

Algebra: Review for Nine Weeks Exam

Slope-intercept form	$y = mx + b$
Standard Form	$Ax + By = C$
Point-slope form	$y - y_1 = m(x - x_1)$
Slope formula	$m = \frac{y_2 - y_1}{x_2 - x_1}$

1. A customer pays \$140 for an annual membership fee to a neighborhood car wash. Each time the customer takes the car for a wash, the customer only pays \$5 for a wash.

a. This function is expressed as the equation $y = 5x + 140$.

b. What do each of these represent in the problem situation?

X variable: # of washes

Y: variable: total cost

Slope: \$5 per car wash

y-intercept: \$140 initial fee

2. What does the word "zero" mean?

x-intercept

3. The graph below represents the population of Webb County since the year 2000.

a. What is the y-intercept and what does this represent?

(0, 193) population in year 2000
193,000

b. What is the rate of change (slope)?

$$\frac{\Delta y}{\Delta x} = \frac{37}{10} = 5,700 \text{ people per } \cancel{\text{day}} \text{ year}$$

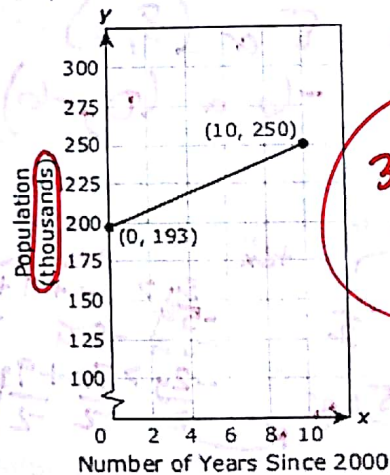
c. What is the equation of this line? (the year 2000 is the beginning value where $x=0$)

$$y = 5,700x + 193,000$$

d. If this trend continues, then what will be the population in the year 2030?

$$y = 5,700(30) + 193,000$$

Population of Webb County, Texas



364,000 people in 2030

4. The number of calories burned is a function of the number of hours you work out.

What are the

a. independent and # of hours

b. dependent variable in this situation?

calories burned

5. A line passes through the point $(-4, 8)$ and has a slope of $(1/4)$. Which of the following is an equivalent equation this situation?

- A. $y + 4 = 1/4 (x - 8)$
- B. $y = 1/4 x + 9$
- C. $x + 4y = 9$
- D. $2x + y = 10$

$$y - 8 = \frac{1}{4} (x + 4)$$

$$y - 8 = \frac{1}{4} x + 1$$

$$y = \frac{1}{4} x + 9$$

Convert to point-slope to y-int.

6. Find the x and y intercepts of $-3x + 4y = -24$

(Hint: Remember you must substitute the number 0 in place of "y" to find the x-intercept.)

x-intercept: 8 or (8, 0)
 y-intercept: -6 or (0, -6)

10. Write an equation of a line that passes through $(4, 3)$ and is perpendicular to the line $y = 4x - 7$.

$$y - 3 = -\frac{1}{4} (x - 4)$$

$$y - 3 = -\frac{1}{4} x + 1$$

$$y = -\frac{1}{4} x + 4$$

11. A line passes through two points $(-2, 7)$ and $(6, 1)$. Using a method of your choice (point-slope form, lists and spreadsheets, etc) find the y-intercept of the line that passes through these two points.

$$m = \frac{\Delta y}{\Delta x} = \frac{1-7}{6+2} = \frac{-6}{8} = -\frac{3}{4}$$

$$y - 1 = -\frac{3}{4} (x - 6)$$

$$y - 1 = -\frac{3}{4} x + \frac{9}{2} \rightarrow y = -\frac{3}{4} x + 4.5 + 1$$

$$y = -\frac{3}{4} x + 5.5$$

12. A line is expressed as $y + 3 = -3(x - 7)$

- a. What is the slope of the line? (Hint: This is written in point-slope form)
-3
- b. What is the point that is given that passes through the line?
(7, -3)

13. Determine which lines, if any, are parallel or perpendicular.

- Line a: $y = 5x - 3$ $m = 5$
- Line b: $x + 5y = 2$ $m = -\frac{1}{5}$
- Line c: $-10y - 2x = 0$ $m = -\frac{1}{5}$

Solve for y

$$\frac{5y}{5} = \frac{-1x + 2}{5}$$

$$y = -\frac{1}{5} x + \frac{2}{5}$$

Solve for y

$$-10y - 2x = 0$$

$$-10y = 2x$$

$$y = -\frac{1}{5} x$$

b and c are parallel
 a is perp to both b + c

Flip

$$y < -1x - \frac{9}{2}$$

or

$$y < -1x - 4.5$$

8. Lines that are parallel must have the same slope. Lines that are perpendicular must have slopes that are negative reciprocals of each other.

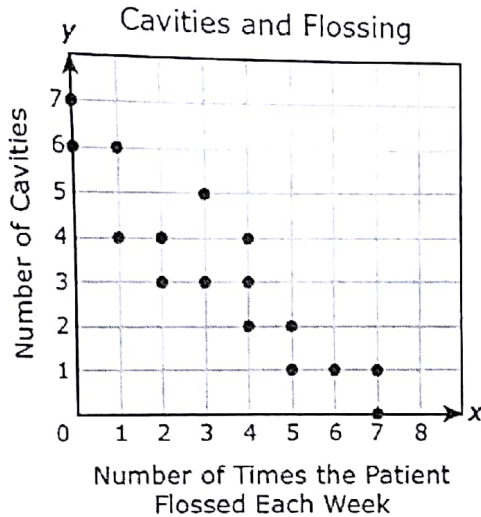
9. Write an equation of the line that passes through $(-3, -5)$ and is parallel to the line $y = 3x - 1$.

$$y + 5 = 3(x + 3)$$

$$y + 5 = 3x + 9$$

$$y = 3x + 4$$

Use the following scatterplot to answer 14 - 16.



14. This is an example of a negative correlation because as the number of times the patient flosses increases the number of cavities decreases.

15. What is the equation of the line of best fit? (There are a total of 16 data points.)

$$y = -0.82x + 6$$

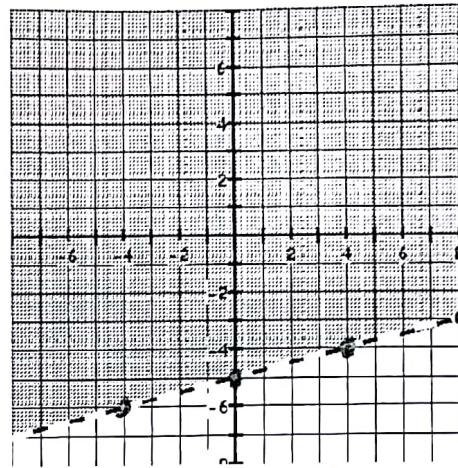
16. What is the value of the correlation coefficient? $r = -0.91$. This means that the data represents a

strong negative correlation. (check your notes)

17. Write an equation of a line that passes through (-2, 11) and is parallel to the line $y = -x + 5$.

$$\begin{aligned} \text{slope} &= -1 \\ y - 11 &= -1(x + 2) \\ y - 11 &= -x - 2 \\ y &= -x + 9 \end{aligned}$$

18. Write the inequality to match the graph below.



$$y > \frac{1}{4}x - 5$$

19. Use the data below to answer the following questions.

X	2	5	9	12	14
y	18	29	42	51	60

a. This is an example of (weak/strong) correlation because the correlation coefficient "r" is equal to .999.

b. The equation to the line of best fit (regression line) is

$$y = 3.4x + 11.4$$