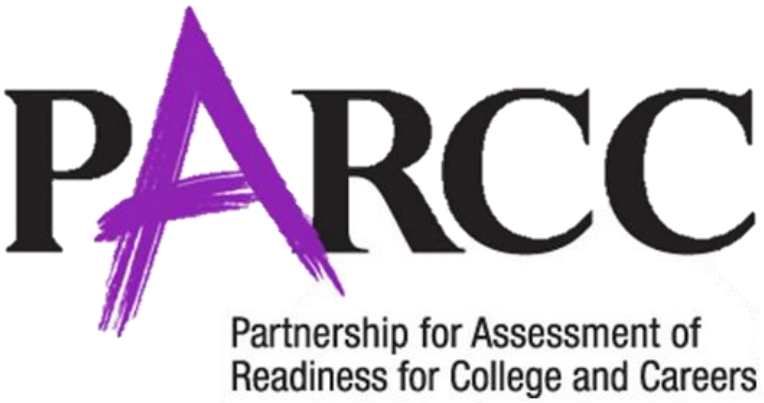


Math

Spring 2017

Grade 7

Released Items

1. **M21642**

Determine which expressions are equivalent to $\frac{1}{4} - \frac{2}{3} - \left(\frac{1}{2} + \frac{5}{6}\right)$.

Select **each** correct answer.

- ☐ A. $\frac{1}{4} - \frac{2}{3} + \left(\frac{1}{2} - \frac{5}{6}\right)$
- ☐ B. $\frac{1}{4} + \frac{2}{3} + \left(\frac{1}{2} - \frac{5}{6}\right)$
- ☐ C. $\frac{1}{4} + \left(-\frac{2}{3}\right) - \frac{1}{2} - \frac{5}{6}$
- ☐ D. $\frac{1}{4} - \frac{2}{3} + \left(-\frac{1}{2}\right) + \left(-\frac{5}{6}\right)$
- ☐ E. $\frac{1}{4} - \frac{2}{3} - \left(-\frac{1}{2}\right) + \left(-\frac{5}{6}\right)$

2. **VF886902**

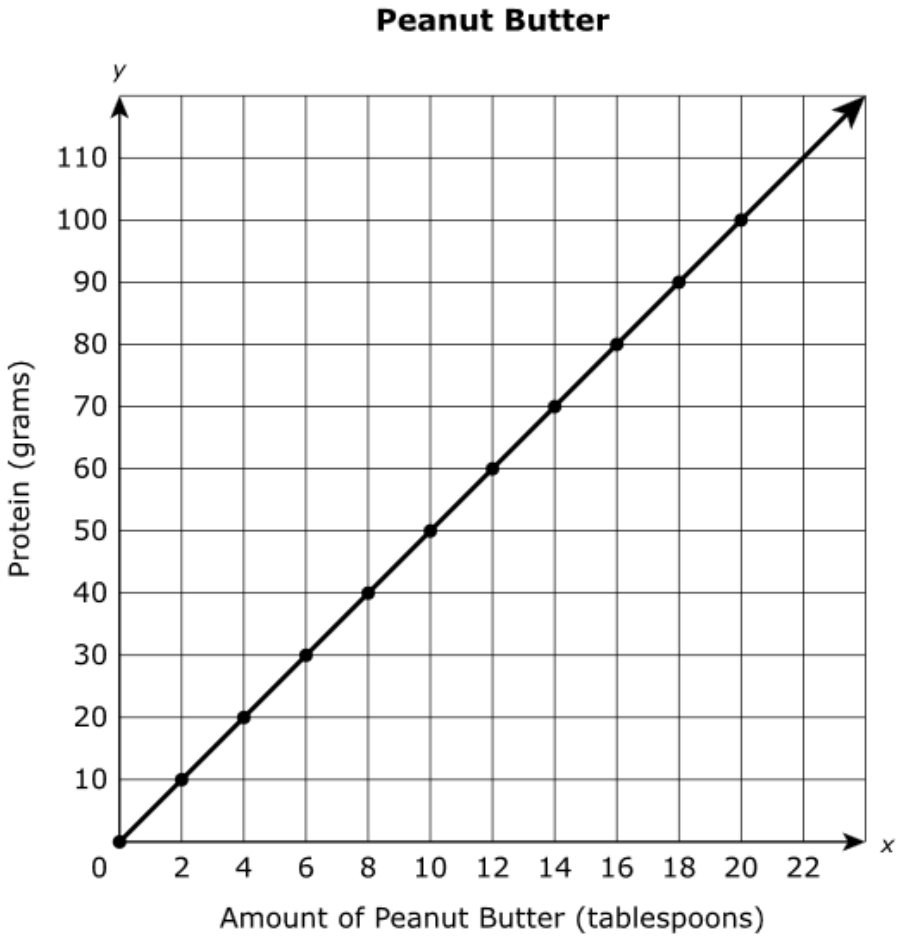
Over a period of 3 hours, the outside temperature changed an average of -2.25° Fahrenheit per hour.

