5.2: Write Linear Equations in Slope – intercept form

Goals: *Write an equation in slope – intercept form given slope and one point
*Write an equation in slope – intercept form given two points
*Write an equation in slope – intercept form given two function values

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Situation 1: Write the equation of a line in slope – intercept form given the slope and one point:

1. Plug in m, x, and y **Ex:** slope: -4, passes through $(-1, 3)$

$$y = mx + b$$

2. Solve for b $3 = -4(-1) + b$
$3 = 4 + b$

3. Plug in m and b $\underline{-4 \quad -4}$

$$-1 = b$$

$$y = -4x - 1$$

Write the equation of the line with the given slope that passes through the given point.

Ex: $(6, 3)$, slope $= 2$ **Ex:** $(6, 3)$ slope: -2

$$y = 2x - 9 \qquad\qquad\qquad\qquad y = -2x + 15$$

Situation 2: write the equation of the line in slope – intercept form that passes through the given points:

1. Find the slope   **Ex:** $(-2, 5)\ (2, -1)$

$$m = -\frac{3}{2}$$

2. Plug in m and one point (x, y) $-1 = -\frac{3}{2}(2) + b$

$$-1 = -3 + b$$

3. Solve for b $\underline{+3 \quad +3}$

$$2 = b$$

4. Plug in m and b $y = -\frac{3}{2}x + 2$

Write the equation of the line in slope – intercept form that passes through the given points:

Ex: $(3, 0)\ (2, -4)$ **Ex:** $(1, -2)\ (5, 4)$

$$y = 4x - 12 \qquad\qquad\qquad\qquad y = \frac{3}{2}x - \frac{7}{2}$$

Ex: $f(4) = 9$ and $f(-4) = -7$ **Ex:** $f(-2) = 10$ and $f(4) = -2$

$y = 2x + 1$ $y = -2x + 6$

Ex: $f(2) = 8$ and $f(4) = -2$

$y = -5x + 18$

Ex: Your gym membership costs \$33 per month after an initial membership fee. You paid a total of \$228 after 6 months. Write an equation for the total cost as a function of the number attended. Then find the total cost for 9 months.

$228 = 33(6) + b$ $y = 33x + 30$

$228 = 198 + b$ $y = 33(9) + 30$

$b = 30$ $y = 327$

Ex: In BMX racing, racers purchase a one-year membership to a track. They also pay an entry fee for each race at that track. One racer paid a total of \$125 for 5 races. A second racer paid a total of \$170 for 8 races. How much does each race cost? How much does the membership fee cost? Write an equation to find the total cost for any number of races.

(5, 125) (8, 170) $m = 15$

$125 = 15(5) + b$ $y = 15x + 50$

$125 = 75 + b$

$50 = b$

Ex: For science class you need to know the Celsius equivalent of a room temperature of 70° Fahrenheit. To estimate, you use the facts that 32° Fahrenheit is equivalent to °0C and that 212°F is equivalent to 100°C. Write an equation to represent degrees Celsius, C, based on degrees Fahrenheit, F.

(32, 0) (212, 100) $m = \dfrac{5}{9}$

$0 = \dfrac{5}{9}(32) + b$

$0 = \dfrac{160}{9} + b$ $C = \dfrac{5}{9}F + \dfrac{160}{9}$

$-\dfrac{160}{9} = b$