



Math

Spring 2018

Grade 8

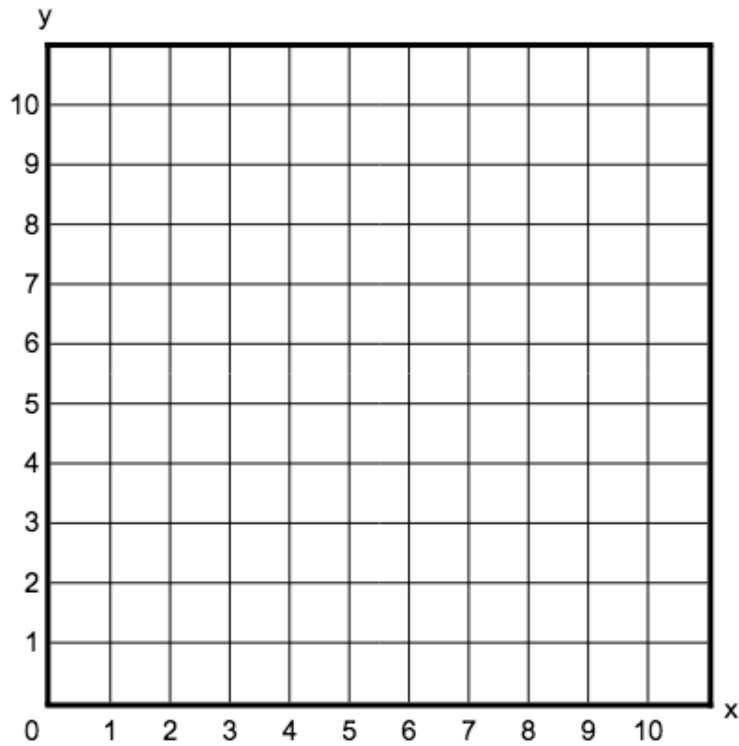
Released Items

1.

VF554976

The graph of a function is made up of two connected line segments. The  $y$ -intercept of the graph is 4. From  $x = 0$  to  $x = 5$ , the slope of the graph is  $\frac{4}{5}$ . From  $x = 5$  to  $x = 10$ , the slope of the graph is  $-\frac{2}{5}$ . Graph the given function on the coordinate plane.

To graph a line segment, select two points on the coordinate plane. A segment will connect the points.



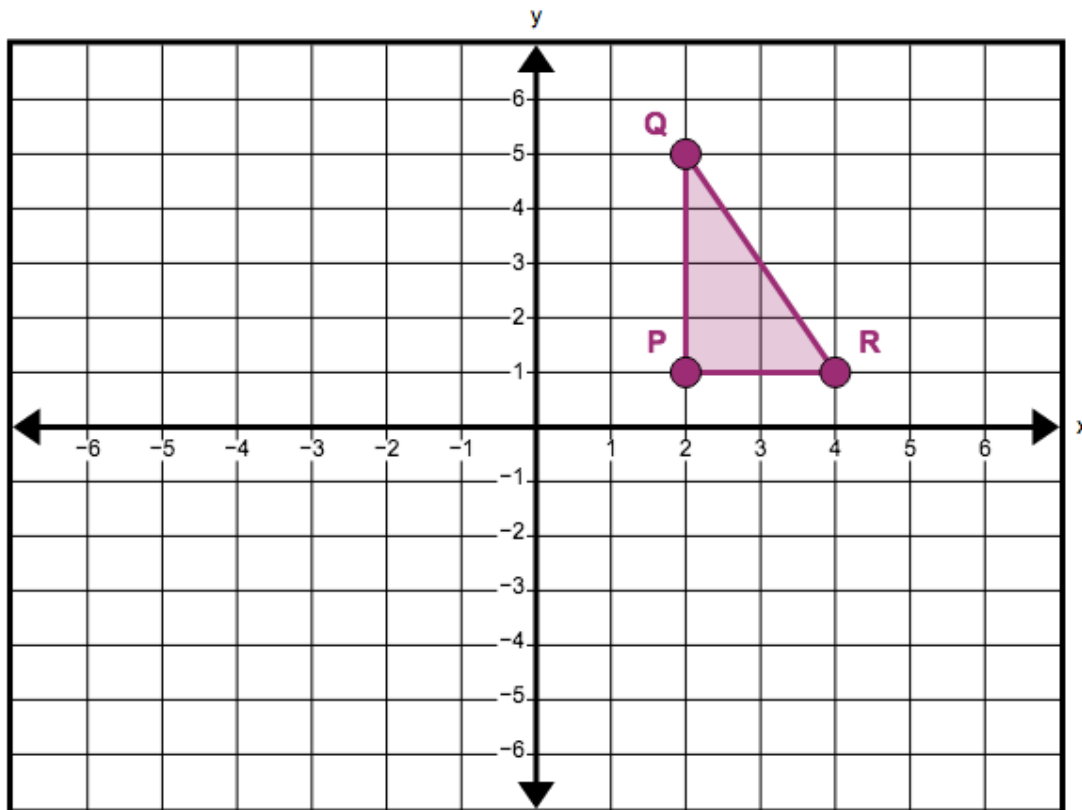
2.