Select from the drop-down menus to correctly complete the sentence.

The temperature [increased / decreased] by [0.75 / 2.25 / 6.75] degrees Fahrenheit from the beginning to the end of the 3-hour period.

3. **VF557966**

The graph shows the amount of protein contained in a certain brand of peanut butter.



Describe the meaning of the point $(6,30)$ on the graph.

Select from the drop-down menus to correctly complete the sentence.

The number 30 represents the number of [grams of protein / tablespoons of peanut butter / grams per tablespoon] for every 6 [grams of protein / tablespoons of peanut butter / grams per tablespoon].

4. **VH009835**

An expression is given.

$$(3x - 1) - 2.75(x + 2)$$

Which expression is equivalent to the given expression?

A. $0.25x - 6.50$

B. $0.25x + 1.00$

C. $0.25x + 4.50$

D. $0.25x - 3.00$

5. **M25729**

Here is an expression.

$\frac{3}{5} \div \frac{1}{4}$

Which situation matches this expression?

A. An athlete runs $\frac{3}{5}$ kilometer in 4 minutes. At that rate, how many kilometers does the athlete run in 1 minute?

B. A teacher fills an empty white pitcher with $\frac{3}{5}$ gallon of water and an empty blue pitcher with $\frac{1}{4}$ gallon of water. How many more gallons of water are now in the white pitcher than in the blue pitcher?

C. Mr. Smith has $\frac{3}{5}$ pound of beans. He uses $\frac{1}{4}$ pound of beans each week. At that rate, for how many weeks will his beans last?

D. A worker cuts pieces of string that are each $\frac{3}{5}$ yard in length. How many pieces of string can the worker cut from a piece of string that is $\frac{1}{4}$ yard in length?

6. **VF542301**

The price of a certain item is P dollars. The sales tax on the item is 7%. Which expressions represent the total cost of the item, in dollars, after the tax has been applied?

Select **each** correct answer.

- A. $0.07P$
- B. $1.07P$
- C. $P + 0.07P$
- D. $1 + 0.07P$
- E. $(1 + 0.07)\,P$

7. **VF525243**

The cost of pumpkin seeds is proportional to their weight. A 24-ounce bag of pumpkin seeds costs $6.00.

What is the unit rate for the pumpkin seeds?

- A. $0.24 per ounce
- B. $0.25 per ounce
- C. $0.40 per ounce
- D. $0.60 per ounce

8. **VF907732**

A weather forecaster reported that the total amount of rainfall for the month was 0.75 inch. He also reported that this amount was 0.55 inch below the average amount of rainfall for the same month during the last ten years. The forecaster summarized his findings in this table.

Rainfall Findings

Amount of rainfall for the month:	0.75 in.
Compared to average amount of rainfall for the month:	-0.55 in.

What was the average amount of rainfall, in inches, for this month during the last ten years?

Enter your answer in the box.

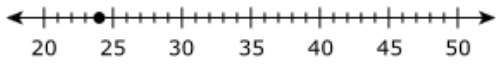
9. **M21133P**

At 8 a.m. on Sunday morning, the temperature was 35° Fahrenheit (°F). A student recorded the change in temperature at 8 a.m. for the next three days.

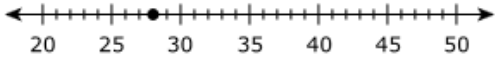
- The change in temperature from Sunday to Monday was -4° F.
- The change in temperature from Monday to Tuesday was $+2^\circ$ F.
- The change in temperature from Tuesday to Wednesday was -5° F.

Which number line shows a point representing the temperature, in degrees Fahrenheit, on Wednesday morning at 8 a.m.?

