

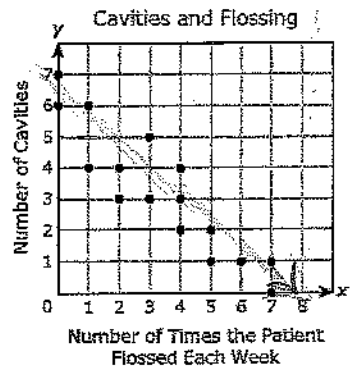
Name: Solutions

Date: _____ Period: _____

STAAR Review – Algebraic Thinking

Scatterplots

1. A dentist made the scatterplot below to show the number of cavities her patients had as it relates to the number of times they flossed their teeth each week.

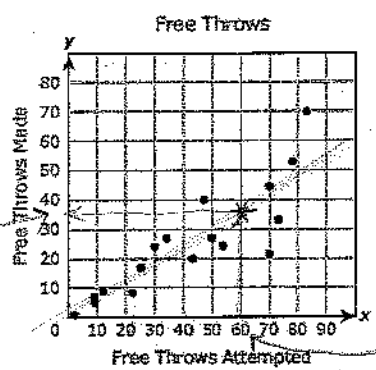


downward trend
(read graphs from left to right)

Which of the following best describes the correlation for the data?

- A Positive correlation
- C Negative correlation
- B Nonlinear correlation
- D No correlation

2. The scatterplot shows the number of free throws that different basketball players attempted and the number that each player made.



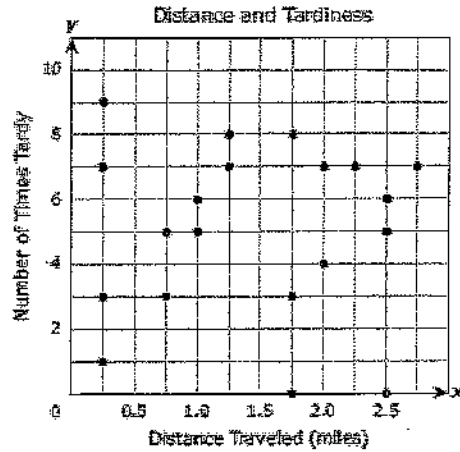
-draw trend line
(about the same # of points above & below your line.)
60 attempted, about 35 free throws made.

Based on the trend in the data, approximately how many free throws would a player be expected to make if he attempted 60 free throws?

- F 50
- G 35
- H 25
- J 60

3.

The scatterplot shows the relationship between the distance that students traveled to get to school and the number of times those students were tardy during the school year.



The principal of the school wants to use this information to help him determine if there is a correlation between distance traveled and the number of times tardy. Which statement is a reasonable conclusion that the principal could make?

- A A student who travels 1.5 miles to get to school will be tardy 9 times during the school year.
- B A student who travels more than 3 miles to get to school will be tardy at least 7 times during the school year.
- C There is no correlation between the distance a student travels to get to school and the number of times the student will be tardy during the school year.**
- D There is a nonlinear correlation between the distance a student travels to get to school and the number of times the student will be tardy during the school year.

Solve Equations by Intersections

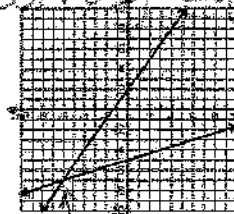
To find the solution to an equation with variables on both sides, graph both sides of the equation and look for the intersection point. When solving for x , the solution is the x -value of the intersection point.

4. Solve the equation, $\frac{1}{3}x - 5 = \frac{3}{2}x + 2$ for the x -value.

Graphing each is an alternate way of solving equations with variables on both sides.

x	$\frac{1}{3}x - 5$	$\frac{3}{2}x + 2$
-6	-7	-10
-3	-6	-7
0	-5	-4
3	-4	-1

Intersection point



Intersection point: $(-6, -7)$
 (x, y)
 $x = -6$

Finding th

6.