1326-M21176

### Part A

The coordinate plane shows a triangle with the coordinates  $(2, 1)$ ,  $(2, 5)$ , and  $(4, 1)$ . Plot the coordinates of the image of the triangle after it is rotated  $180^\circ$  counterclockwise about the origin.

To graph a polygon, plot all of the vertices on the coordinate plane. Select the “Close Shape” button when you are done.



Close Shape

### Part B

Which rule describes a  $270^\circ$  clockwise rotation about the origin?

- ☐ A.  $(x, y) \rightarrow (y, -x)$
- ☐ B.  $(x, y) \rightarrow (-y, x)$
- ☐ C.  $(x, y) \rightarrow (-x, -y)$
- ☐ D.  $(x, y) \rightarrow (x + 270, y + 270)$

3.

VF654722

Determine the solution(s) of the equation  $x^2 = 36$ .

Select **each** correct answer.

- ☐ A.  $x = -18$
- ☐ B.  $x = -6$
- ☐ C.  $x = -\sqrt{6}$
- ☐ D.  $x = \sqrt{6}$
- ☐ E.  $x = 6$
- ☐ F.  $x = 18$

4.

M21566P

$$\begin{cases} 4x - y = 6 \\ -4x + y = 8 \end{cases}$$

Which statement correctly describes the system of equations shown?

- ☐ A. The system has no solution because the graph of the system represents the same line.
- ☐ B. The system has no solution because the graph of the system represents parallel lines.
- ☐ C. The system has infinitely many solutions because the graph of the system represents the same line.
- ☐ D. The system has infinitely many solutions because the graph of the system represents parallel lines.

5.

VF491644

Which of these equations define  $y$  as a nonlinear function of  $x$  ?

Select **each** correct answer.

☐ A.  $3y = 2x - 1.5$

☐ B.  $y = x^2 + 3$

☐ C.  $y = 1$

☐ D.  $5(x + y) = -25$

☐ E.  $y = x^3$

☐ F.  $y = 12 - x^2$

6.

VH002738

$$\begin{cases} y = 2x + b \\ y = 3x + c \end{cases}$$

In the system of equations shown,  $b$  and  $c$  are constants. In the coordinate plane, the graphs of the equations intersect at point  $P$ .

If the  $x$ -coordinate of point  $P$  is 2, which of the following expressions are equal to the  $y$ -coordinate of point  $P$ ?

Select **each** correct answer.

