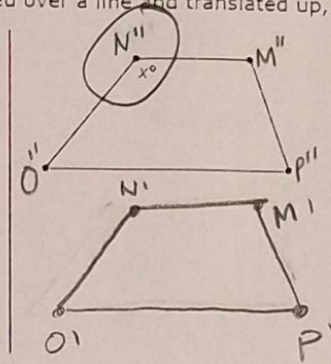
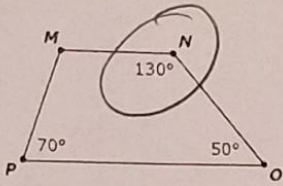


1.

Quadrilateral $MNOP$ is reflected over a line and translated up, as shown.



$x = 130$

What is the value of x ?

2.

Select all of the equations that represent linear functions.

$y = x$

$y = 2x$

$y = x^2$

$y = \frac{2}{x} \rightarrow y = 2x^{-1}$

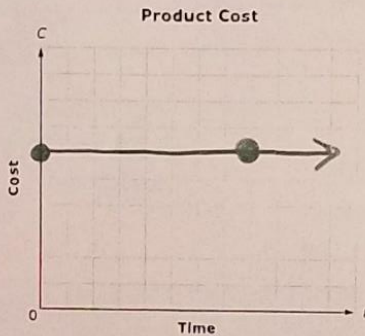
$y = \frac{x}{2} \rightarrow y = \frac{1}{2}x$

cannot have an x with an exponent

3.

The cost of a product, C , remains constant over time, t .

Use the Add Arrow tool to create a graph that could represent this situation.



Dots could be anywhere, just needs to be a horizontal line

4.

Select whether each equation has no solution, one solution, or infinitely many solutions.

	No solution	One solution	Infinitely many solutions
$7x + 10 = 7x + 10$	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> $10 = 10$
$4x = 4x + 3$	<input checked="" type="checkbox"/> $0 = 3$	<input type="checkbox"/>	<input type="checkbox"/>
$5x + 3 = 2x - 3$	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
$2x + 8 = 3 + 2x$	<input checked="" type="checkbox"/> $8 = 3$	<input type="checkbox"/>	<input type="checkbox"/>

5.

An equation is shown.

$\left(\frac{1}{6}\right)^p = 36^3 \cdot 6^{18}$

What is the value of p ?

$\left(\frac{1}{6}\right)^p = (6^2)^3 \cdot 6^{18}$

$\left(\frac{1}{6}\right)^p = 6^6 \cdot 6^{18}$

$\left(\frac{1}{6}\right)^p = 6^{24}$

$p = -24$

6.

Brian and Tim both ride their bikes at a constant speed and leave from the same location. Brian's ride times are shown in the table.

Brian's Bike Ride

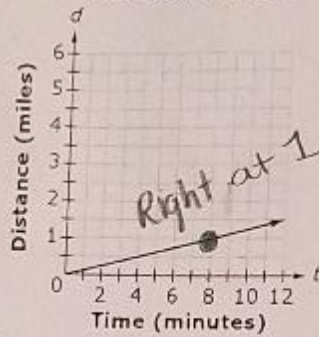
Time (minutes)	Distance (miles)
8	1
16	2
24	3

Tim rides faster than Brian.

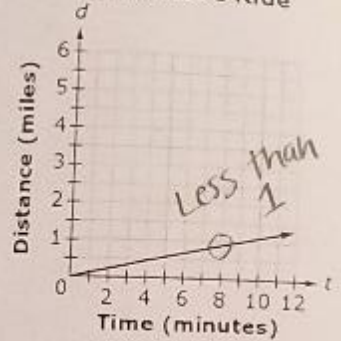
Which graph could represent Tim's bike ride?

So at 8 minutes, Tim should be higher than 1 mile

(a) Tim's Bike Ride

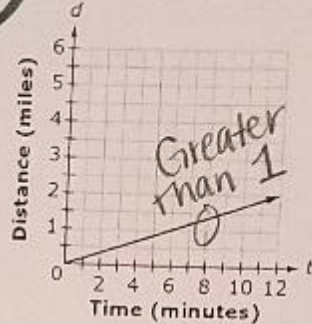


(c) Tim's Bike Ride

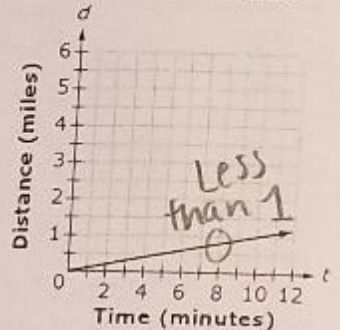


(b)

Tim's Bike Ride



(d) Tim's Bike Ride



7.

