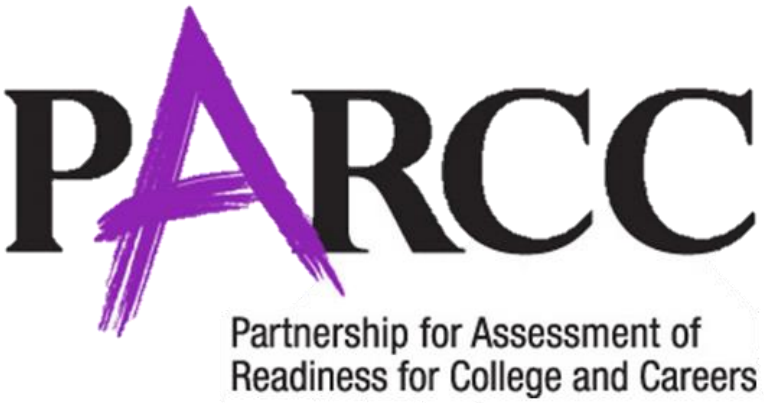


Math

Spring 2017

Grade 8

Released Items

1. M20380

The table shows a relation that is a function, where x is the input and y is the output.

x	y
−4	6
−2	0
1	−4
0	3

Which ordered pairs could be included in the table so that the relation remains a function?

Select **each** correct answer.

- ☐ A. $(-4, 2)$
- ☐ B. $(0, 0)$
- ☐ C. $(1, 2)$
- ☐ D. $(2, -4)$
- ☐ E. $(4, 0)$
- ☐ F. $(-6, -4)$
- ☐ G. $(-1, 5)$

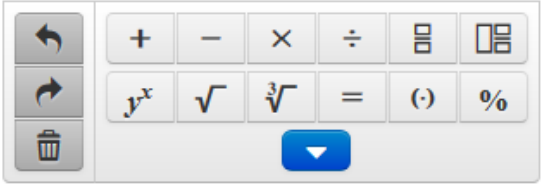
2. M21898

$$7(2m-1)-\frac{3}{5}m=\frac{6}{5}(4-3m)$$

Solve for m.

Enter your answer in the space provided. Enter **only** your answer.

$m =$ ☐



3. VH003398

Indicate whether each value of x in the table is a solution to the equation $x^2 = 30$, the equation $x^3 = 30$, or neither equation.

Select all appropriate cells in the table.

Value of x	Solution of $x^2 = 30$	Solution of $x^3 = 30$	Solution of Neither $x^2 = 30$ nor $x^3 = 30$
$x = \sqrt{30}$	☐	☐	☐
$x = -\sqrt{30}$	☐	☐	☐
$x = \sqrt[3]{30}$	☐	☐	☐
$x = -\sqrt[3]{30}$	☐	☐	☐

4. VF802095

Four systems of equations are shown in the table. Indicate whether each system of equations has no solution, one solution, or infinitely many solutions by selecting a box in each row in the table.

System of Equations	No Solution	One Solution	Infinitely Many Solutions
$2x + y = 4$ $-4x - 2y = -8$	☐	☐	☐
$x = 1$ $y = 4$	☐	☐	☐
$y = 2x - 5$ $y = 2x + 5$	☐	☐	☐
$y = 2x + 1$ $y = -3x + 1$	☐	☐	☐

5. M22231

Which equations represent functions that are non-linear?

Select **each** correct answer.

- [ ] A. $y = x$
- [ ] B. $2y = \frac{1}{2}x$
- [ ] C. $y = 8 + x$
- [ ] D. $y - 6 = x^2$
- [ ] E. $y = \frac{1}{3} - 5x$
- [ ] F. $y = 2x^2 + 5 - 3x^3$

6. VF822500

$$y = mx + 2$$
$$y = px + 6$$

In the system of equations shown, *m* and *p* are the slopes of the lines represented by the equations. The *x*-coordinate of the solution to the system of equations is 4.

Which of the following is true?

