Chapter 5: Writing Linear Equations
Study Guide

5.1: Write equations of lines given slope and *y* – intercept or two points

Write the equation of the line with the given information:

Ex: Slope: 0, *y* – intercept: ½

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

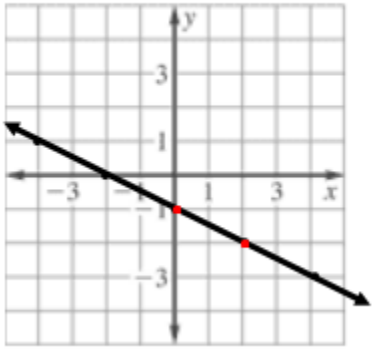
Ex: Passes through (0, 5) and (1, 7)

$y = 2x + 5$

Ex: has the function values $f(1) = -9$, $f(0) = -11$

$y = 2x - 11$

Ex:



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

5.2: Write the equation of lines given slope and one point, or two points

Write the equation of the line with the given information:

Ex: Slope 3, passes through (1, 1)

$y = 3x - 2$

Ex: Slope –5, passes through (–4, 7)

$y = -5x - 13$

Ex: Passes through (1, 4) (2, 7)

$y = 3x + 1$

Ex: Passes through (–2, –2) (1, –1)

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

Ex: (–3, 1) (–3, –1)

$x = -3$

Ex: (1, 5) (–7, 5)

$y = 5$

Ex: Passes through $\left(\frac{9}{2},1\right)\left(-\frac{7}{2},7\right)$

$y = -\frac{3}{4}x + \frac{35}{8}$

Ex: $f(3) = 1$, $f(6) = 4$

$y = x - 2$

Ex: You have a subscription to an online magazine that allows you to view 25 articles from the magazine's archives. You are charged an additional fee for each article after the first 25 articles viewed. After viewing 28 articles, you paid a total of $34.80. After viewing 30 articles, you paid a total of $40.70.

a. What is the cost per archived article after the first 25 articles viewed?

Create ordered pairs (3, 34.80) and (5, 40.70) *remember you only pay for the number of articles **after** the first 25.

The cost per article is $2.95. You get this by finding the slope and simplifying it.

b. What is the cost of the magazine subscription?

Using the slope and one of the ordered pairs and plugging into $y = mx + b$ you are finding b, the y-intercept, which is the cost of the subscription when you are reading 0 extra articles.

b = $25.95

Ex: A delivery service charges a base price for an overnight delivery of a package, plus an extra charge for each pound the package weighs. A customer is billed $22.85 for shipping a 3-lb package and $40 for shipping a 10-lb package.

a. Write an equation that gives the total cost for shipping a package of any weight.

$y = 2.45x + 15.50$

b. Then find the cost of shipping a 15-lb package.

y = $52.25

5.5: Write equations of parallel and perpendicular lines

Ex: Write the equation of the line that is parallel to $-6x + y = -1$ and passes through the point (1, 7)

Since the slope of the first line is 6 (add $6x$) to both sides first, and then plug in (1, 7) for x and y you get:

$y = 6x + 1$

Ex: Write the equation of the line that is perpendicular to $y + 3 = 2x$ and passes through the point (–5, 2)

Since the slope of the given line is 2 then the slope of the answer line would be –½. Plug in (–5, 2) for x and y and the final answer is:

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

Ex: Determine which lines, if any, are parallel or perpendicular:

a. $y = \frac{3}{5}x + 1$ (already in slope-int. form) $m = 3/5$

b. $5y = 3x - 2$ (divide by 5 to get in slope-int) $m = 3/5$

c. $10x - 6y = -4$ (minus $10x$ then divide by -6) $m = 5/3$

Lines *a* and *b* are parallel since they have the same slope.

5.4: Write Equations of Lines in Standard Form

Write two equivalent equations in standard form:

Ex: $3x - 6y = 9$

$x - 2y = 3$

$6x - 12y = 18$

Write equations of lines in standard form using the given information:

Ex: (4, 4) and (8, 2)

$x + 2y = 12$

Ex: (–2, 3) and (–4, –5)

$4x - y = -11$

Ex: Write the equations of the horizontal and vertical lines that pass through the point (7, 2)

$x = 7$ and $y = 2$

Complete equations in standard form:

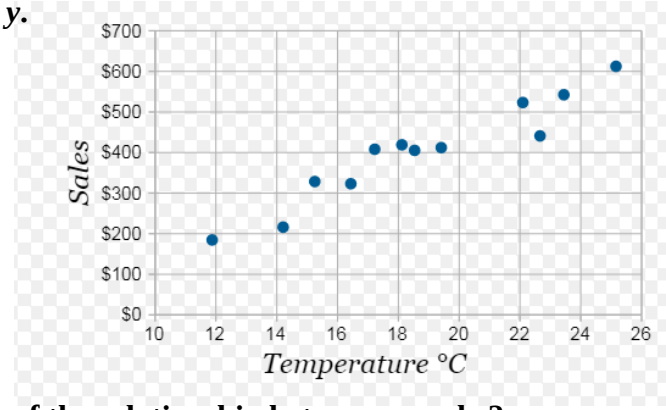
Ex: $5x + By = 6$; (2, 1)

$5x - 4y = 6$

Ex: $Ax + 5y = 7$; (4, 3)

$2x - 5y = -7$

Use the scatter plot below to determine the type of association and decide which line is most representative of the relationship between *x* and *y*.



A. Please choose the best description of the relationship between *x* and *y*.

1. Relatively no correlation
2. Positive correlation
3. Negative correlation

It is a positive correlation

B. Which equation provides the best description of the relationship between *x* and *y*?

1. $y = 35x$
2. $y = -12x + 150$
3. $y = 30x + 150$
4. $y = 25x - 10$

Equation 3 ($y = 30x + 150$) because this slope and *y*-intercept appears to match. The others do not.