☐ A.  $4 + b$

☐ B.  $4b$

☐ C.  $6 + c$

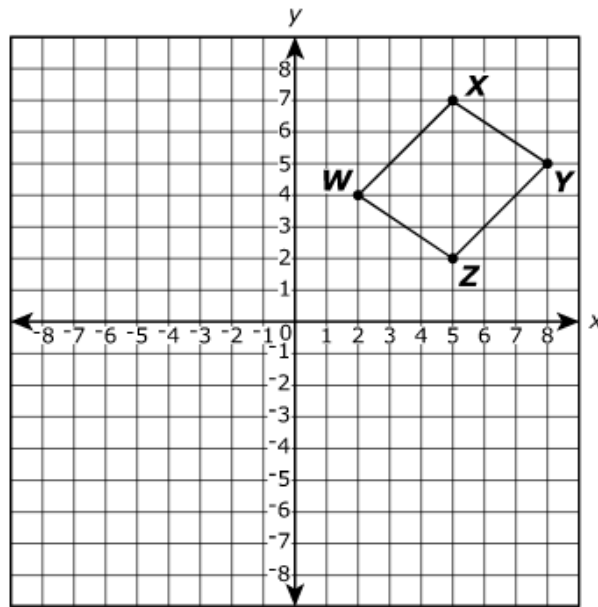
☐ D.  $6c$

☐ E.  $4b + 6c$

7.

VH010947

Parallelogram  $WXYZ$  is shown on the coordinate plane.



Parallelogram  $W'X'Y'Z'$  (not shown) is the reflection of parallelogram  $WXYZ$  across the  $y$ -axis. Which statement is true?

- ☐ A.  $\overline{W'X'}$  is parallel to  $\overline{W'Z'}$
- ☐ B.  $\overline{W'X'}$  is parallel to  $\overline{Z'Y'}$
- ☐ C.  $\overline{W'X'}$  is perpendicular to  $\overline{W'Z'}$
- ☐ D.  $\overline{W'X'}$  is perpendicular to  $\overline{Z'Y'}$

8.

VH143227

Which expression is equivalent to  $5^3$ ?

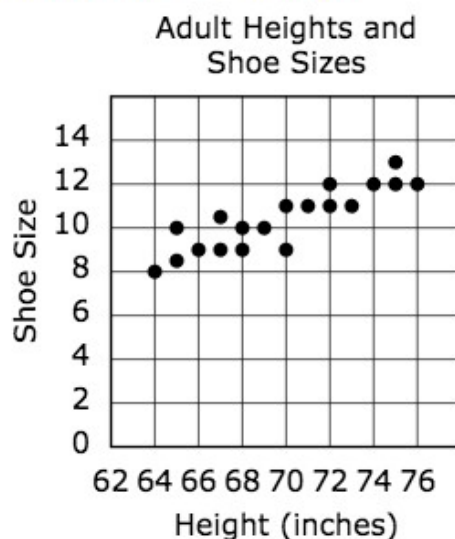
Select **each** correct expression.

- ☐ A.  $5^7 \cdot 5^{-4}$
- ☐ B.  $\frac{5^{12}}{5^4}$
- ☐ C.  $5 + 5^2$
- ☐ D.  $5^0 \cdot 5^3$
- ☐ E.  $5^3 - 5^0$