The the

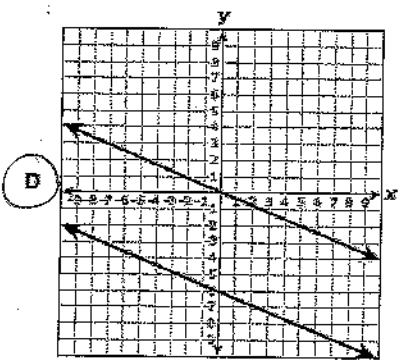
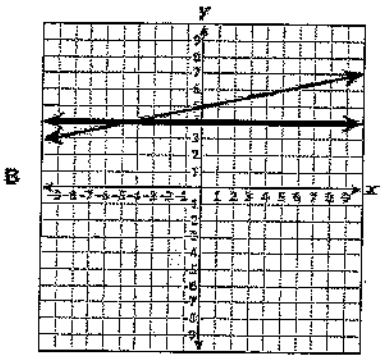
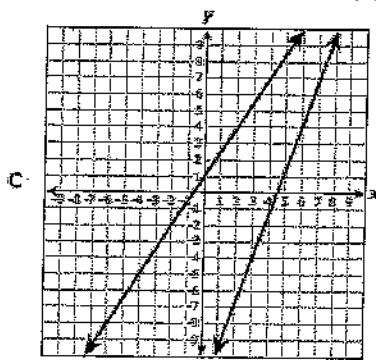
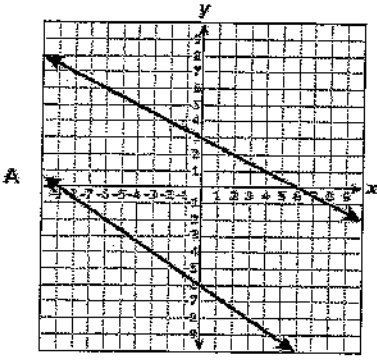
y
 What is
 What is

5.

Which of the following graphs best represents a system of equations that has no solution?

the solution is the intersection.

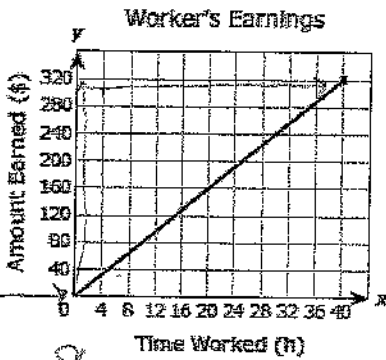
no solution will never intersect.



Finding the slope and y-intercept of a line

6.

The graph below shows the relationship between the number of dollars a worker earns and the number of hours worked.



count for slope

$$\frac{\text{up}}{\text{right}} = \frac{320}{40} = 8$$

y-intercept

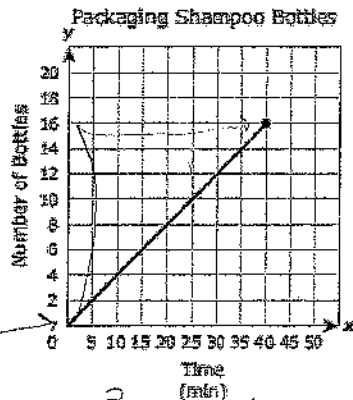
What is the slope of the line? 8

What is the y-intercept of the line? (0, 0)

equation: $y = 8x + 0$

7.

The graph shows the time it took a worker to package 16 bottles of shampoo.



Count for slope

$$\frac{\text{up}}{\text{right}} = \frac{16}{40} = \frac{2}{5} = 0.4$$

y-intercept

What is the slope of the line? $\frac{2}{5} = 0.4$

What is the y-intercept of the line? $(0, 0)$

8.

The table shows the playing time in minutes of high-definition videos and the file size of these videos in megabytes (MB).

Videos	
Playing Time, x (min)	File Size, y (MB)
0.5	60
1.5	180
2	240
4.5	540
5	600

* Can use calc to find the equation. (see Tech Tip on # 12.)

$$y = mx + b$$

\uparrow Slope \uparrow $(0, b)$
 \downarrow \downarrow y-intercept

What is the slope of the line? 120

What is the y-intercept of the line? $(0, 0)$

calc = $y = 120x + 0$

Tables

9.

The first five terms in a pattern are shown below.

find the table that matches

$-0.5, -0.25, 0, 0.25, 0.5, \dots$

If the pattern continues, which expression can be used to find the n th term?

- A $0.75n - 1.25$
- B $-0.25n - 0.25$
- C $0.25n - 0.75$
- D $-0.5n + 0.25$

Tech Tip:

Graph each expression in the answer choices.

Use x instead of n .

Use Ctrl + T to view the table to see if the expression matches the sequence.

10.

The dishwasher used. The total number of times the...

Based on the data, how many times will the dishwasher be used when the...

11.

A weightlifter lifted a weight, including the weight of the...



If the weight of the...

12.

Which table shows the...

x	y
-3	-12
-1	-4
2	8
5	20

x	y
-4	10.4
2	9.8
4	-2.4
8	-6.8

Use the calculator...

10.

The dishwasher at a restaurant is loaded with the same number of dishes every time it is used. The table below shows the total number of dishes washed as a function of the number of times the dishwasher is used.