Charlie and Susan are planning a party for 10 people. Charlie finds a location that charges an initial fee of \$20 plus \$25 per person.

Susan finds a location whose rental fee is represented by the equation $y = 15x + 100$, where x is the number of people in attendance and y is the total cost.

Select all the statements that are true.

- Charlie's location is a cheaper location.
- Susan's location is cheaper for 10 people.
- The charge for each additional person is greater for Susan's location. (\$15 vs \$25)
- The charge for each additional person is greater for Charlie's location. (\$15 vs \$25)
- If the number of people at the party changes to 12, the total cost at each location is the same.

Charlie $y = 25x + 20$ $25(10) + 20 = 270$
 Susan $y = 15x + 100$ $15(10) + 100 = 250$

$25(12) + 20 = 320$
 $15(12) + 100 = 280$

8.

Two cylinders, A and B, are created.

- Cylinder A has volume V .
- Cylinder B has the same height as cylinder A.
- Cylinder B has half the diameter of cylinder A.

Create an expression that represents the volume of cylinder B in terms of V .

Volume of cylinder B = $\frac{V}{4}$

$\left(\frac{r}{2}\right)^2 = \frac{r^2}{4}$

9.

A system of equations is shown.

$2x - y = 15$
 $y = 9$

What is the value of x in the solution to this system?

$2x - 9 = 15$

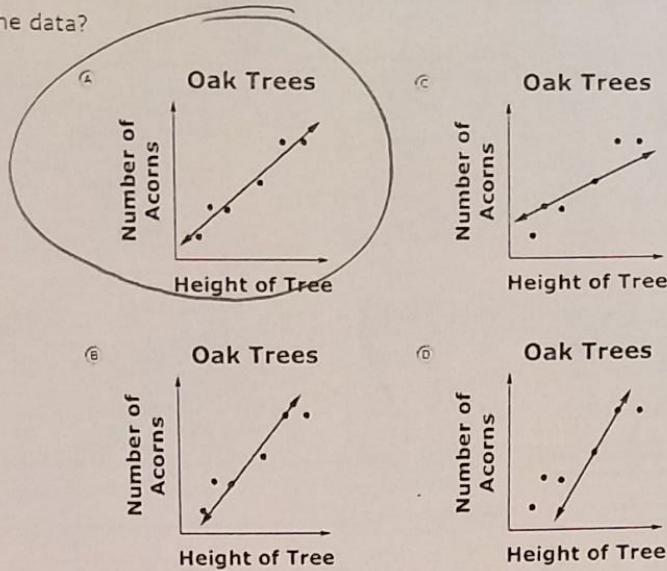
$2x = 24$

$x = 12$

10.

Marcus collects acorns from some oak trees. He records the height of the trees and the number of acorns collected, and plots the data on a coordinate grid.

Which line best models the data?



An equation is shown.

$$n^2 = 43$$

11.

Select all of the values that represent solutions to this equation.

- -43^2
- $-\sqrt{43}$
- $\sqrt{43}$
- $(\frac{1}{2})43$
- 43^2

$$\sqrt{n^2} = \sqrt{43}$$

$$n = \pm \sqrt{43}$$

12.

A linear function contains the three ordered pairs shown in the table.

n	g
1	4
5	6
7	7

$$\frac{4-6}{1-5} = 0.5$$

Rate of Change
 $0.5 \cdot 2 = 1$

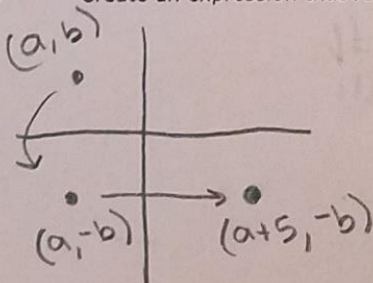
Create an equation for a different linear function that has twice the rate of change and the same initial value as the one represented by the table.

$$g = n + 3.5$$

13.