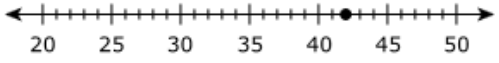
A.



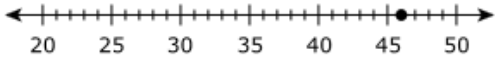
B.



C.



D.



10. **M21664**

Andy currently runs a total of 12 miles each week. He plans to increase the number of miles he runs each week by 1.5 miles until he is running a total of 26 miles each week. Which equation can be used to determine *x*, the number of weeks that it will take Andy to reach his goal?

A. $12 + 1.5x = 26$

B. $(12 + 1.5)x = 26$

C. $12(1.5 + x) = 26$

D. $12 + 1.5 + x = 26$

11. **VF658006**

This table represents a proportional relationship between x and y.

x	y
2	3
4	6
6	9

Based on the values in the table, complete the sentence shown.

Enter your answer in the boxes.

When x increases by 1, y increases by

$$\frac{\square}{\square}.$$

12. **VF486747**

Which of the following expressions represent a number greater than 1?

Select **each** correct answer.

- ☐ A. $\frac{1}{3} \times 2$
- ☐ B. $2 \div \frac{1}{3}$
- ☐ C. $\frac{1}{4} \times \frac{2}{3}$
- ☐ D. $\frac{3}{4} \div \frac{2}{3}$
- ☐ E. $\frac{2}{3} \times \frac{3}{4}$
- ☐ F. $\frac{2}{3} \div \frac{3}{4}$

13. **M20836**

A factory sells backpacks for $40.00 each. The cost to make 1 backpack is $10.00. In addition to the costs of making backpacks, the factory has operating expenses of $12,000 per week. The factory's goal is to make a profit of at least $980 each week. Which inequality represents the number of backpacks, x, that need to be sold each week for the factory to meet this goal? How many backpacks must the factory sell to meet its weekly goal?

Select the inequality that represents this situation **and** select the correct statement.

$30x + 12{,}000 \leq 980$

$30x + 12{,}000 \geq 980$

$30x - 12{,}000 \leq 980$

$30x - 12{,}000 \geq 980$

The factory must sell a minimum of 367 backpacks to meet the weekly goal.

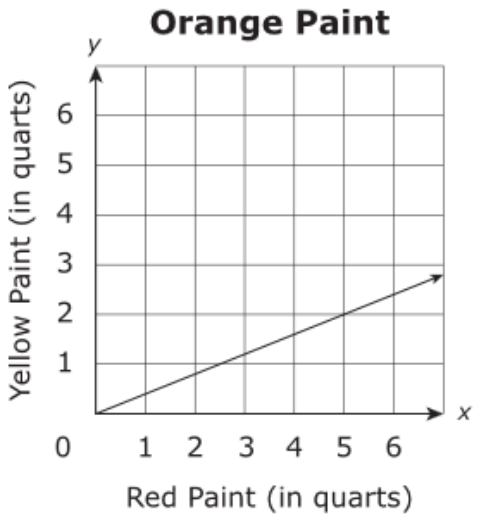
The factory must sell a minimum of 368 backpacks to meet the weekly goal.

The factory must sell a minimum of 432 backpacks to meet the weekly goal.

The factory must sell a minimum of 433 backpacks to meet the weekly goal.

14. **VH029343**

The graph shows the numbers of quarts of yellow paint that must be mixed with different numbers of quarts of red paint to make a certain shade of orange paint.



Based on the graph, write an equation that shows the relationship between the number of quarts of yellow paint, y, and the number of quarts of red paint, x, needed to make the shade of orange paint.

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

15. **VF653052**

Julian will factor the expression $36xyz + 24xy - 16x$ by dividing each term by a common factor.

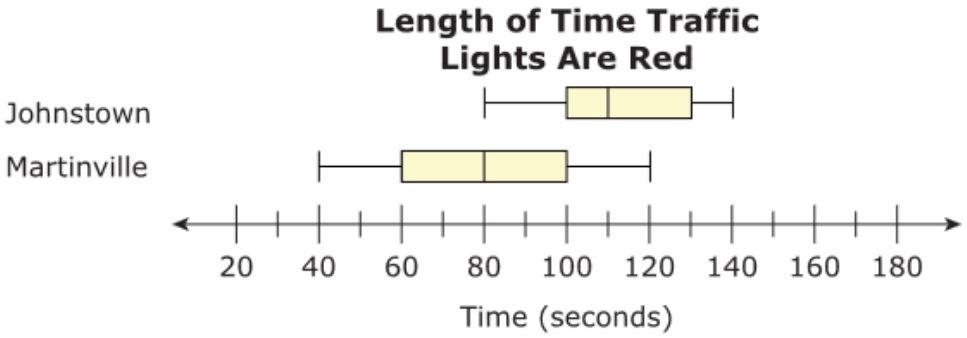
Which possible common factor could Julian use?