Restaurant Dishwasher

Number of Times Used	Total Number of Dishes Washed
2	52
4	104
5	156
8	208

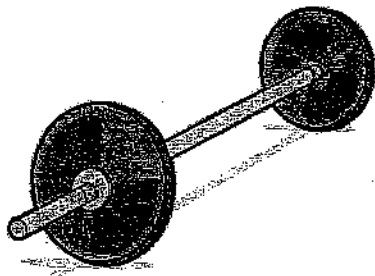
so 1 time would be $\frac{52}{2} = 26$ dishes.
 $208 + 26 = 234$

Based on the data in the table, what is the total number of dishes that will have been washed when the dishwasher is used 9 times?

234 dishes

11.

A weightlifter is adding plates of equal weight to a bar. The table below shows the total weight, including the bar, that he will lift depending on the total number of plates on the bar.



Number of Plates	Total Weight (lb)
2	115
4	185
6	255
8	325

every 2 plates weigh 70 pounds.
 so $115 - 70 = 45$

If the weight of the bar without any plates is represented by the y-intercept, what is the weight of the bar?

So the bar weighs 45 pounds.

12.

Which table shows the same rate of change of y with respect to x as $y = 4 - \frac{5}{8}x$?

slope

$m = -\frac{5}{8} = -0.625$

A

x	y
-5	-12
-1	-4
2	8
5	20

$y = 4x + 0$ (A)

$y = 0.625x + 4$ (C)

x	y
-4	6.5
2	2.75
4	1.5
8	-1

B

x	y
-4	10.4
2	0.8
4	-2.4
8	-8.8

$y = -1.6x + 4$

$y = -4x + 0$ (D)

x	y
-3	12
-1	4
2	-8
5	-20

Tech Tip:

For each of the answer choices, type the table in a Spreadsheet (New Document and then choose Lists and Spreadsheets.)

Insert Page and choose Data and Statistics page.

To find the equation, go to Menu \rightarrow Analyze \rightarrow Regression \rightarrow Show Linear (mx + b)

Use the calc to get the equation of each table.

13.

Problem: Write the equation of the table below.

x	2	4	6	8	10	12
y	10	13	16	19	22	25

Three friends were studying for their math test. They each had different ideas about how to answer the problem. Each student's answer to the problem is shown below.

Katy	Ryan	David
<p>Slope = $\frac{2}{3}$ and y-intercept = (0, 7)</p> <p>$y = \frac{2}{3}x + 7$</p>	<p>Slope = $\frac{3}{2}$ and y-intercept = (0, 7)</p> <p>$y = \frac{3}{2}x + 7$</p>	<p>Slope = $\frac{3}{2}$ and y-intercept = (0, 7)</p> <p>$y = 7x + \frac{3}{2}$</p> <p><i>switched</i></p>

graph each equation and look at the table to see which is correct.

Who is correct? Why?

Ryan is correct.

How would you help the friend(s) that calculated the problem incorrectly?

- Katy: the slope is "upside down"
- David: switched the y-intercept + slope in the equation. In $y = mx + b$, the slope is the # w/ the x.

Write and Solve Equations

For each word problem, write an equation and then solve the equation.

14.

A painter charges \$35 per hour for labor plus \$40 for a ladder rental when he paints a house. The customer provides the paint. The total charge to paint a customer's house was \$950. How many hours did the painter spend painting this house?

F $12\frac{2}{3}h$

G $28h$

H $23h$

J Not here

$$35h + 40 = 950$$

$$\begin{array}{r} 35h + 40 = 950 \\ -40 \quad -40 \\ \hline 35h = 910 \\ \frac{35h}{35} = \frac{910}{35} \\ h = 26 \end{array}$$

$$\frac{35h}{35} = \frac{910}{35}$$

$$h = 26$$

15.

If $y = -\frac{4}{5}x$

F $-\frac{35}{4}$

G $-\frac{55}{4}$

H $\frac{35}{4}$

J $\frac{55}{4}$

16.

A student bought using the function

If the student s

oints of an Equati

remember to use your c

remember: the table, list

Which set of c

$y = 12 - 3x?$

A $((-3, -27)$

B $((-18, 10)$

C $((-5, 27),$

D $((-7, -9),$

15.

If $y = \frac{4}{5}x - 2$, what is the value of x when $y = -9$?

F $\frac{35}{4}$

G $\frac{55}{4}$

H $\frac{35}{4}$

J $\frac{55}{4}$

$$\begin{array}{r} -9 = \frac{4}{5}x - 2 \\ +2 \qquad \qquad +2 \\ \hline -7 = \frac{4}{5}x \\ -\frac{4}{5} \qquad \qquad \frac{4}{5} \\ \hline \frac{35}{4} = x \end{array}$$

← Remember to use the **ctrl + /** to divide by a fraction.

