

# WRITING PERPENDICULAR LINE EQUATIONS

Perpendicular Lines have opposite reciprocal slope. The easiest formula to use is Point-slope  
 $y - y_1 = m(x - x_1)$  because it gives the slope  $m$  and a point on the line.

Directions: For #9-16, write and describe the perpendicular ( $\perp$ ) slope. Then write the perpendicular linear equation that passes through the given point.

- 9)  $y = -3x + 2$  and the perpendicular line equation passes through  $(15, 7)$ .

$$m = -3$$

$$m_{\perp} = +\frac{1}{3}$$

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

$$y - 7 = \frac{1}{3}(x - 15)$$

$$y - 7 = \frac{1}{3}x - 5 \quad \boxed{y = \frac{1}{3}x + 2}$$

- 11)  $y = 4x - 6$  and the perpendicular line equation passes through  $(18, -31)$ .

$$m = 4$$

$$m_{\perp} = -\frac{1}{4}$$

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

$$y + 31 = -\frac{1}{4}(x - 18)$$

$$y + 31 = -\frac{1}{4}x + 4.5 \quad \boxed{y = -\frac{1}{4}x - 26.5}$$

- 13)  $y = -\frac{3}{4}x + 5$  and the perpendicular line equation passes through  $(-21, -44)$ .

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

$$m_{\perp} = \frac{4}{3}$$

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

$$y + 44 = \frac{4}{3}(x + 21)$$

$$y + 44 = \frac{4}{3}x + 28 \quad \boxed{y = \frac{4}{3}x - 16}$$

- 15)  $y = \frac{1}{7}x - 9$  and the perpendicular line equation passes through  $(-6, 81)$ .

$$m = \frac{1}{7}$$

$$m_{\perp} = -7$$

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

$$y - 81 = -7(x + 6)$$

$$y - 81 = -7x - 42$$

$$\boxed{y = -7x + 39}$$

- 10)  $y = \frac{1}{4}x - 3$  and the perpendicular line equation passes through  $(6, -35)$ .

$$m = \frac{1}{4}$$

$$m_{\perp} = -4$$

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

$$y + 35 = -4(x - 6)$$

$$y + 35 = -4x + 24$$

$$\boxed{y = -4x - 11}$$

- 12)  $y = \frac{2}{5}x + 4$  and the perpendicular line equation passes through  $(10, -37)$ .

$$m = \frac{2}{5}$$

$$m_{\perp} = -\frac{5}{2}$$

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

$$y + 37 = -\frac{5}{2}(x - 10)$$

$$y + 37 = -\frac{5}{2}x + 25$$

$$\boxed{y = -\frac{5}{2}x - 12}$$

- 14)  $y = \frac{4}{7}x - 7$  and the perpendicular line equation passes through  $(-24, 53)$ .

$$m = \frac{4}{7}$$

$$m_{\perp} = -\frac{7}{4}$$

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

$$y - 53 = -\frac{7}{4}(x + 24)$$

$$y - 53 = -\frac{7}{4}x - 42$$

$$\boxed{y = -\frac{7}{4}x + 11}$$

- 16)  $y = 3x + 8$  and the perpendicular line equation passes through  $(-18, 1)$ .

$$m = 3$$

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

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

$$y - 1 = -\frac{1}{3}(x + 18)$$

$$y - 1 = -\frac{1}{3}x - 6$$

$$\boxed{y = -\frac{1}{3}x - 5}$$