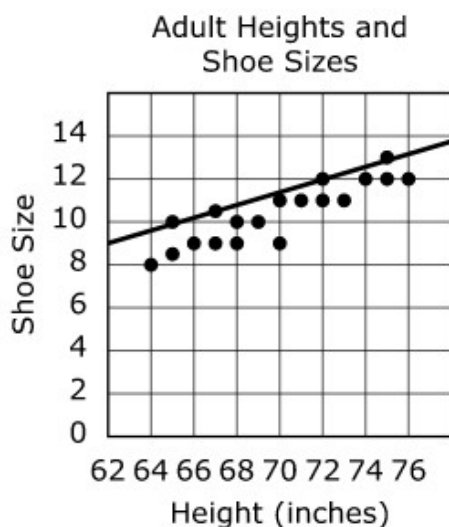
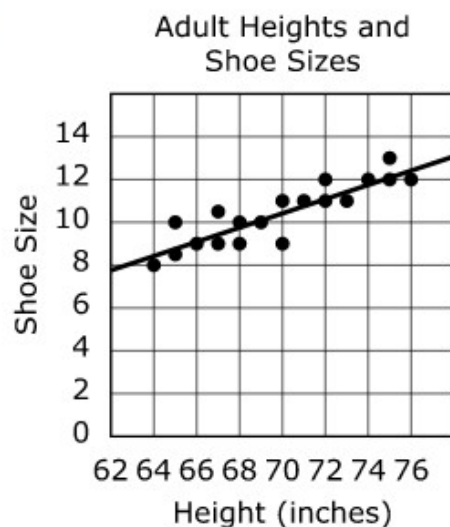
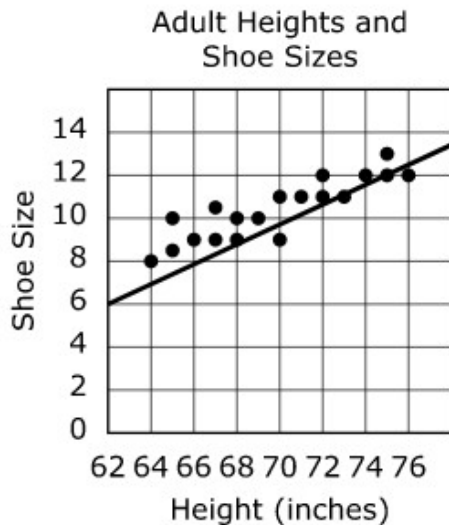
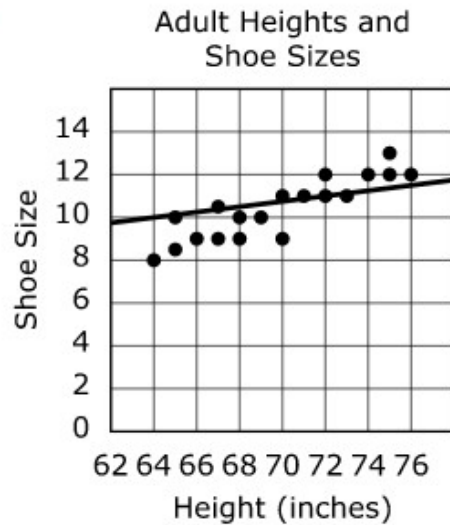
9.

VH095743

The scatter plot shows the height and shoe size of 19 adults.



