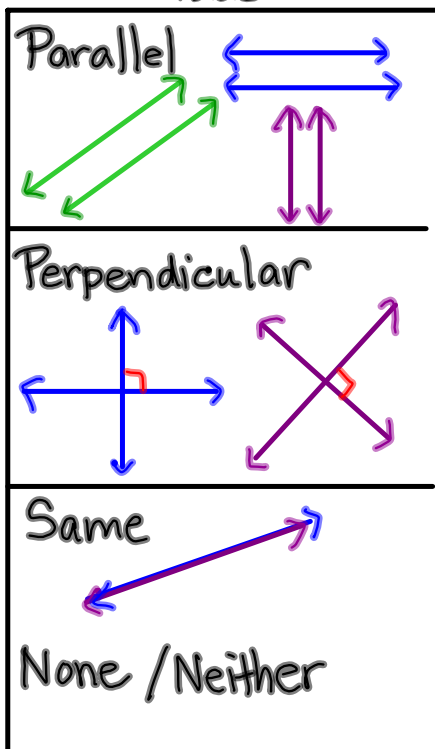


Sec. 5-6 Parallel and Perpendicular Lines

Outside



Inside

never intersect $y = 3x - 1$
SAME slope $y = 3x + 6$
 different intercepts $3x - y = 1$
 $3x - y = -6$

intersect at a RIGHT angle
 slopes: opposite reciprocals
 (flip fraction, change sign)

intersect at every point
 infinitely many times
SAME slope SAME intercepts
 intersect, but not at 90°
 slope not $\begin{cases} \text{same} \\ \text{opposite reciprocal} \end{cases}$

Problem 1

Write an equation in slope-intercept form of the line that passes through $(2, 15)$ - PT and is parallel to the graph of

$$y = 4x - 1$$

$m = 4$

$$(x_1, y_1), m = 4$$

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

$$y - 15 = 4(x - 2)$$

$$y - 15 = 4x - 8$$

$$\begin{array}{r} 0 + 15 \\ \hline y = 4x + 7 \end{array}$$

b. $(-3, -1)$ parallel to $y = 2x + 3$
 $m = 2$ $m = 2$

$$y + 1 = 2(x + 3)$$

$$y + 1 = 2x + 6$$

$$\begin{array}{r} -1 \\ \hline y = 2x + 5 \end{array}$$

Problem 2:

Are the graphs of ① $2y = -3x + 6$ and
 ② $y = \frac{2}{3}x + 2$ ~~parallel~~, perpendicular,
 or neither? opp reciprocal

$$\textcircled{1} \frac{2y}{2} = \frac{-3x + 6}{2}$$

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

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

$$\textcircled{2} y = \frac{2}{3}x + 2$$

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

perpendicular

b. $y = \frac{3}{4}x + 7$

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

neither

$$4x - 3y = 9$$

$$\begin{array}{r} -4x \\ \hline \end{array}$$

$$\begin{array}{r} -3y = -4x + 9 \\ \hline -3 \quad -3 \quad -3 \end{array}$$

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

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

Problem 3:

A graph passing through $(10, 15)$ and perpendicular to $y = -\frac{5}{6}x - 2$ $m = -\frac{5}{6}$ has what equation in slope-intercept form?

$$(x_1, y_1) \quad m = \frac{6}{5}$$

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

$$5(y - 15) = 5 \cdot \frac{6}{5}(x - 10)$$

$$\frac{6}{5} \cdot \frac{-10^2}{1}$$

$$y - 15 = \frac{6}{5}x - 12$$

$$\begin{array}{r} +15 \qquad \qquad \qquad +15 \\ \hline y = \frac{6}{5}x + 3 \end{array}$$

$$\begin{array}{r} 5y - 75 = 6(x - 10) \\ 5y - 75 = 6x - 60 \\ \hline +75 \qquad \qquad +75 \end{array}$$

