

Parallel and Perpendicular Lines

Parallel Lines $\Rightarrow$ Slopes are Equal

Ex. $y = -3x + 8$

$$y = -3x - 7$$

Slope is equal, lines are parallel.

Perpendicular Lines $\Rightarrow$ Slopes are Opposite Reciprocals

Ex. $y = \frac{2}{3}x + 9$

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

Since $\frac{2}{3} \cdot (-\frac{3}{2}) = -1$, lines are perpendicular

- ① A line passes through $(-3, -1)$ and is parallel to $y = 2x + 3$.
What equation represents the line in slope-intercept form?

$$y = mx + b$$

$$y = 2x + b$$

$$-1 = 2(-3) + b$$

$$-1 = -6 + b$$

$$\begin{array}{r} +6 \quad +6 \\ -1 = -6 + b \\ \hline 5 = b \end{array}$$

$$y = 2x + 5$$

- ② A line passes through $(5, -2)$ and is perpendicular to $y = 5x + 4$.
Write an equation (Slope-Intercept).

$$y = mx + b$$

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

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

$$-2 = -1 + b$$

$$\begin{array}{r} +1 \quad +1 \\ -2 = -1 + b \\ \hline -1 = b \end{array}$$

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