Select **each** correct answer.

2 6 8 x $4x$ $8x$ y $6y$ $2xy$

16. **VH012073**

These box plots represent the number of seconds that a random sample of 100 traffic lights are red in each of two cities: Johnstown and Martinville.



Based on the data in the two box plots, which statement about the **difference** in the medians of the two data sets is true?

A. The difference is about $2\frac{2}{3}$ times the range of the data for Johnstown, and about 2 times the range of data for Martinville.

B. The difference is about 2 times the range of the data for Johnstown, and about $2\frac{2}{3}$ times the range of data for Martinville.

C. The difference is about $\frac{3}{8}$ times the range of the data for Johnstown, and about $\frac{1}{2}$ times the range of data for Martinville.

D. The difference is about $\frac{1}{2}$ times the range of the data for Johnstown, and about $\frac{3}{8}$ times the range of data for Martinville.

17. **VF652084**

A scientist removed a sample of 39.1 grams of a chemical from a container. The sample was $5\frac{3}{4}$ grams less than $\frac{3}{10}$ of the total mass of the chemical in the container.

What was the total mass, in grams, of the chemical in the container before the scientist removed the sample of 39.1 grams? Show your work or explain how you know.

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

18. **VF907675**

Howard has a garden in the shape of a rectangle.

- The length is 5.4 meters.
- The width is 1.5 meters.

Howard will increase both the length and the width by 20% each.

Part A

What will be the perimeter, in meters, of the enlarged garden?

Enter your answer in the box.

Part B

By how many square meters will the area of the garden **increase**?

Enter your answer in the box.

19. **1484-M22172**

A factory has two types of machines.

- The factory has 6 cutting machines and 4 stamping machines.
- Each cutting machine cuts 105 parts every 3 minutes.
- Each stamping machine stamps 24 parts every 20 seconds.

Part A

How many parts can all 6 cutting machines cut in 1 minute?

A. 105 parts

B. 140 parts

C. 210 parts

D. 315 parts

Part B

The factory needs to stamp 4,320 parts. How many minutes will it take for all 4 stamping machines to stamp 4,320 parts?

A. 10 minutes

B. 15 minutes

C. 45 minutes

D. 60 minutes

(continues on next page)

Part C

One of the cutting machines is shut down for repairs. How many parts can the remaining machines cut in $4\frac{1}{2}$ hours?

- A. 788 parts
- B. 2,363 parts
- C. 28,350 parts
- D. 47,250 parts

Part D

All of the machines are kept cool by circulating cold water through them. The water makes 1 complete cycle through a 30 foot long tube every 12 seconds. Correctly complete the statement about the distance traveled by the water in 3 minutes and number of complete cycles the water makes in 3 minutes.

Select from the drop-down menus to correctly complete the sentence.

The water travels [150 / 216 / 360 / 450] feet and completes [8 / 15 / 30 / 36] cycles in 3 minutes.

20. **VH095849**

Devon graphed a line that contains the points shown in this table.

