Chapter 5: Writing Linear Equations
Study Guide (Reg)

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

$y = ½$

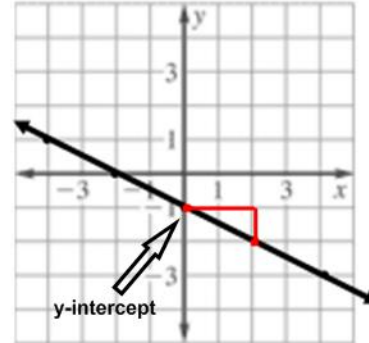**Ex:** Passes through (0, 5) and (1, 7)

$y = 2x + 5$

Ex: (1, –9), (0, –11)

Find the slope: $\dfrac{-11-(-9)}{0-1} = \dfrac{-2}{-1} = 2$

*Recall that the y-intercept happens when $x = 0$
so $b = -11$

$y = 2x - 11$

Ex:

$y = -½\, x - 1$

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)

$y = mx + b$
$1 = 3(1) + b$
$1 = 3 + b$
$-2 = b$

$y = 3x - 2$

Ex: Slope –5, passes through (–4, 7)

$y = mx + b$
$7 = -5(-4) + b$
$7 = 20 + b$
$-13 = b$

$y = -5x - 13$

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

$m = \dfrac{7-4}{2-1} = 3$
$y = mx + b$
$4 = 3(1) + b$
$4 = 3 + b$
$1 = b$

$y = 3x + 1$

Ex: Passes through (–2, –2) (1, –1)

$m = \dfrac{-1--2}{1--2} = \dfrac{1}{3}$
$y = mx + b$
$-1 = \dfrac{1}{3}(1) + b$
$-1 = \dfrac{1}{3} + b$
$-\dfrac{4}{3} = b$

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

Ex: (3, 1) (–3, –1)

$$m = \frac{-1-1}{-3-3} = \frac{-2}{-6} = \frac{1}{3}$$
$$y = mx + b$$
$$1 = \frac{1}{3}(3) + b$$
$$4 = 1 + b$$
$$3 = b$$

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

Ex: (1, 5) (–7, 5)

$$m = \frac{5-5}{-7-1} = \frac{0}{-8} = 0$$
$$y = mx + b$$
$$5 = 0(1) + b$$
$$5 = 0 + b$$
$$5 = b$$

$$y = 0x + 5$$
$$y = 5 \quad \text{*SIMPLIFY*}$$

Ex: Passes through (−1, 1), (−7, 7)

$$m = \frac{7-1}{-7--1} = \frac{6}{-6} = -1$$
$$y = mx + b$$
$$1 = -1(-1) + b$$
$$1 = 1 + b$$
$$0 = b$$

$$y = -1x$$

Ex: (3, 1), (6, 4)

$$m = \frac{4-1}{6-3} = \frac{3}{3} = 1$$
$$y = mx + b$$
$$1 = 1(3) + b$$
$$1 = 3 + b$$
$$-2 = b$$

$$y = 1x - 2$$

Ex: You are taking a Tae Kwon Do class that costs $15 a month. In addition, you needed to purchase a uniform. You paid a total of $108 after 6 months.

a. Find the cost of a uniform. Show or explain your work.

x: # months , y: total cost → (6, 108)
$$y = mx + b$$
$$108 = 15(6) + b$$
$$108 = 90 + b$$
$$18 = b \rightarrow \text{Cost of a uniform}$$

b. Write an equation that gives the total cost (in dollars) as a function of the length of time you have been taking classes (in months).

$$y = 15x + 18$$

c. Find the total cost after 9 months.

$$y = 15(9) + 18$$
$$y = 135 + 18$$
$$y = 153$$

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.

$y = \$52.25$