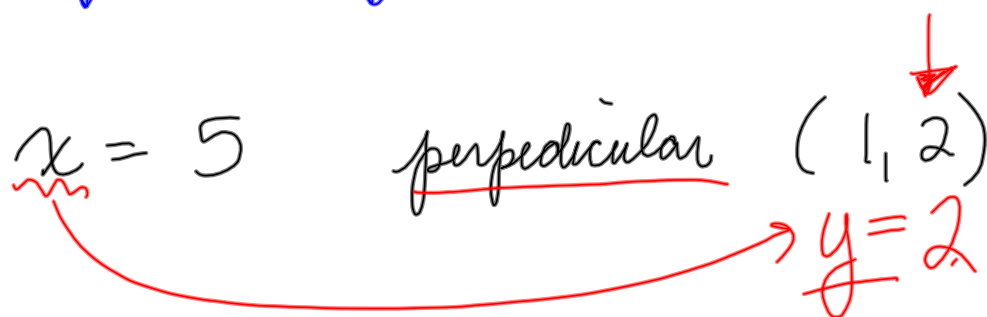
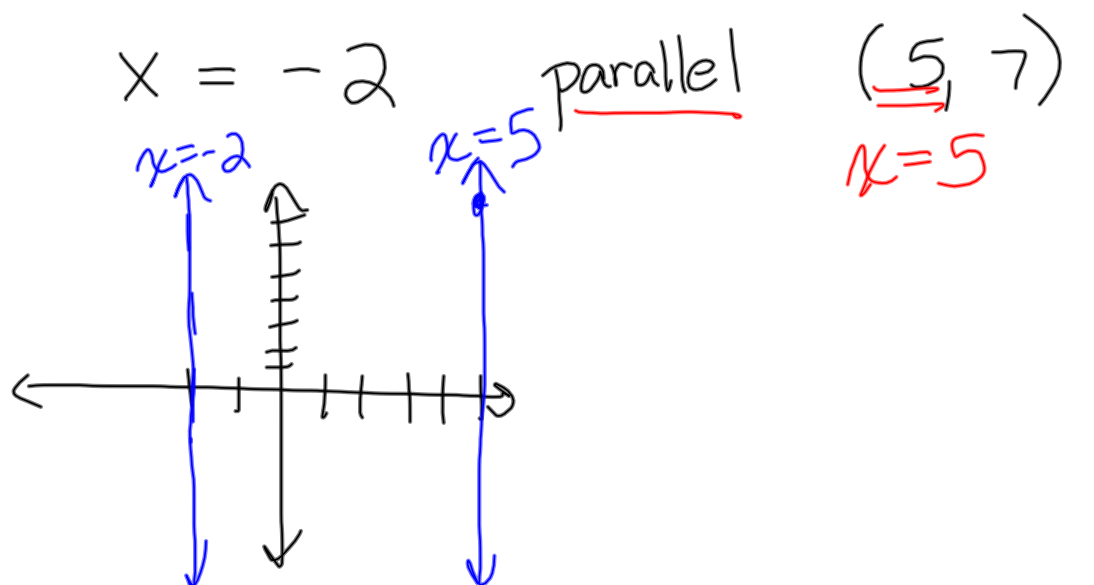
$$\frac{5y}{5} = \frac{6x}{5} + \frac{15}{5}$$

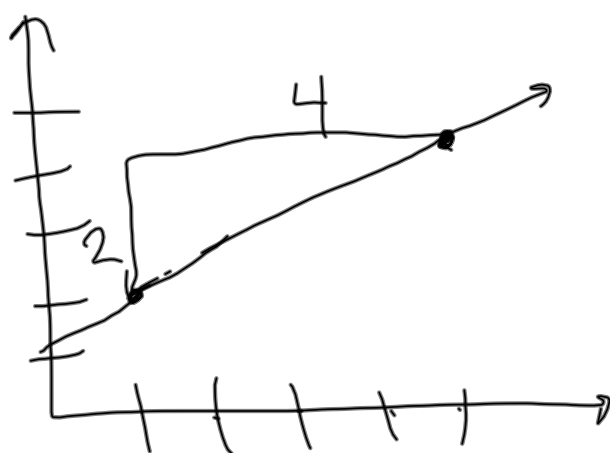
$$y = \frac{6}{5}x + 3$$

$$m = -\frac{3}{8}$$

$$m_{\perp} = \frac{8}{3}$$

$$m = 6 = \frac{6}{1} \quad m_{\perp} = -\frac{1}{6}$$





$(2, 3)$
perp.
 $m = -2$ $m = \frac{2}{4}$
 $m = \frac{1}{2}$