

## 6.5 Slope-Point Form of the Equation for a Linear Function – Part 2

**Example 1:** Write the equation of the line that passes through the point  $(1, -1)$  and is:

a) Parallel to  $y = \frac{2}{3}x - 5$  (write answer in slope - intercept form)

↳ same slope

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

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

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

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

-1                      -1

↳ we don't know the y-intercept so we'll start with point-slope form.

point  $(1, -1)$   
 $x_1$        $y_1$

$$y = \frac{2}{3}x - \frac{2}{3} - \frac{1 \times 3}{1 \times 3}$$

$$y = \frac{2}{3}x - \frac{5}{3}$$

b) Perpendicular to  $y = \frac{2}{3}x - 5$  (write answer in slope - intercept form)

↳ slope is negative reciprocal

$$m = \frac{2}{3} \rightarrow m_{\perp} = -\frac{3}{2}$$

use  $(1, -1)$  like in part (a)

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

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

-1                      -1

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

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

**Example 2:** Find the equation of the line which has an x-intercept of 3, and is: point  $(3, 0)$   
 $x_1$       $y_1$

a) Parallel to  $y = 3x + 5$  (write answer in slope - intercept form)

↳ same slope

$$m = 3$$

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

$$y - 0 = 3(x - 3)$$

$$y = 3x - 9$$

b) Perpendicular to  $y = 3x + 5$  (write answer in slope - intercept form)

↳ slope must be negative reciprocal

$$m = \frac{3}{1} \rightarrow m_{\perp} = -\frac{1}{3}$$

use  $(3, 0)$  from part (a)

$$y - 0 = -\frac{1}{3}(x - 3)$$

$$y = -\frac{1}{3}x - 3\left(-\frac{1}{3}\right)$$

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