16.

A student bought concert tickets online. The total cost, c , in dollars, of t tickets can be found using the function below.

$$c = 24.50t + 9.50$$

If the student spent a total of \$83 on tickets, how many tickets did he buy?

$$\begin{array}{r} 83 = 24.50t + 9.50 \\ - 9.50 \\ \hline 73.50 = 24.50t \\ \frac{73.50}{24.50} = \frac{24.50t}{24.50} \end{array}$$

$$t = 3$$

3 tickets

Points of an Equation

Remember to use your calculator wisely!

Remember: the table, list of ordered pairs, graph, and mapping are all different views of the same information.

Which set of ordered pairs contains only points that are on the graph of the function $y = 12 - 3x$?

- A $\{(-3, 27), (0, 0), (6, 54)\}$
- B $\{(-18, 10), (-6, 6), (18, -2)\}$
- C $\{(-5, 27), (-1, 15), (8, -12)\}$**
- D $\{(-7, -9), (-4, 0), (2, 18)\}$

Tech Tip:
Graph the equation.
Use Ctrl T to view the table to see which list of points is the answer.

See if the points are listed in the table.

Be careful with negatives!

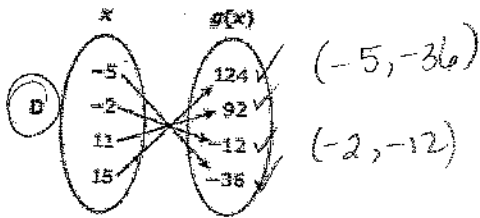
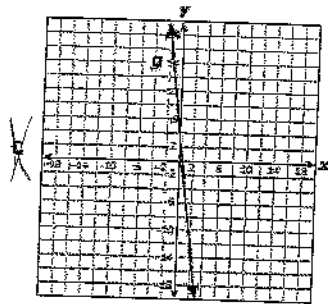
18.

Which representation shows the same relationship as $g(x) = \frac{4}{3}(6x + 3)$?

A

x	g(x)
28	3
12	1
-20	-3
-36	-5

B $g = \{(13, 108), (10, 96), (4, 36), (-3, -28)\}$



Tech Tip:

Graph the equation.

Use Ctrl T to view the table to see which list of points is the answer.

Remember, the table, list of ordered pairs, graph, and mapping are all different views of the same information.

Direct Variation (Proportional Situation)

If y varies directly with x, it means y is proportional to x. Write and solve a proportion.

19.

The mass of a substance varies directly with the volume of the substance. The volume of 100 kilograms of the substance is 80 liters. What is the volume, in liters, of 3.2 kilograms of this substance?

$$\frac{\text{Mass}}{\text{Volume}} = \frac{100 \text{ kg}}{80 \text{ L}} = \frac{10}{8} = \frac{1}{.8} = \frac{3.2 \text{ kg}}{?}$$

2.56 L

Points on a

Count the slope and to the right

20.

The graph priced.

Based on this

A (5, 24)

B (8, 34)

C (6, 24)

D (7, 29)

Write Equations f

An architect 15.85 m tall used to find t

A $h(n) = 15$

B $h(n) = 3.9$

C $h(n) = 3.9$

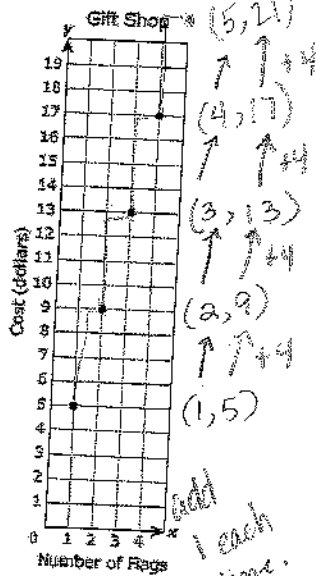
D $h(n) = 19.$

Points on a Graph

Count the slope of the line and continue in the same pattern. In this example, from one point to the next, count up 4 and to the right 1. Continue the pattern for 5, 6, 7, and 8 flags.

20.

The graph shows the cost of purchasing x small flags at a gift shop if the flags are equally priced.



Based on this information, which ordered pair represents an additional point on the graph?

- A ~~(5, 14)~~ (5, 21)
- B (8, 34)
- C ~~(6, 24)~~ (6, 25)
- D (7, 29)

Write Equations from Word Problems AND Write Word Problems that match an Equation

An architect is designing an office building with n floors that will have an FM radio antenna 15.85 m tall on its roof. Each floor of the building will be 3.9 m high. Which function can be used to find the total height of the building in meters, including the FM antenna?