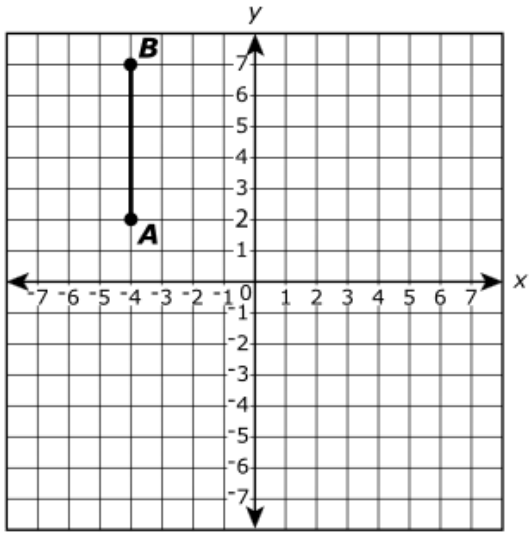
- ( ) A. $m > 0$
- ( ) B. $p < 0$
- ( ) C. $m > p$
- ( ) D. $p > m$

7. M20382P

What is the value of $0.5 + 0.\bar{2}$?

- ( ) A. $\frac{7}{9}$
- ( ) B. $\frac{7}{10}$
- ( ) C. $\frac{13}{18}$
- ( ) D. $\frac{15}{22}$

8. VF865913



On the coordinate plane shown, $\overline{AB}$ is a vertical segment with a length of 5 units. If $\overline{A'B'}$ is the image of $\overline{AB}$ after a rotation, which must be true about $\overline{A'B'}$?

A. The length of $\overline{A'B'}$ is 5 units.

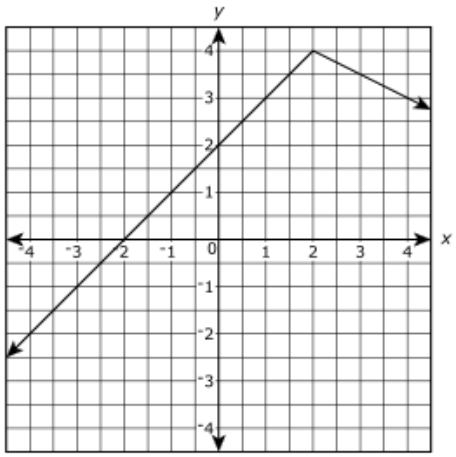
B. The length of $\overline{A'B'}$ cannot be determined.

C. $\overline{A'B'}$ is a horizontal segment.

D. $\overline{A'B'}$ is a vertical segment.

9. VF802006

The graph of a function is shown on the coordinate plane.



Which table of values consists of ordered pairs that are represented on the graph?

A.

x	y
-1	1
0	2
2	4
4	6

C.

x	y
-3	-1
-1	3
1	3
3	1

B.

x	y
-2	0
-1.5	0.5
0.5	2.5
3	5

D.

x	y
-4	-2
-0.5	1.5
0.5	2.5
4	3

10. VF925576

Indicate whether each expression in the table is equivalent to 3^2, 3^{-2}, or neither.

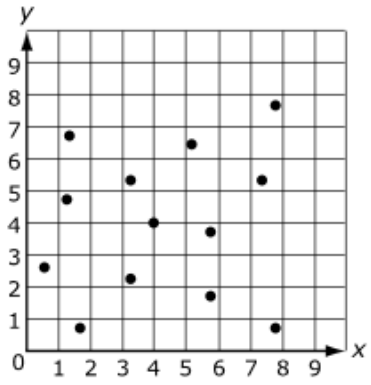
Select all appropriate cells in the table.

Expression	Equivalent to 3^2	Equivalent to 3^{-2}	Neither Equivalent to 3^2 nor 3^{-2}
$(3^{-1})^2$	☐	☐	☐
$(3^{-1})^{-1}$	☐	☐	☐
$\left(\frac{1}{3}\right)^2$	☐	☐	☐
$\left(\frac{1}{3}\right)^{-2}$	☐	☐	☐

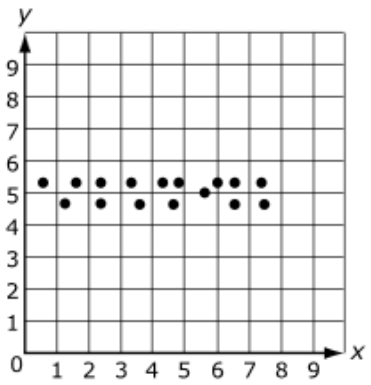
11. VF555938

Which scatter plot shows data with a negative linear association?

