

4.2 Use Linear Equations in Slope-Intercept Form

Solve for y!
 $y = mx + b$

Write an equation of the line in **slope-intercept form** that passes through the point $(-1, 3)$ and has a **slope of -4**. m

x_1, y_1

$$y - y_1 = m(x - x_1)$$

$$y - 3 = -4(x - (-1))$$

$$y - 3 = -4x - 4$$

$$\begin{array}{r} y - 3 \\ +3 \\ \hline y = -4x - 1 \end{array}$$

Write an equation of the line in **slope-intercept form** that passes through the point $(6, 3)$ and has a **slope of -2**. m

x_1, y_1

$$y - y_1 = m(x - x_1)$$

$$y - 3 = -2(x - 6)$$

$$y - 3 = -2x + 12$$

$$\begin{array}{r} y - 3 \\ +3 \\ \hline y = -2x + 15 \end{array}$$

Write an equation of the line in **slope-intercept form** that passes through the point $(-3, -11)$ and has a **slope of $\frac{1}{2}$** . m

$$y - y_1 = m(x - x_1)$$

$$y + 11 = \frac{1}{2}(x + 3)$$

$$y + 11 = \frac{1}{2}x + \frac{3}{2}$$

$$\begin{array}{r} -11 \\ \hline y = \frac{1}{2}x - \frac{19}{2} \end{array}$$

Write an equation of the line in **slope-intercept form** that passes through $(\frac{9}{2}, 1)$ and $(-\frac{7}{2}, 7)$.

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{7 - 1}{-\frac{7}{2} - \frac{9}{2}} = \frac{6}{-8} = -\frac{3}{4}$$

$$y - 1 = -\frac{3}{4}\left(x - \frac{9}{2}\right) \quad \text{or} \quad y - 7 = -\frac{3}{4}\left(x + \frac{7}{2}\right)$$

$$y - 1 = -\frac{3}{4}x + \frac{27}{8}$$

$$\begin{array}{r} +1 \\ \hline y = -\frac{3}{4}x + \frac{35}{8} \end{array}$$

$$y - 7 = -\frac{3}{4}x - \frac{21}{8}$$

$$\begin{array}{r} +7 \\ \hline y = -\frac{3}{4}x + \frac{35}{8} \end{array}$$

Your gym membership charges $\$35$ per month after an initial membership fee. Roger has paid a total of $\$250$ after 6 months.

$$\begin{array}{cc} \text{slope} & \\ \boxed{\$35} & \\ \text{months} & \text{\$} \\ (6, 250) & \end{array}$$

- a) Write an equation that gives the total cost of a gym membership as a function of the length of membership.

$$\begin{aligned} y - y_1 &= m(x - x_1) \\ y - 250 &= 35(x - 6) \\ y - 250 &= 35x - 210 \\ +250 & \qquad \qquad +250 \end{aligned}$$

$$y = 35x + 40$$

- b) Find the total cost of membership after $\underline{10}$ months.

$$\begin{aligned} y &= 35(10) + 40 \\ \boxed{y} &= \boxed{\$390} \end{aligned}$$

dep. var. \rightarrow $\$$ depends on # of races \leftarrow ind. var. (x)
 A BMX race track charges a membership fee and an entry fee per race. Deandre paid a total of $\$76$ after 3 races. Chris paid a total of $\$124$ after 7 races.

$$\begin{array}{cc} (3, 76) & (7, 124) \\ x_1 & x_2 \\ y_1 & y_2 \end{array}$$

a) How much does the track membership cost?

$$\begin{aligned} m &= \frac{y_2 - y_1}{x_2 - x_1} \\ m &= \frac{124 - 76}{7 - 3} \\ m &= \frac{48}{4} = 12 \end{aligned}$$

$$\begin{aligned} y - y_1 &= m(x - x_1) \\ y - 76 &= 12(x - 3) \\ y - 76 &= 12x - 36 \\ +76 & \qquad \qquad +76 \\ \boxed{y} &= \boxed{12x + 40} \end{aligned}$$

$\$40$

- b) What is the entry fee per race?

$$\$12/\text{race}$$

- c) Write an equation that gives the total cost as a function of the number of races entered.

$$y = 12x + 40$$