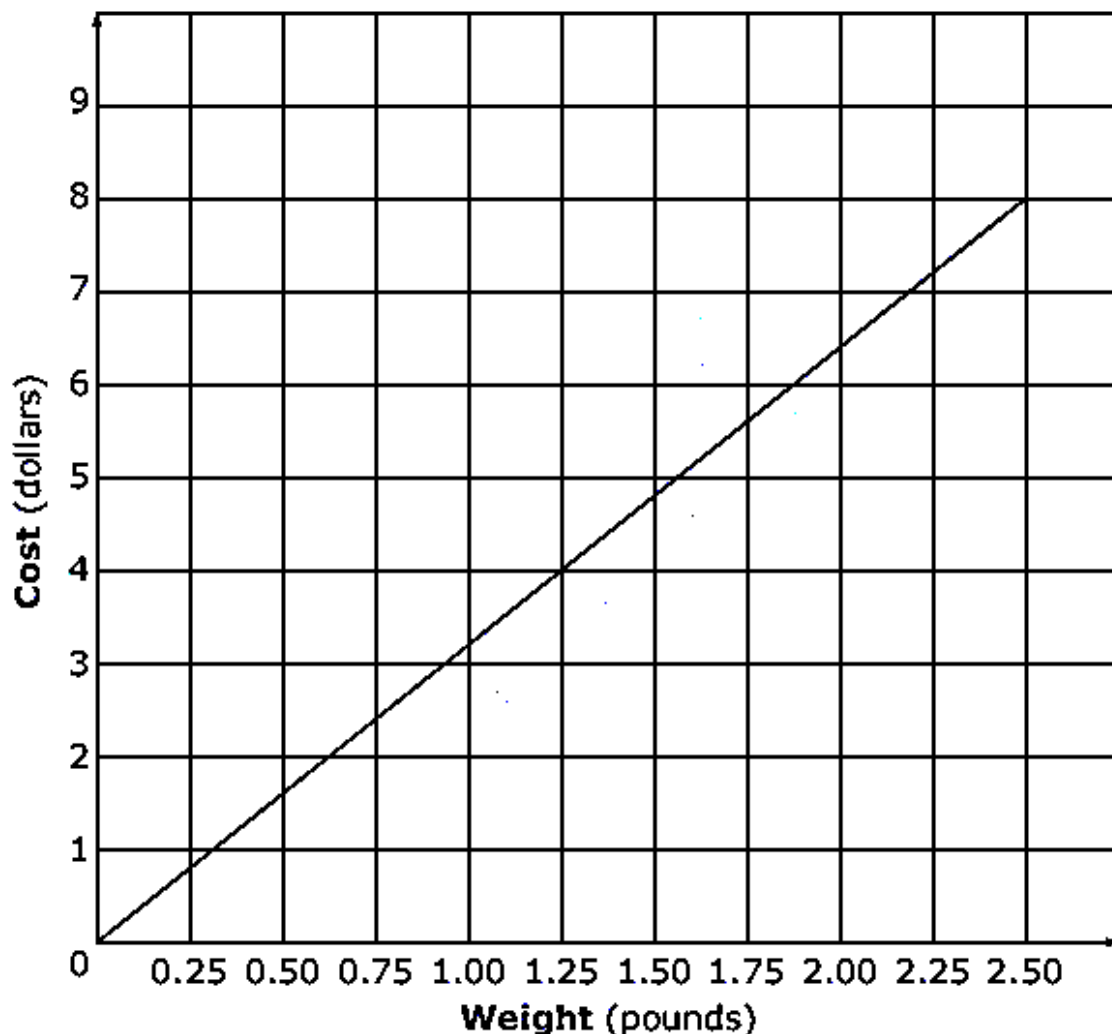


On Tuesday, he drove home. His speed on Tuesday was 5 miles per hour faster than for the trip on Monday. Which equation would model the distance,  $d$ , that Mr. James had traveled on his return trip after  $t$  hours?

- A  $d = 45t$
- B  $d = 50t$
- C  $d = 55t$
- D  $d = 60t$

12. Two stores sell cherries at different prices per pound.

- Store P sells 3.5 pounds of cherries for \$13.30.
- The graph below shows the cost to purchase different weights of cherries at Store Q.



Phillip needs to purchase 10 pounds of cherries. Which statement below is true?

- A Phillip will spend \$8.00 less on cherries at Store P than at Store Q.
- B Phillip will spend \$8.00 more on cherries at Store P than at Store Q.
- C Phillip will spend \$6.00 less on cherries at Store P than at Store Q.
- D Phillip will spend \$6.00 more on cherries at Store P than at Store Q.

13. Limousine Company P and Company R both charge a rental fee plus an additional charge per hour.

- The equation  $y = 50 + 30x$  models the total cost (in dollars),  $y$ , of renting a limousine from Company P for  $x$  hours.
- The table below shows the cost to rent a limousine from Company R for different lengths of time.