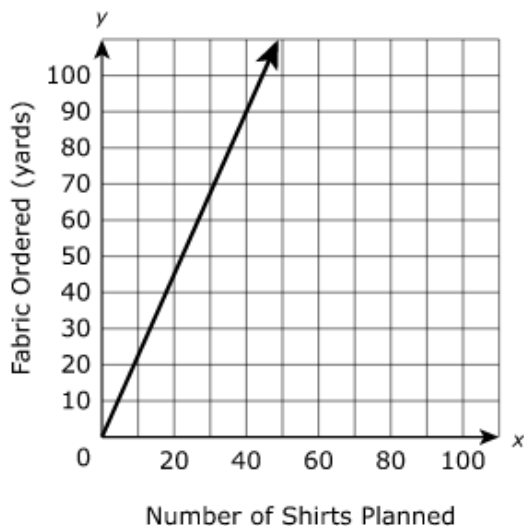
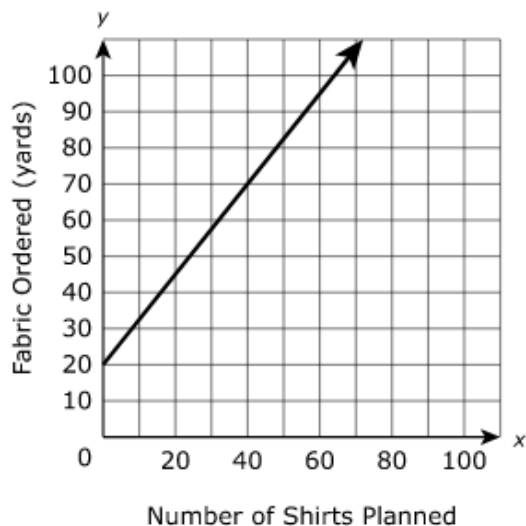
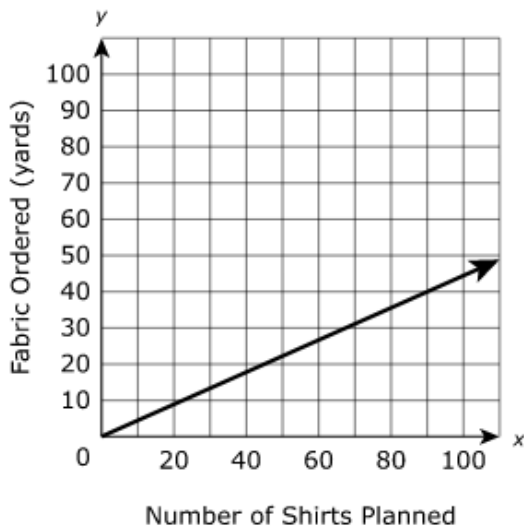
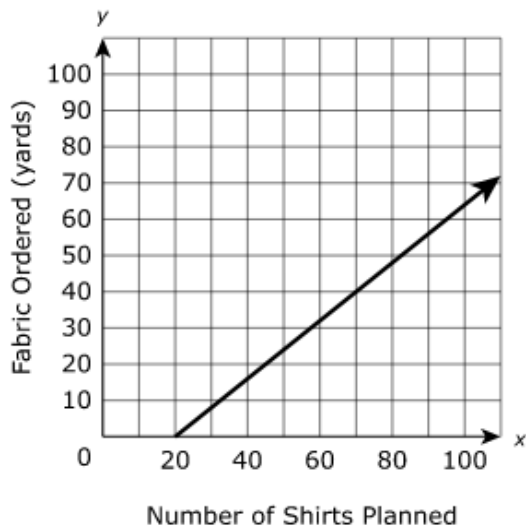
Which of these **most** closely approximates a line of best fit for the data in the scatter plot?

☐ A.

☐ C.

☐ B.

☐ D.


10.

VH012635

For every 20 shirts Western Shirt Company plans to make, it orders 45 yards of fabric. Which graph represents the relationship between  $x$ , the number of shirts the company plans to make, and  $y$ , the number of yards of fabric it orders?

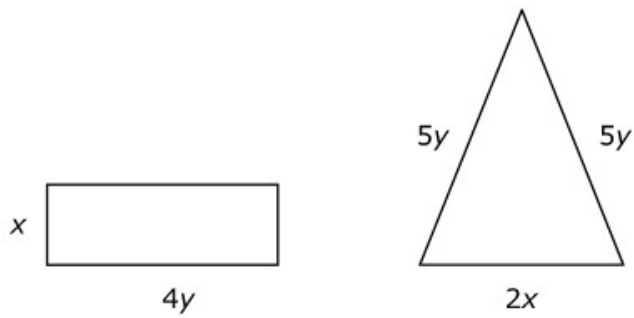
☐ A.☐ B.☐ C.☐ D.



11.

VF643153

The perimeter of the rectangle is 34 inches. The perimeter of the triangle is 40 inches.



shapes are not drawn to scale

**Part A**

What is the value of  $y$ ?

Enter your answer in the box.