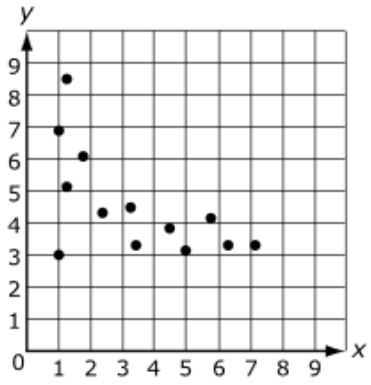
A.



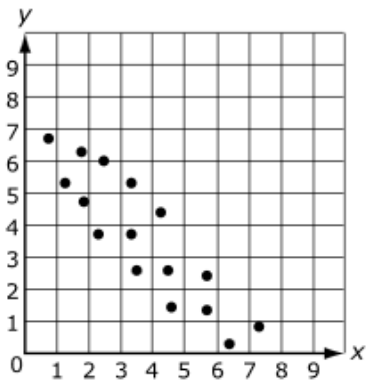
C.



B.



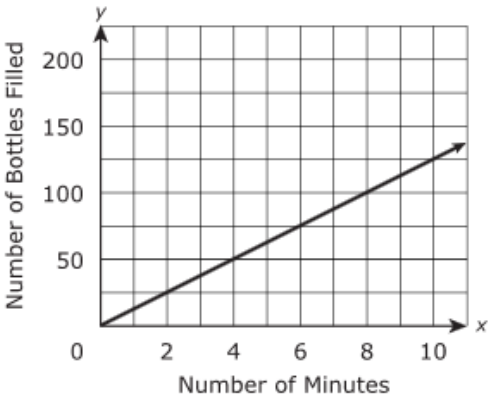
D.



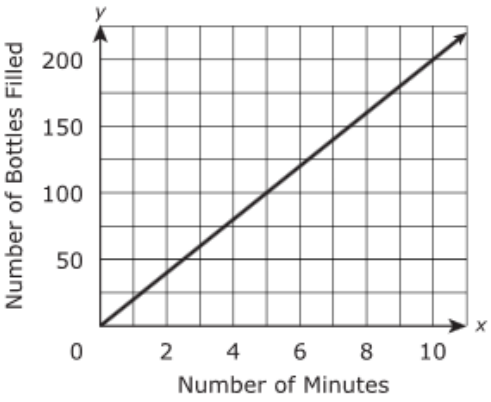
12. VH000063

The number of bottles a machine fills is proportional to the number of minutes the machine operates. The machine fills 250 bottles every 20 minutes. Which graph shows the number of bottles, y, the machine fills in x minutes?

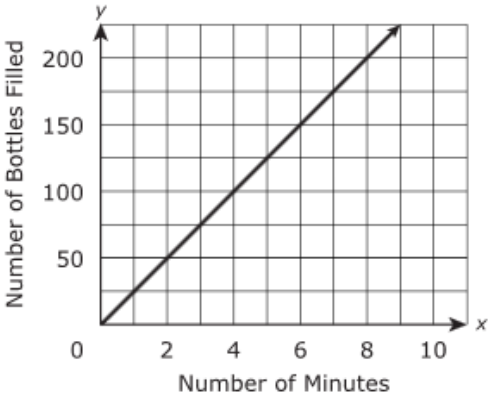
A.



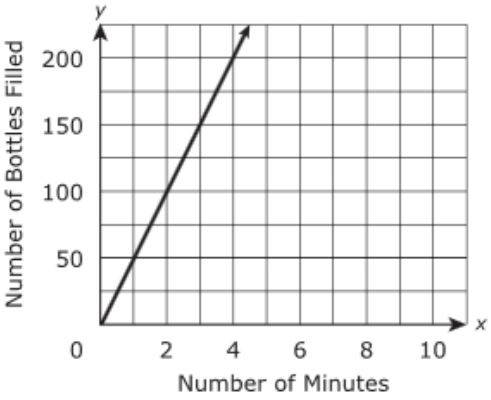
B.



C.