**Company R**

<b>Time (hours)</b>	1	2	3	4	5
<b>Total Cost</b>	\$100	\$125	\$150	\$175	\$200

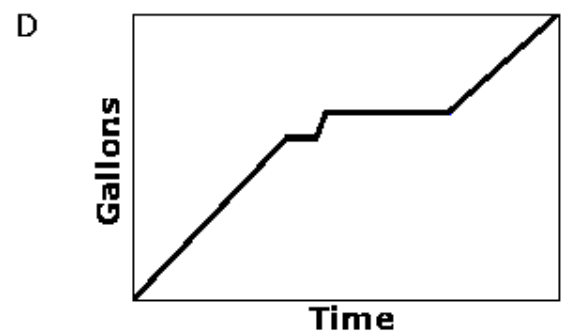
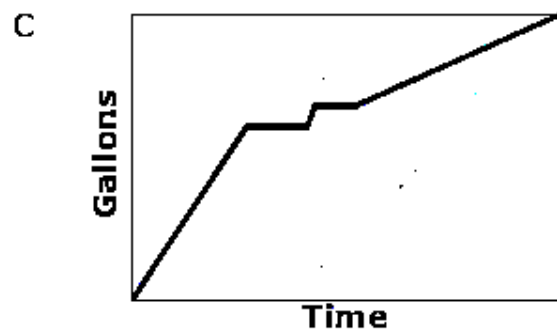
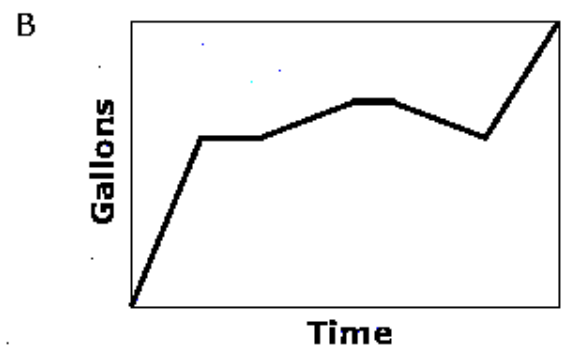
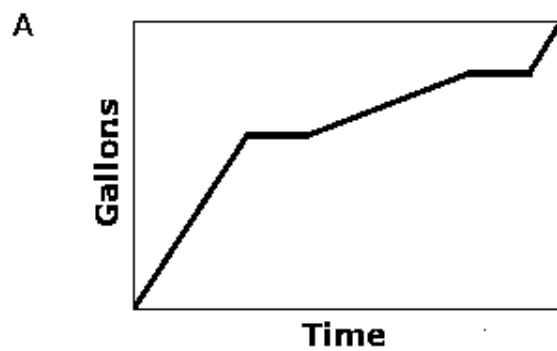
Which statement accurately compares the per hour charges of the two companies?

- A Company P charges \$5 less per hour than Company R.
- B Company P charges \$5 more per hour than Company R.
- C Company P charges \$25 less per hour than Company R.
- D Company P charges \$25 more per hour than Company R.

14. Mr. Jones filled his swimming pool with water.

- Mr. Jones began filling the pool at a constant rate.
- He turned off the water for a while.
- He then turned the water back on at a slower constant rate.
- Mr. Jones turned off the water again for a while.
- He then turned the water back on at the first rate.

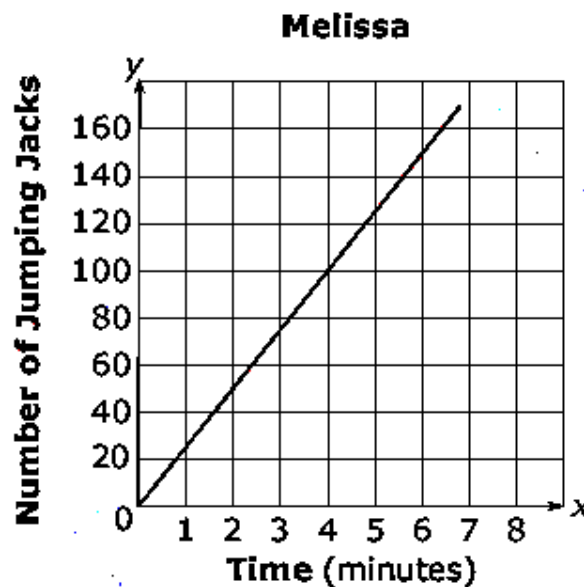
Which graph *best* represents Mr. Jones filling the pool?



15. Alicia and Melissa did jumping jacks. The table below shows the number of jumping jacks that Alicia had done in different amounts of time.