Point R has coordinates (a, b) . The point is reflected across the x-axis and then translated 5 points to the right to create point S.

Create an expression that represents the y-coordinate of S.



$$\boxed{-b}$$

14.

A restaurant manager surveys 80 people in two different age groups on whether they prefer turkey or chicken sandwiches.

Which two-way table shows no association between age and sandwich choice?

(A)

	Turkey	Chicken	Total
People Age 30 and Over	30	10	40
People Under Age 30	10	30	40
Total	40	40	80

(C)

	Turkey	Chicken	Total
People Age 30 and Over	0	40	40
People Under Age 30	40	0	40
Total	40	40	80

(B)

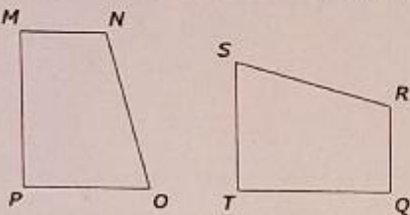
	Turkey	Chicken	Total
People Age 30 and Over	40	0	40
People Under Age 30	0	40	40
Total	40	40	80

(D)

	Turkey	Chicken	Total
People Age 30 and Over	20	20	40
People Under Age 30	20	20	40
Total	40	40	80

15.

Congruent quadrilaterals $MNOP$ and $QRST$ are shown.



Which sequence of transformations can be used to show that the two quadrilaterals are congruent?

- (A) Translate $MNOP$ to the right, and then rotate it 90° clockwise about point P .
- (B) Translate $MNOP$ to the right, and then rotate it 180° clockwise about point O .
- (C) Rotate $MNOP$ 90° counterclockwise about point P , and then reflect it across a vertical line.
- (D) Rotate $MNOP$ 90° counterclockwise about point O , and then reflect it across a vertical line.

16.

Kelly is running home from the park. The function shown gives her distance, d , in miles, from home after t minutes.

$$d = -0.15t + 2.3$$

What does -0.15 represent in this function?

- (A) the number of minutes Kelly has been running
- (B) the total distance from home after each minute
- (C) the total distance from home when Kelly began running
- (D) the rate at which the distance from home changes each minute

17.

What is $0.\overline{83}$ written as a fraction?

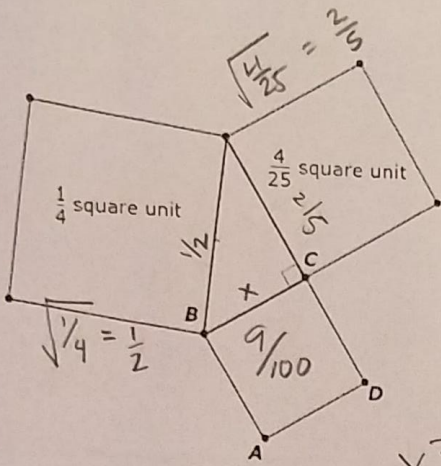
$$\begin{aligned} x &= 0.83333... \\ 10x &= 8.33333... \\ 100x &= 83.33333... \end{aligned}$$

$$100x - 10x = 75$$

$$\frac{90x}{90} = \frac{75}{90}$$

$$x = \frac{5}{6}$$

18.



QUEST. QUEST

The figure shown includes a triangle and three squares. The areas of two of the squares are given.

What is the area of ABCD?

- (A) $\frac{9}{100}$ square unit
- (B) $\frac{1}{10}$ square unit
- (C) $\frac{3}{10}$ square unit
- (D) $\frac{41}{100}$ square unit

$$x^2 + \left(\frac{2}{5}\right)^2 = \left(\frac{1}{2}\right)^2$$

$$x^2 + \frac{4}{25} = \frac{1}{4}$$

$$x^2 = \frac{9}{100}$$

$$x = \frac{3}{10}$$

19.

The table shows the average distance from the sun for each of three planets, rounded to three significant figures.

Planet	Average Distance from Sun (miles)
Earth	9.30×10^7
Mars	1.42×10^8
Jupiter	4.84×10^8

$$\frac{9.30 \times 10^7}{3.42 \times 10^8} = \frac{1}{x}$$

$$9.30 \times 10^7 \cdot x = 3.42 \times 10^8$$

$$x = 3.68$$

The average distance from Earth to the sun is defined as 1 astronomical unit.