**Part B**

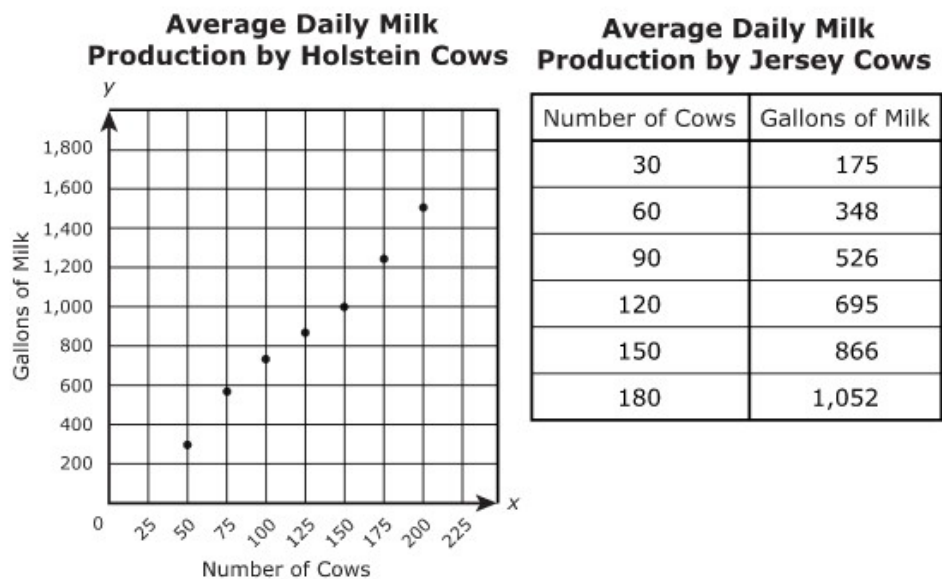
What is the area, in square inches, of the rectangle?

Enter your answer in the box.

Holstein cows and Jersey cows are two different types of dairy cows.

The graph shows the average number of gallons of milk produced each day at dairy farms with Holstein cows.

The table shows the average number of gallons of milk produced each day at dairy farms with Jersey cows.



Martin’s Dairy Farm has 110 Holstein cows. Stinson’s Dairy Farm has 110 Jersey cows.

- Use the information in the graph and the table to:
- Determine which dairy farm will produce more milk in a two-month period.
  - Estimate how much more milk that dairy farm will produce in the two months.
  - Show and explain your work and any assumptions you used to determine your answer.

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

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▼ Math symbols

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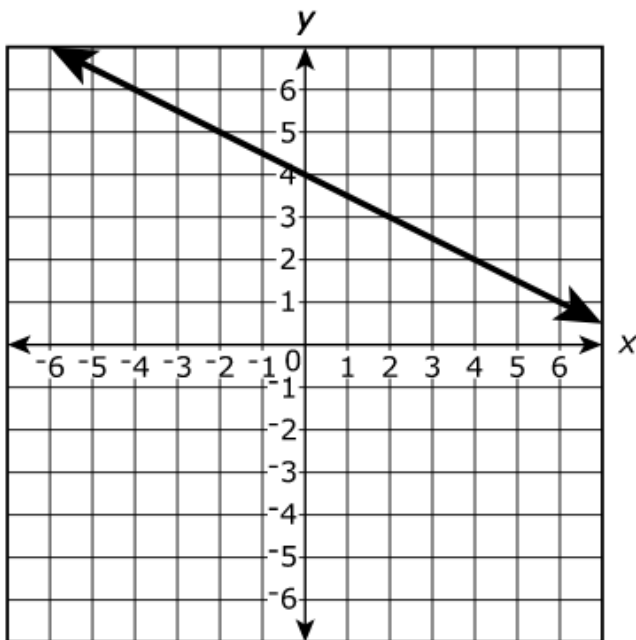
► Relations

► Geometry

13.

VH049778

A line is graphed on the coordinate plane.

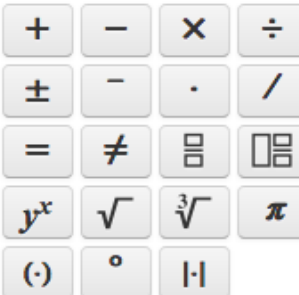


Write the equation of the line in slope-intercept form. Explain how you found the slope and the y-intercept.

Enter your answer and your explanation in the space provided.



▼ Math symbols



► Relations

► Geometry

14.

1491-M22211

Victoria bought a set of food storage containers. Each container is a cylinder.