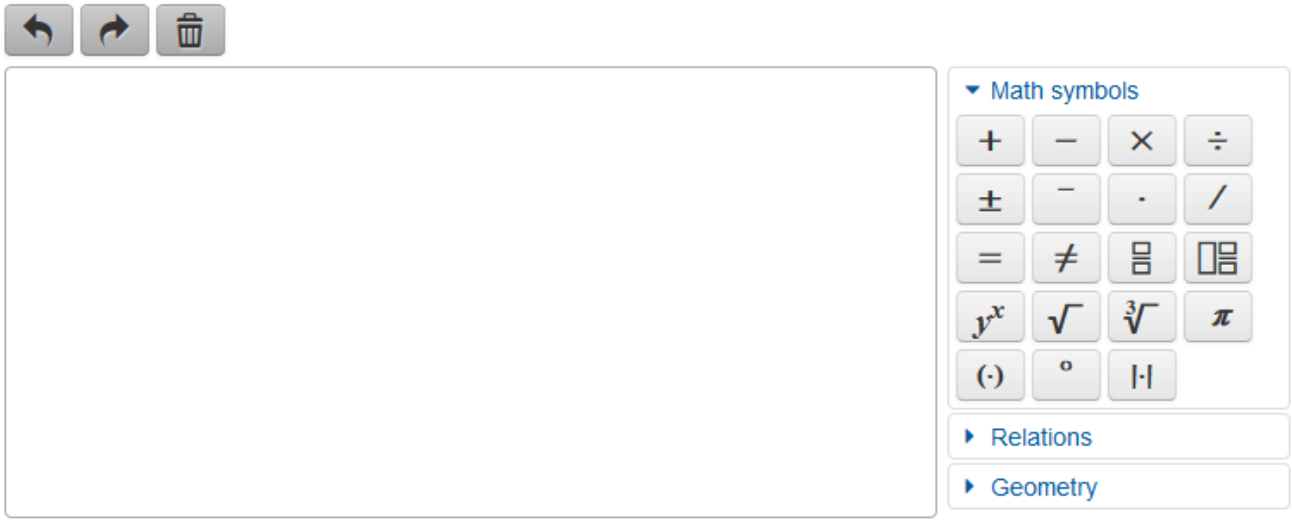
x	y
1	1
2	3
3	5
4	7
5	9

Devon concluded that the points in the table represent a proportional relationship for these reasons:

- Reason 1: The table contains the point (1, 1).
- Reason 2: The table contains only positive values.
- Reason 3: The line that contains these points is straight.

For each of Devon's reasons, explain whether or not it **must** indicate that the points in the table are in a proportional relationship. Justify your response for each reason.

Enter your answer and your justification in the space provided.



21. **VF647112**

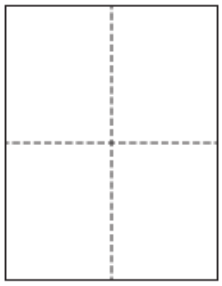
A person operating a machine can mow 0.75 acres in $\frac{1}{2}$ hour. What is the rate, in acres per hour, that the person can mow? Write your answer as a decimal.

Enter your answer in the box.

[ ] acres per hour

22. **VF801806**

A rectangular sheet of paper has a length of x inches and a width of $\frac{3}{4}x$ inches. Rico folds the paper in half once vertically and once horizontally, forming four smaller equal-sized rectangles, as shown in this diagram.



Part A

Write an expression that represents the perimeter, in inches, of **one** of the four smaller rectangles.

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

Part B

Rico concludes that the sum of the perimeters of all four smaller rectangles is equal to twice the perimeter of the larger rectangle.

Show or explain all of the steps of your reasoning to verify whether or not Rico's conclusion is correct.

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

Math symbols

Relations

Geometry

23. **M20270**

Angle *JKL* and angle *MKQ* are complementary angles.

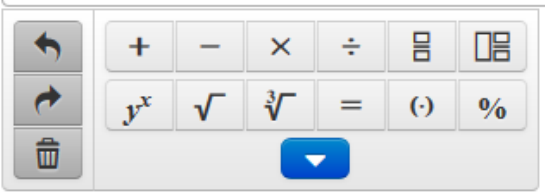
The measure of angle *JKL* is twice the measure of angle *MKQ*.

Write one equation to find x, the measure of angle *MKQ*, and then solve for x.

Enter your equation and your solution in the space provided.

Equation: ☐

Measure of angle MKQ: ☐ °



24. **VF862649**

Katie completes $\frac{2}{3}$ of a craft project in $\frac{3}{4}$ of an hour.

At this rate, what fraction of the craft project does Katie complete in one hour? Give your answer in fraction form.

Enter your answer in the boxes.

☐

———

☐

25. **VH000342**

Liz and Sara each ride their bikes every day.

The table shows the number of miles Liz and Sara rode their bikes during five randomly selected days.

Number of Miles Ridden

	Day 1	Day 2	Day 3	Day 4	Day 5
Liz's distance (miles)	13	9	8	9	11
Sara's distance (miles)	5	5	15	9	6

Based on the data in the table, which is the best comparative statement about the number of miles each girl rides on a typical day?