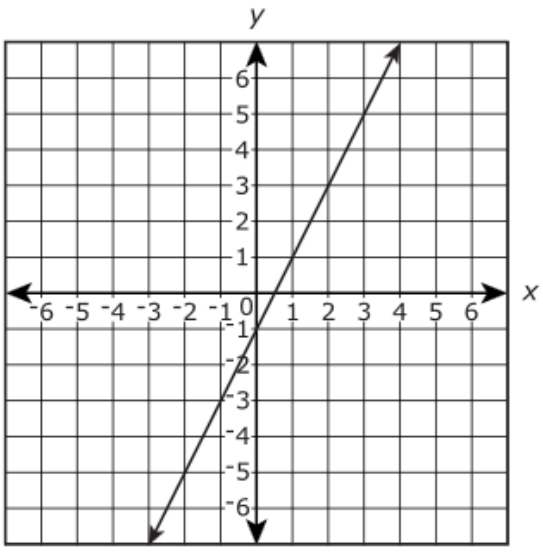
D.



13. VF885524

The graph of Function 1 is shown on the coordinate plane.

Function 1



The equations of three other functions are given. Indicate whether the slope of each function is greater than, equal to, or less than the slope of Function 1.

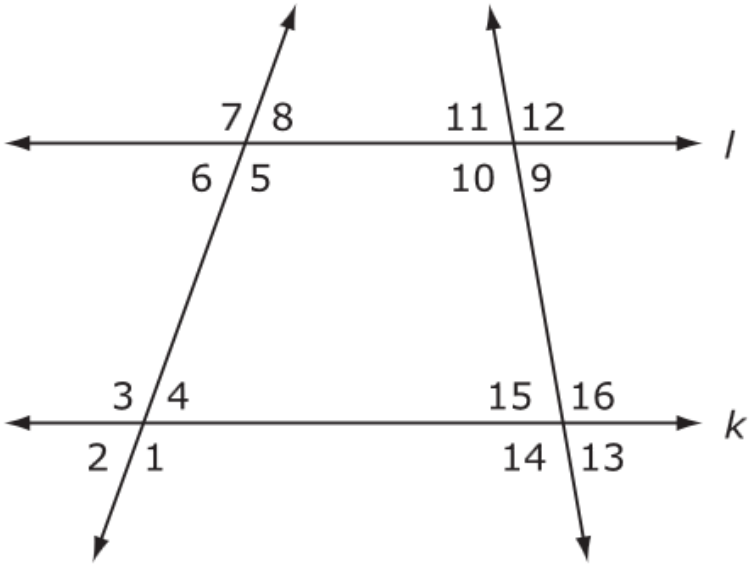
Drag and drop each equation into the correct box.

$y = 3 + 2x$	$y = 2$	$y = \frac{3}{2}x + 6$

Slope of the function is greater than the slope of Function 1	Slope of the function is equal to the slope of Function 1	Slope of the function is less than the slope of Function 1

14. VF525280

In the figure shown, lines *k* and *l* are parallel.



Amy claims that $m\angle 4 + m\angle 5 = m\angle 10 + m\angle 9$.

Is Amy correct? Use appropriate mathematical language to justify your response.

Enter your answer and your justification in the space provided.

Math symbols

Relations

Geometry

15. VH030088

A pool is in the shape of a rectangular prism. On Monday, water was pumped out of the pool at a constant rate, starting at 12:00 p.m. At 12:15 p.m., the water in the pool was 45 inches deep. At 12:35 p.m., the water in the pool was 41 inches deep.

Part A

By how many inches does the depth of the water decrease each minute?

Enter your answer in the box.

[ ] inch(es)

Part B

Write an equation that represents y, the depth of the water (in inches), after x minutes.

Enter your equation in the space provided. Enter **only** your equation.

A manufacturer makes candles in the shapes of right circular cylinders and right circular cones.

Part A

One candle, in the shape of a right circular cylinder, has a height of 7.5 inches and a diameter of 5 inches. What is the volume of the candle? Round your answer to the nearest cubic inch.

Enter your answer in the box.

[ ] cubic inches

Part B

Another candle, in the shape of a right circular cone, has the same height and diameter as the candle in Part A. What is the volume of this candle? Round your answer to the nearest cubic inch.

Enter your answer in the box.

[ ] cubic inches

Part C

A third candle, in the shape of a right circular cone, has a volume of 16 cubic inches and a radius of 1.5 inches. What is the height, in inches, of the candle? Round your answer to the nearest inch.

Enter your answer in the box.

[ ] inches

Part D

A fourth candle, in the shape of a right circular cylinder, has a volume of 75 cubic inches and a height of 6 inches. What is the radius, in inches, of this candle? Round your answer to the nearest inch.