- A ~~$h(n) = 15.85x + 3.9$~~
- B $h(n) = 3.9n + 15.85$
- C ~~$h(n) = 3.9n \times 15.85$~~
- D ~~$h(n) = 19.75n$~~

total height = antenna + each floor.
 $h = 15.85 + 3.9n$

don't add them unless they both have "n"

22.

The cost of staying at a hotel can be found using the function $y = 129x + 9.95$, where x is the number of days a guest stays at the hotel and y is the cost in dollars. The cost includes a flat fee for Internet access. If the fee for Internet access is not included, which statement is true?

flat fee for internet access

- A The cost is \$9.95 less per day.
- B The cost is \$9.95 less. ✓ one-time fee**
- C The cost is \$9.95 more per day.
- D The cost is \$9.95 more.

23.

An online music service lets customers download an unlimited number of songs for \$0.25 each after paying a monthly membership fee of \$5.00. The total amount of money a customer spends on music in dollars in a single month can be found using the function $y = 0.25x + 5$. What does the variable x represent in this function?

- F The total amount of money the customer spends on music each month
- G The number of songs the customer downloads each month**
- H The number of customers that use the music service
- J The cost of downloading one song

↑↑ each costs 25¢
↑ monthly fee

24.

A teacher will determine the total number of books to order for a class using the function $b(n) = 4n$, where n represents the number of students in the class. What is the independent quantity in this situation?

- F The number of students in the class**
- G The total number of books to order
- H The number of books each student needs
- J Not here

of students in class

of books to order depends on # of students

✓ # of books to order depends on # of students
✗ # of students depends on # of books to order

25.

Which situation can be represented by $y = 12x - 4$?

- A The number of eggs, y , in x dozen eggs for sale after 4 dozen eggs are sold $y = 12x - 4(12)$
- B The cost, y , of buying x movie tickets that sell for \$8 each $y = 8x$
- C The cost, y , after a \$4 discount, of buying x T-shirts that sell for \$12 each $y = 12x - 4$ ← discount**
- D The number of inches, y , in an x -foot-tall tree after cutting off 4 feet

$\frac{y}{12} = x - 4$

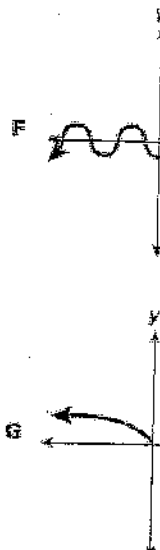
Is it a Function?

Are the x-values unique?

Does the graph pass the v

6.

Which graph d



Which set of order

- A) $(-3, 2), (0, 5)$**
- B) $(-3, 0), (4, 3)$
- C) $(3, 2), (-4, -)$
- D) $(5, 4), (2, 3), (0, 5)$

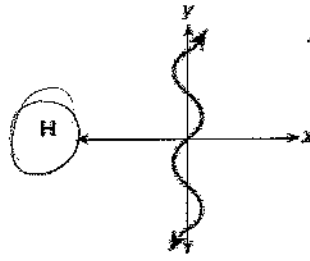
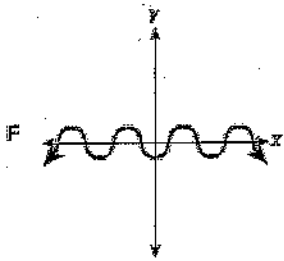
Is it a Function?

Are the x-values unique? If yes, the data represents a function.

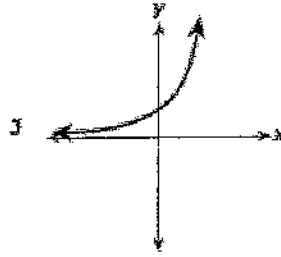
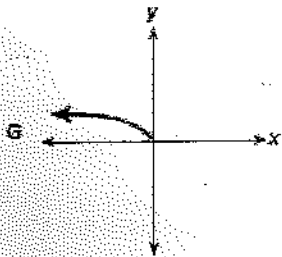
Does the graph pass the vertical line test? If yes, the data represents a function.

6.

Which graph does not represent y as a function of x ?



Does not pass the vertical line test.



Which set of ordered pairs represents y as a function of x ?

A $\{(-9, 2), (0, 5), (1, -2), (-3, 6)\}$

B $\{(-1, 0), (4, 3), (-7, -3), (-3, 6)\}$ x -repeats

C $\{(3, 2), (-4, -2), (5, 1), (-4, 1)\}$ x -repeats

D $\{(5, 4), (2, 3), (1, 1), (2, 4)\}$ x -repeats

ident
order
order