

2.6 Parallel and Perpendicular Lines

Perpendicular Lines:

intersect at one point

opposite signs
flipped fraction (reciprocal)

$$A. \quad \frac{3}{1} \rightarrow -\frac{1}{3}$$

$$B. \quad -\frac{1}{2} \rightarrow +\frac{2}{1} = \boxed{2}$$

$$C. \frac{2}{3} \rightarrow -\frac{3}{2}$$

$$D. -\frac{4}{5} \rightarrow \frac{5}{4}$$

Writing perpendicular equations

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

$$(2, 4)$$

① Find the slope

① $\frac{1}{3} \rightarrow -\frac{3}{1}$

$$m = -3$$

② plug into the point-slope form

② $m = -3$ $(\underset{x}{2}, \underset{y}{4})$

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

$$y - 4 = -3(x - 2)$$

③ Write in slope-intercept form

③ $y - 4 = -3(x - 2)$

$$y - 4 = -3x + 6$$

$$y = -3x + 10$$

$$y = 2x + 1 \quad (1, 8)$$

$$\textcircled{1} \quad \frac{2}{1} \rightarrow -\frac{1}{2} \quad \textcircled{2} \quad y - 8 = -\frac{1}{2}(x - 1)$$

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

$$\textcircled{3} \quad y - 8 = -\frac{1}{2}(x - 1)$$

$$y - 8 = -0.5(x - 1)$$

$$y - 8 = -0.5x + 0.5$$

$$y = -0.5x + 8.5$$

$$y = -\frac{1}{2}x + 8\frac{1}{2}$$

$$1x + 4y = 12$$

Standard
Form

$$-1x$$

$$-1x$$

$$\frac{4y}{4} = \frac{-1x}{4} + \frac{12}{4}$$

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

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

$$\text{perp: } m = 4$$

$$(1, -6); \boxed{x - 2y = 4} \text{ — re-write}$$

$$\begin{array}{r} x - 2y = 4 \\ -x \qquad -x \\ \hline -2y = -x + 4 \\ \frac{-2y}{-2} = \frac{-x}{-2} + \frac{4}{-2} \end{array}$$

$$\boxed{y = \frac{1}{2}x - 2}$$

$$m = \frac{1}{2} \rightarrow m = -\frac{2}{1}$$

$$\boxed{m = -2}$$

$$(1, -6) \quad y = mx + b$$

$$(-6) = (-2)(1) + b$$

$$-6 = -2 + b$$

$$+2 \quad +2$$

$$\boxed{-4 = b}$$

$$\boxed{y = -2x - 4}$$