Enter your answer in the box.

[ ] inches

17. VH060335

The table shows the results of a survey of students and their parents. The students and their parents were asked, "If you had an hour to spend by yourself, would you prefer to read a book or would you prefer to watch TV?"

Free Time Survey

	Read a Book	Watch TV
Students	18	32
Parents	25	9

Based on the results of the survey, which of these statements are true?

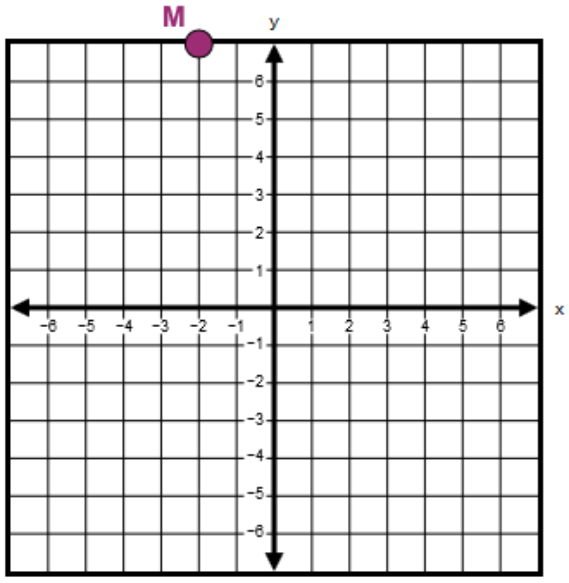
Select **all** that apply.

- ☐ A. A total of 84 people were surveyed.
- ☐ B. A total of 43 students were surveyed.
- ☐ C. Of the parents surveyed, 9 prefer to watch TV.
- ☐ D. Of the students surveyed, 18 prefer to watch TV.
- ☐ E. A greater percentage of the people surveyed prefer to read a book than to watch TV.

18. M20384

Point M is located at $(-2,7)$. Point N is located at $(6,y)$. The distance between points M and N on the coordinate plane is 10 units. Find a possible y-value of point N and plot point N on the graph.

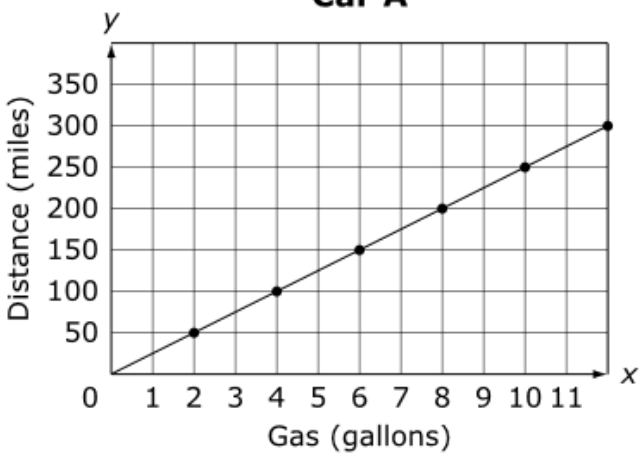
Select the place on the coordinate plane to plot the point.



19. VF554945

A car manufacturer provided information about two different car models.

Car A



Car B

Gas (gallons)	Distance (miles)
0	0
3	60
5	100
7	140
10	200

The graph and table each show a proportional relationship between the number of miles traveled and the advertised number of gallons of gas used for the two car models, A and B, respectively. Based on the graph and table, car A can travel how many times the distance car B can travel when both cars use 1 gallon of gas? Write your answer as a decimal.

Enter your answer in the box.

20. 1237-M20590

Jennifer works at a bookstore. She earns an hourly wage plus 4% commission on her monthly sales. Her total earnings for June, July, and August are shown in the table.

Jennifer's Paycheck

Month	June	July	August
Amount	$1,005	$884	$936

Part A

Jennifer worked 60 hours in June, and her total sales were $8,625. Find the amount she earned from commission in June and the hourly wage she is paid.

Enter your answers in the space provided.

