

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

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

$$y = 2x - 9$$

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

$$y = -2x + 15$$

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: $(3, 0)$ $(2, -4)$

$$y = 4x - 12$$

Ex: $(1, -2)$ $(5, 4)$

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

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.

x : # races y : Total Cost

y depends on $x \rightarrow$ Total Cost depends on # races

$$(6, 228), 33 = m$$

$$228 = 33(6) + b$$

$$228 = 198 + b$$

$$b = 30$$

$$y = 33x + 30$$

$$y = 33(9) + 30$$

$$y = 327$$

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.

$$(5, 125) (8, 170)$$

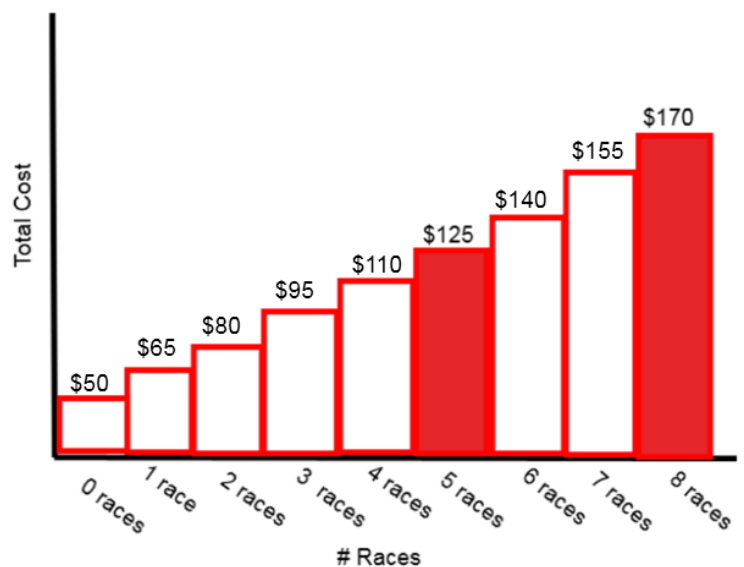
$$m = 15$$

$$125 = 15(5) + b$$

$$y = 15x + 50$$

$$125 = 75 + b$$

$$50 = b$$



Ex: You earn money in the winter by shoveling snow for neighbors. You get paid by the hour and also get an upfront fee from each neighbor. Last storm you worked for 3 hours and earned \$26. Another time you worked for 8 hours and earned \$61. Find the rate per hour and the upfront fee, then write an equation to represent the total amount of money you would make for any number of hours worked.

x : # hours

y : Total amount earned

y depends on $x \rightarrow$ Total amount depends on hours

(3, 26) and (8, 61)

$$\frac{61-26}{8-3} = \frac{35}{5} = 7$$

$$y = mx + b$$

$$26 = 7(3) + b$$

$$26 = 21 + b$$

$$5 = b$$

Rate per hour: \$7 per hour

Upfront Fee: \$5

$$y = 7x + 5$$