

More Writing Equations of Parallel and Perpendicular Lines

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

1. Write the equation (in Standard Form) for the line containing (2, 3) and (4, 1)

$$m = \frac{1-3}{4-2} = \frac{-2}{2} = -1$$

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

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

$$\boxed{x + y = 5}$$

2. Write the equation (in Standard Form) for the line containing (-3, 5) and having x-intercept 2.

(2, 0)

$$m = \frac{0-5}{2+3} = \frac{-5}{5} = -1$$

$$y - 5 = -(x + 3)$$

$$y - 5 = -x - 3$$

$$\boxed{x + y = 2}$$

3. Write the equation (in Standard Form) for the line with x-intercept -6 and y-intercept 5.

(-6, 0) (0, 5)

$$m = \frac{5-0}{0+6} = \frac{5}{6}$$

$$y - 0 = \frac{5}{6}(x + 6)$$

$$y = \frac{5}{6}x + 5$$

$$6y - 5x + 30 \Rightarrow \boxed{5x - 6y = -30}$$

4. Write the equation (in Standard Form) for the vertical line passing through (7, -3)

$$x = 7$$

5. Write the equation (in Standard Form) for the line parallel to $2x - 4y = 3$ and passing through $(-1, 5)$

$$\begin{aligned} -4y &= -2x + 3 \\ y &= \frac{1}{2}x - \frac{3}{4} \end{aligned}$$

$$y - 5 = \frac{1}{2}(x + 1)$$

$$y - 5 = \frac{1}{2}x + \frac{1}{2}$$

$$2y - 10 = x + 1 \Rightarrow \boxed{x - 2y = -11}$$

6. Write the equation (in Standard Form) for the line perpendicular to $3x - 5y = 1$ and with the same y-intercept as $y = 3x + 4$

$$(0, 4)$$

$$\begin{aligned} -5y &= -3x + 1 \\ y &= \frac{3}{5}x - \frac{1}{5} \end{aligned}$$

$$y - 4 = -\frac{5}{3}(x - 0)$$

$$y - 4 = -\frac{5}{3}x$$

$$3y - 12 = -5x$$

$$\boxed{5x + 3y = 12}$$

7. Write the equation (in Standard Form) for the perpendicular bisector of the segment whose endpoints are $(1, 6)$ and $(2, -3)$

slope $\leftarrow$ $\rightarrow$ midpoint

$$\textcircled{1} \text{ mdpt: } \left(\frac{1+2}{2}, \frac{6-3}{2} \right) = \left(\frac{3}{2}, \frac{3}{2} \right)$$

$$\textcircled{2} \text{ slope: } \frac{6+3}{1-2} = \frac{9}{-1} = -9$$

$$\textcircled{3} \perp \text{ slope: } \frac{1}{9}$$

$$\textcircled{4} y - \frac{3}{2} = \frac{1}{9}\left(x - \frac{3}{2}\right)$$

$$18\left(y - \frac{3}{2}\right) = \left(\frac{1}{9}x - \frac{1}{6}\right)18$$

$$18y - 27 = 2x - 3$$

$$\boxed{x - 9y = -12}$$

or

$$\boxed{2x - 18y = -24}$$