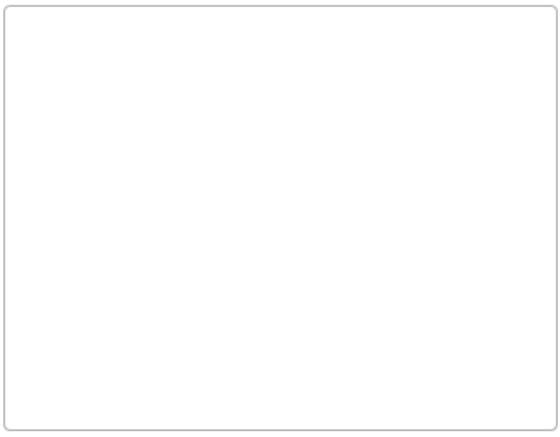
Part B

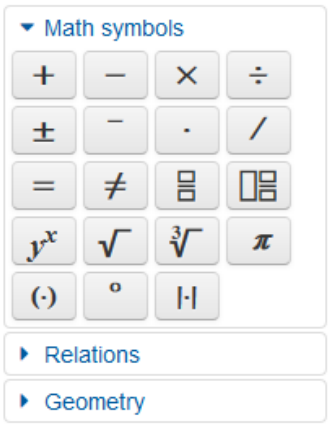
From June to the end of September, Jennifer wants to save at least $1,500.

- Her monthly expenses are $600.
- Jennifer saves whatever money she has left after paying her expenses each month.
- Jennifer is scheduled to work 80 hours in September.

Find the minimum sales she needs in September to meet her goal of saving at least $1,500. Show or explain your work for each step.

Enter your answer and your work or explanation in the space provided.





A designer builds and sells small chairs and large chairs.

The cost of material is \$10 for each small chair and \$15 for each large chair.

The selling price is \$22 for a small chair and \$51 for a large chair.

Part A

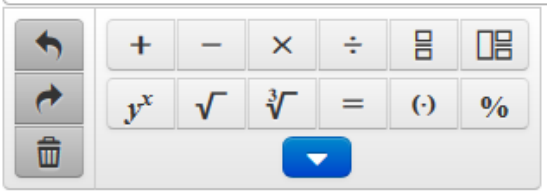
The designer spends \$305 on material to make chairs. The designer makes 8 more small chairs than large chairs.

- Write a system of equations that can be used to determine s , the number of small chairs, and t , the number of large chairs, the designer makes.
- How many small chairs did the designer make?

Enter your answers in the space provided. Enter **only** your answers.

System of equations : $\begin{cases} \square \\ \square \end{cases}$

Number of small chairs : $\square$



Part B

The designer sold x small chairs and y large chairs. After subtracting the cost of the material from the selling price of each chair, the designer earned a total of \$312. The system of equations describes this situation.

$$\begin{cases} x = 3.5y \\ 12x + 36y = 312 \end{cases}$$

Which pair of sentences correctly describes the chairs the designer sold?

A. The designer sold 3.5 times as many large chairs as small chairs.The designer earned \$12 for each small chair sold and \$36 for each large chair sold.

B. The designer sold 3.5 times as many small chairs as large chairs.The designer earned \$12 for each small chair sold and \$36 for each large chair sold.

C. The designer sold 3.5 times as many small chairs as large chairs.The designer earned \$22 for each small chair sold and \$51 for each large chair sold.

D. The designer sold 3.5 times as many large chairs as small chairs.The designer earned \$22 for each small chair sold and \$51 for each large chair sold.

(continues on next page)

21. (continued from previous page) 5119-M25764

Part C

The system of equations describes the number of small chairs, x, and the number of large chairs, y, sold when the designer earned a total of $312.

$$\begin{cases} x = 3.5y \\ 12x + 36y = 312 \end{cases}$$

Determine the number of small chairs and the number of large chairs sold.

Select from the drop-down menus to choose the number of chairs.

Number of small chairs: 4 7 8 14

Number of large chairs: 2 4 6 14

22. M20868P

Two linear functions are shown.

Function 1

$y = \frac{4}{3}x + 2$

Function 2

x	y
−3	−2.5
−1	0.5
2	5
4	8

Which statements about the functions are true?

Select **each** correct answer.

- ☐ A. The rate of change for function 1 is greater than the rate of change for function 2.
- ☐ 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 equal to the rate of change for function 2.
- ☐ D. The y-intercept of the line for function 1 is greater than the y-intercept of the line for function 2.
- ☐ E. The y-intercept of the line for function 2 is greater than the y-intercept of the line for function 1.
- ☐ F. The y-intercept of the line for function 1 is equal to the y-intercept of the line for function 2.