What is the distance, in astronomical units, from Mars to Jupiter? Round your answer to the nearest hundredth.

20.

Point A has an x-coordinate of -6 and is 10 units away from the origin.

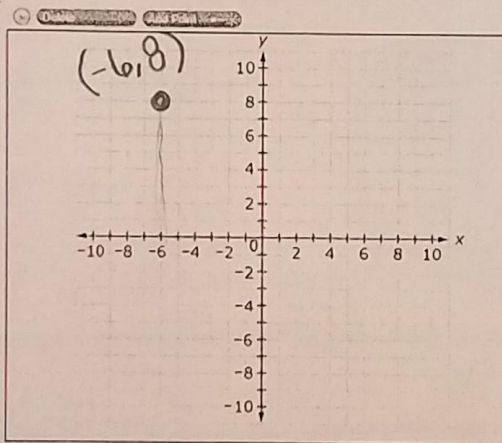
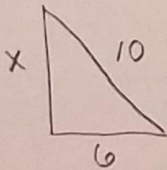
Use the Add Point tool to plot a possible location for point A.

$$x^2 + 6^2 = 10^2$$

$$x^2 + 36 = 100$$

$$x^2 = 64$$

$$x = 8$$



* you could also put it at (-6, -8)

21.

Between what two consecutive whole numbers is the value of $\sqrt{40}$?

Enter each number in a separate answer box.

6

7

$$\sqrt{40} = 6.32$$

22. A system of linear equations has no solutions. One of the equations of the system is shown.
 $y = 2x - 1$

Which equation could be the other equation of the system?

(A) $y = -\frac{1}{2}x + 1$

(B) $y = -2x - 1$

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

(D) $y = 2x + 2$

23. An inequality is shown, where b is an integer.

$4.5 < \sqrt{b} < 4.9$

What is a possible value of b ?

$4.5 < \sqrt{b} < 4.9$

$\sqrt{20.25}$

$\sqrt{24.01}$

$b = 21$
 $b = 22$
 $b = 23$
 $b = 24$

Any of these would work

24. Mark recorded the diameter of the same tree trunk every year for 10 years. He modeled the data with the equation shown, where d is the diameter, in inches, of the tree trunk after y years.

$d = 0.47y + 0.25$

According to the model, which statement about the tree trunk is true?

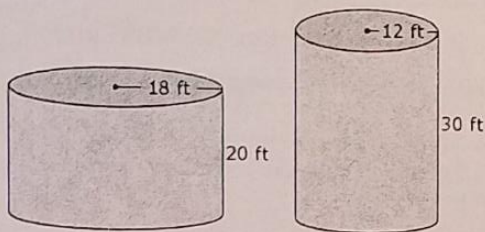
(A) Over the next year, the diameter of the tree trunk will grow exactly 0.25 inch.

(B) Over the next year, the diameter of the tree trunk will grow exactly 0.47 inch.

(C) Each year, on average, the diameter of the tree trunk increased by 0.25 inch.

(D) Each year, on average, the diameter of the tree trunk increased by 0.47 inch.

25. A farm has two cylindrical silos for storing grain as shown.



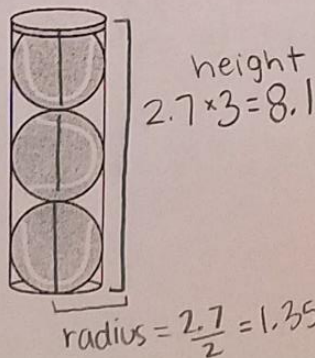
$V = \pi \cdot 18^2 \cdot 20$
 $= 6480\pi$

$V = \pi \cdot 12^2 \cdot 30$
 $= 4320\pi$

$6480\pi - 4320\pi = 6785.8$

How much greater is the volume, in cubic feet, of the larger silo than the smaller silo?

26. Three tennis balls are inside a can (cylinder). The diameter of one tennis ball is 2.7 inches. How much empty space is in the can?



Volume of can = $\pi \cdot (1.35)^2 \cdot 8.1$
 $= 46.38$

Volume of ball = $\frac{4}{3} \pi \cdot (1.35)^3$
 $= 10.3$

Empty Space = $46.38 - 3(10.3)$
 $= 15.48$ cubic inches