Alicia	Time (minutes)	1	2	3	4	5	6	7	8
	Jumping Jacks	30	60	90	120	150	180	210	240

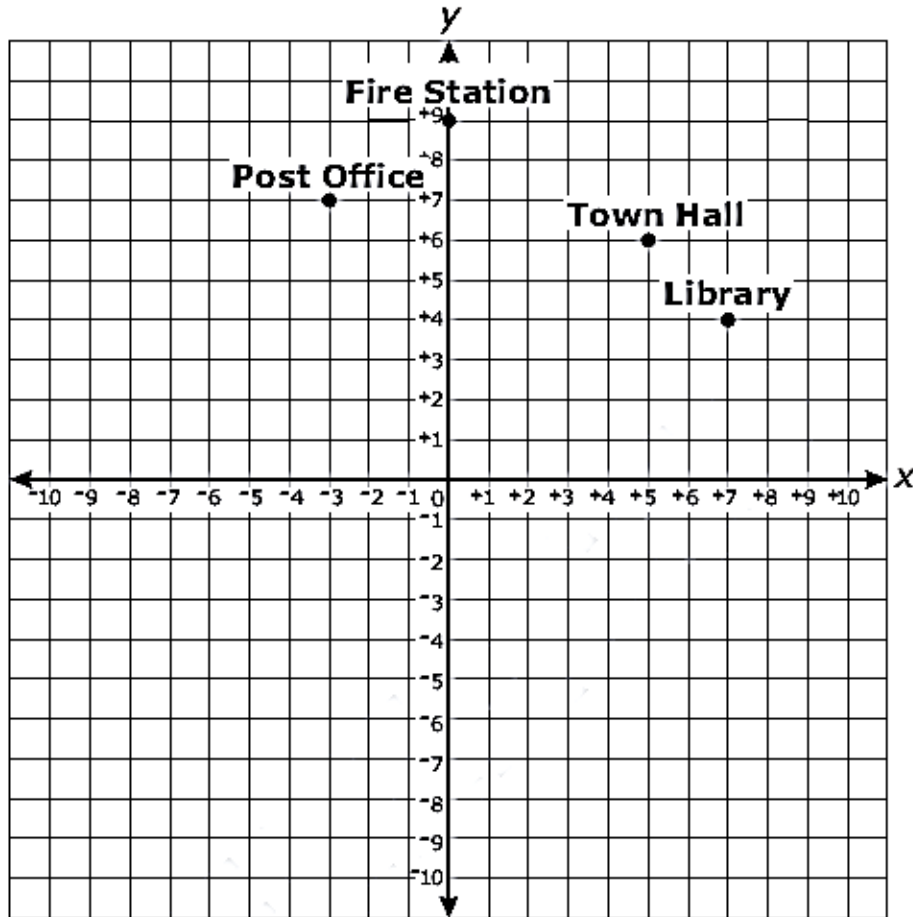
The graph below shows the number of jumping jacks Melissa had done in different amounts of time.



Which choice *best* describes the difference between the rates at which the girls did jumping jacks?

- A Melissa did 6 more jumping jacks per minute than Alicia.
- B Alicia did 6 more jumping jacks per minute than Melissa.
- C Melissa did 5 more jumping jacks per minute than Alicia.
- D Alicia did 5 more jumping jacks per minute than Melissa.

16. A town's buildings were graphed on a coordinate grid.

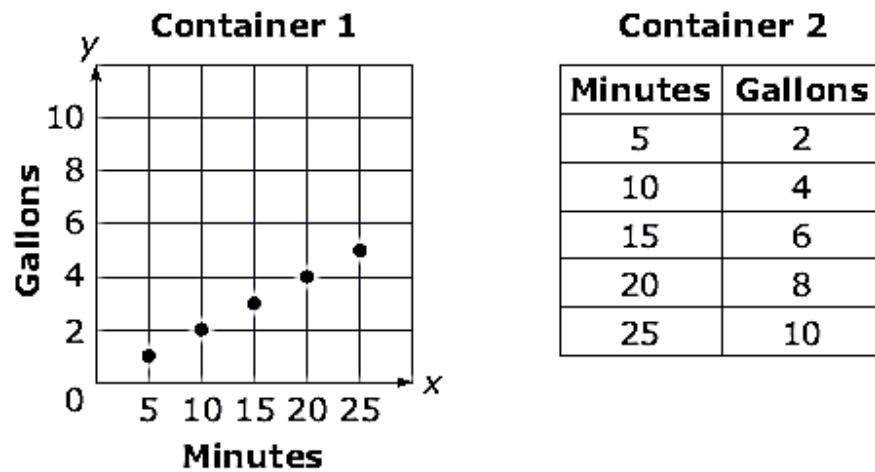


Which equation would represent a line drawn to connect the Town Hall and Post Office?

- A  $y = -\frac{2}{3}x + \frac{28}{3}$
- B  $y = -\frac{1}{8}x + \frac{53}{8}$
- C  $y = \frac{3}{5}x + 9$
- D  $y = \frac{1}{8}x + \frac{59}{3}$



17. Rain is flowing into two containers at different rates. The figure below shows the volume of water in each container at different times.



What is the difference in the rate of change between the two containers?

- A  $\frac{1}{5}$  gallon per minute
- B  $\frac{3}{5}$  gallon per minute
- C  $\frac{5}{2}$  gallons per minute
- D  $\frac{15}{2}$  gallons per minute