**Part A**

Storage container J has a diameter of 4.25 inches and a height of 5.25 inches. Which value is closest to the volume of storage container J?

- ☐ A. 35 cubic inches
- ☐ B. 74 cubic inches
- ☐ C. 140 cubic inches
- ☐ D. 298 cubic inches

**Part B**

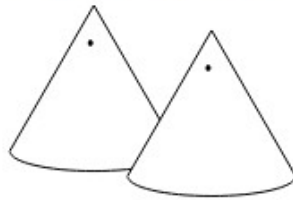
Storage container K has a diameter of 4.75 inches and a volume of approximately 103.38 cubic inches. Which value is closest to the height of storage container K?

- ☐ A. 1.46 inches
- ☐ B. 3.46 inches
- ☐ C. 5.83 inches
- ☐ D. 6.93 inches

(continues on next page)

**Part C**

Container L has a height of 8 inches and a diameter of 5.25 inches. Container L is filled completely with salt. The salt in the container is used to fill several salt shakers. Each salt shaker is the same size and is shaped like a cone with a height of 3 inches and a diameter of 2 inches.



How many cone-shaped salt shakers can be completely filled with the salt from container L?

- ☐ A. 13
- ☐ B. 18
- ☐ C. 27
- ☐ D. 55

**Part D**

The radius of container M is 3 inches and the height is 9.5 inches. A cook has several boxes of sugar that are each the same size and volume. The cook empties 1 box of sugar into container M. He then empties  $\frac{1}{3}$  of another box of sugar into container M to completely fill it. What is the approximate volume, in cubic inches, of 1 box of sugar?

- ☐ A. 134.3
- ☐ B. 201.5
- ☐ C. 238.8
- ☐ D. 358.1

15.

M25185

A student uses a calculator to estimate the number of leaves in a forest. The student's calculation is based on an estimate of about  $2 \times 10^5$  leaves on a mature tree. After the student performs some calculations, the calculator displays the result  $2E^{-8}$ .

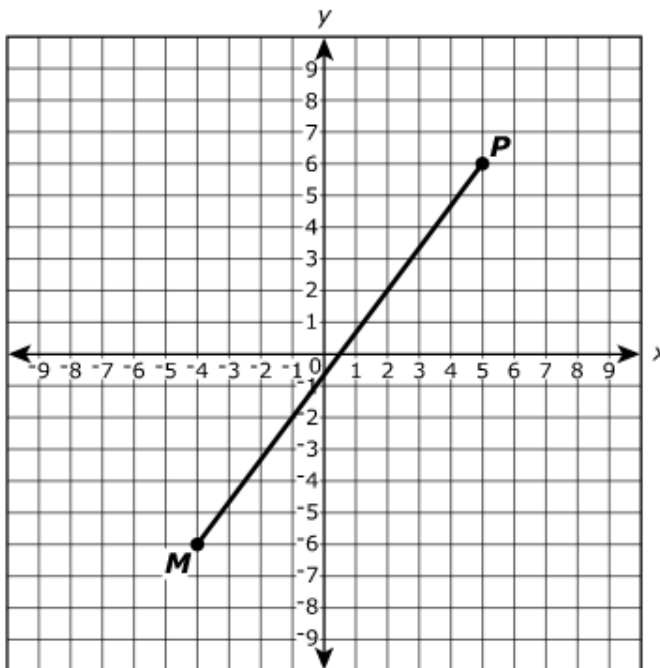
Which statement provides a reasonable explanation for the calculator's result?

- ☐ A. The result indicates an estimate of 200,000,000 leaves. This is reasonable because a forest has many trees.
- ☐ B. The result indicates an estimate of  $2^8$ . This is reasonable because it represents a value greater than the number of leaves on a single tree.
- ☐ C. The result indicates an estimate of 0.00000002. This is not a reasonable result because it indicates that the estimated number of leaves is less than one.
- ☐ D. The result indicates an estimate of  $-16$ . This is not a reasonable result because there cannot be a negative number of leaves in the forest.

