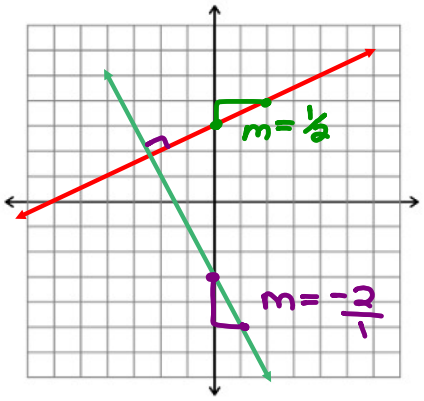
Perpendicular Lines

Perpendicular Lines are 2 lines where the slopes are **negative reciprocals** of each other.



m	$m_{\perp}$
2	$-\frac{1}{2}$
$\frac{1}{3}$	-3
-4	$\frac{1}{4}$
$-\frac{3}{4}$	$\frac{4}{3}$
0	$\frac{1}{0}$ ← Ø

ex) Write an equation of a line $\perp$ to $y = -3x + 4$.

$m_{\perp} = \frac{1}{3}$ $\quad y = \frac{1}{3}x + 2$

ex) Write the equation of a line $\perp$ to $y = 2x + 5$ and contains $(-6, 7)$ in slope-intercept form.

x_1, y_1 $\quad m_{\perp} = -\frac{1}{2}$

$$y - 7 = -\frac{1}{2}(x + 6)$$

$$y - 7 = -\frac{1}{2}x - 3$$

$$\boxed{y = -\frac{1}{2}x + 4}$$

ex) Write the equation of a line $\perp$ to $-4x + 3y = 1$ and contains the point $(8, 1)$ in slope-intercept form.

x_1, y_1

1) Rearrange into $y = mx + b$ form

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

2) Find $\perp$ slope

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

3) Plug into $y - y_1 = m(x - x_1)$

$$y - 1 = -\frac{3}{4}(x - 8)$$

4) Rearrange

$$y - 1 = -\frac{3}{4}x + 6$$

$$\boxed{y = -\frac{3}{4}x + 7}$$