A. On a typical day, Liz rides farther than Sara because the mean of Liz's data is greater than the mean of Sara's data.

B. On a typical day, Sara rides farther than Liz because the mean of Sara's data is greater than the mean of Liz's data.

C. On a typical day, Liz rides farther than Sara because the range of Liz's data is greater than the range of Sara's data.

D. On a typical day, Sara rides farther than Liz because the range of Sara's data is greater than the range of Liz's data.

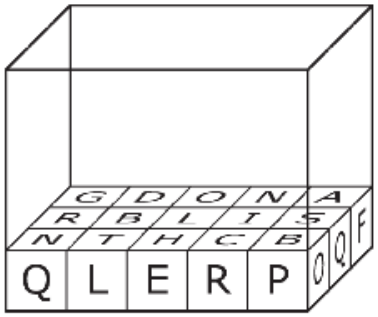
26. **VF657003**

Select from the drop-down menus to correctly complete each sentence.

There [is no triangle / is exactly 1 triangle / are exactly 2 triangles / are more than 2 triangles] with angle measures of 30°, 70°, and 80°.

There [is no triangle / is exactly 1 triangle / are exactly 2 triangles / are more than 2 triangles] with two sides each 6 inches long and one angle measure of 90°.

The bottom of the inside of a rectangular prism is completely covered with a layer of letter cubes, as shown.



Not drawn to scale.

The edges of each letter cube are $1\frac{1}{2}$ inches long.

Part A

What are the length and the width, in inches, of the bottom of the inside of the prism?

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

☐ inches long

☐ inches wide

Part B

The height inside the rectangular prism is $\frac{3}{4}$ foot.

How many layers of letter cubes can fit inside the prism? Show or explain how you determined your answer.

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

Math symbols

Relations

Geometry

(continues on next page)

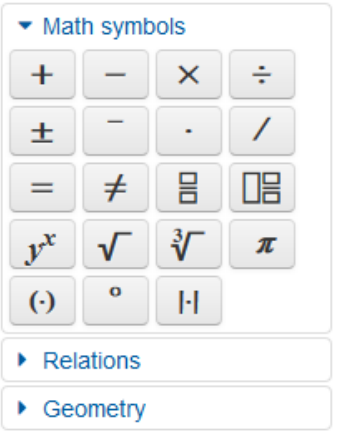
27. (continued from previous page) VF650704

Part C

The weight of the prism when empty is $\frac{1}{4}$ pound. The weight of the prism when it is completely filled with letter cubes is 4 pounds.

What is the weight, **in ounces**, of one letter cube? Show or explain how you determined your answer.

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

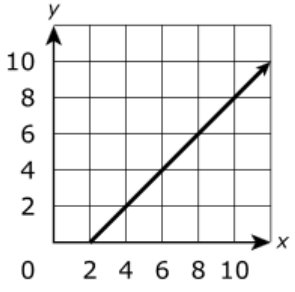


28. VH000318

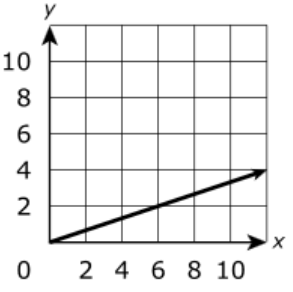
Which graphs represent a proportional relationship between *x* and *y*?

Select **each** correct answer.

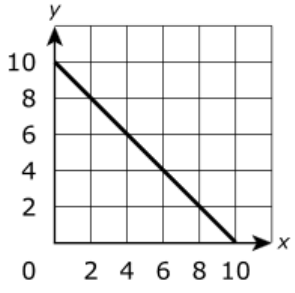
A.



B.



C.



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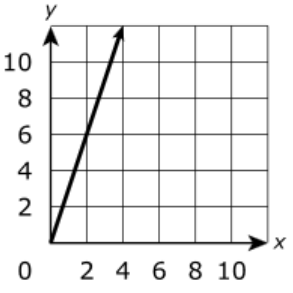
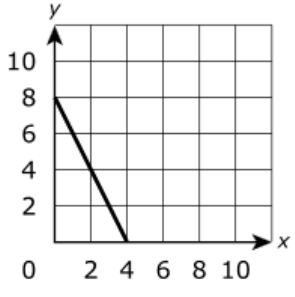


E.



F.