16.

VH223158

The coordinate plane shows  $\overline{MP}$ .



Both coordinates of points  $M$  and  $P$  are integers. What is the length, in units, of  $\overline{MP}$ ?

Enter your answer in the box.



17.

M25297

Here is information about gasoline prices at Gas Station Y and Gas Station Z.

The table shows the cost of different numbers of gallons of gasoline at Gas Station Y.

**Gas Station Y**

| Number of Gallons | Cost (dollars) |
|-------------------|----------------|
| 2                 | 6.74           |
| 5                 | 16.85          |
| 9                 | 30.33          |

At Gas Station Z, the cost of 15 gallons of gasoline is \$51.30, and the cost of 8 gallons of gasoline is \$27.36.

What is the cost, in dollars per gallon, of the gasoline at the gas station with the **greater** cost?

Enter your answer in the box.

18.

1744-M23053P

In one city, the cost for a gym membership is given by the equation  $y = 32.50x + 65$ , where  $y$  is the total cost, in dollars, for a membership for a certain number of months,  $x$ .

**Part A**

In the equation for the cost of a gym membership, which statement correctly describes **both** the slope and the  $y$ -intercept?

- ☐ A. The slope represents the monthly charge for a gym membership, and the  $y$ -intercept represents the sign-up fee for a gym membership.
- ☐ B. The slope represents the monthly charge for a gym membership, and the  $y$ -intercept represents the total cost for the first month of a gym membership.
- ☐ C. The slope represents the sign-up fee for a gym membership, and the  $y$ -intercept represents the monthly charge for a gym membership.
- ☐ D. The slope represents the total cost for the first month of a gym membership, and the  $y$ -intercept represents the sign-up fee for a gym membership.

**Part B**

What is the cost, in dollars, of a gym membership for 6 months?

- ☐ A. \$103.50
- ☐ B. \$260.00
- ☐ C. \$422.50
- ☐ D. \$585.00



19.

1337-M21837

Noah works in a sporting goods store. He packs basketballs in shipping boxes to fill customers' orders. Noah packed 8 full boxes and 5 boxes that were not full. Each of the 5 boxes contained 3 fewer basketballs than a full box. The total number of basketballs he packed was 245.

**Part A**

Which equation can be used to find  $n$ , the number of basketballs in a full box?

- ☐ A.  $(8n + 5)(n - 3) = 245$
- ☐ B.  $8n + (5 - 3)n = 245$
- ☐ C.  $8n + 5(n - 3) = 245$
- ☐ D.  $8n + 5n - 3 = 245$

**Part B**

What is the number of basketballs in one full box?

- ☐ A. 17
- ☐ B. 20
- ☐ C. 24
- ☐ D. 28

**Part C**

The basketballs Noah packed had two different prices. Of the total number of basketballs sold, 60% had a price that was \$21 more than the price of the remaining basketballs. The total amount of the store's sales for all the basketballs was \$8,967. What was the price for one of the more expensive basketballs?

Enter your answer in the box.

**Part D**

The total for shipping charges for the 8 full boxes was \$54.75 more than the total for shipping charges for the partially filled boxes. Each of the partially filled boxes costs \$12.25 to ship. What was the cost to ship 1 full box?

Enter your answer in the box.

20.

M25256

Function  $F$  and function  $H$  are linear functions of  $x$ .

Function  $F$  is described by the values in the table shown.

| $x$ | $y$   |
|-----|-------|
| 0   | -2.00 |
| 0.2 | -1.85 |
| 0.6 | -1.55 |
| 1.4 | -0.95 |

Function  $H$  is defined by the equation  $y = -0.8 + 0.7x$ .

Compare the rates of change of each function.

Drag and drop the number or symbol into the appropriate box.

|  |  |  |
|--|--|--|
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|      |      |     |      |
|------|------|-----|------|
| -0.8 | 0.15 | 0.7 | 0.75 |
| >    | =    | <   |      |