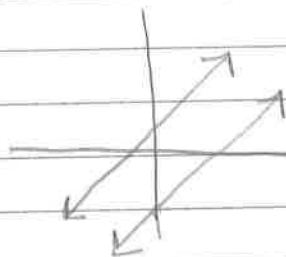


4.4

Parallel Lines ... What do we know?

- same slope
- different y-int



Which lines are parallel?

$y = 3x - 2$ ————— $y = 3x + 5$

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

$y = 2x + 4$

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

* only works when "y" is by itself.

Write 3 equations that are parallel to...

$$\begin{array}{r} 2y - 6 = -4x \\ +6 \quad +6 \end{array}$$

1. get "y" alone

2. note "m"

$$\frac{2y}{2} = \frac{-4x + 6}{2}$$

$$y = -2x + 3 \quad m = -2$$

① $y = -2x + 4$

② $y = -2x + 8$

③ $y = -2x$

Are these equations parallel?

①

$y = 3x + 2$

$m = 3$

$$\frac{2y}{2} = \frac{6x - 6}{2}$$

$y = 3x - 3$

$m = 3$

} yes

$$\begin{array}{l} \textcircled{2} \quad y - 5 = 6x \\ \quad \quad +5 \quad +5 \\ y = 6x + 5 \\ \quad \quad \quad m=6 \end{array} \quad \begin{array}{l} y - 6x = -1 \\ \quad \quad +6x \quad +6x \\ y = 6x - 1 \\ \quad \quad \quad m=6 \end{array}$$

yes

$$\begin{array}{l} \textcircled{3} \quad 8x - 2y = 3 \\ \quad \quad -8x \quad \quad -8x \\ \quad \quad \quad -2y = -8x + 3 \\ \quad \quad \quad \frac{-2y}{-2} = \frac{-8x + 3}{-2} \\ y = 4x - \frac{3}{2} \\ \quad \quad \quad m=4 \end{array} \quad \begin{array}{l} x + 4y = -1 \\ \quad \quad -x \quad \quad -x \\ \quad \quad \quad 4y = -x - 1 \\ \quad \quad \quad \frac{4y}{4} = \frac{-x - 1}{4} \\ y = -\frac{1}{4}x - \frac{1}{4} \\ \quad \quad \quad m = -\frac{1}{4} \end{array}$$

no

Write an equation in slope-intercept form for a line that passes through the point and is parallel to the equation

① $(3, 10)$ $y = 2x - 8 \rightarrow$ note slope $m=2$ \rightarrow done w/equation

$$\begin{array}{l} y = mx + b \\ x = 3 \quad y = 10 \quad m = 2 \\ 10 = 2(3) + b \\ 10 = 6 + b \\ -6 \quad -6 \\ 4 = b \end{array}$$

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

$$\begin{array}{l} \textcircled{2} \quad (-1, -2) \\ x = -1 \\ y = -2 \\ m = 3 \end{array} \quad \begin{array}{l} 3x - y = 5 \\ \quad \quad -3x \quad \quad -3x \\ \quad \quad \quad -y = -3x + 5 \\ \quad \quad \quad \frac{-y}{-1} = \frac{-3x + 5}{-1} \\ y = 3x + 5 \\ \quad \quad \quad m=3 \end{array}$$

$$\begin{array}{l} y = mx + b \\ -2 = 3(-1) + b \\ -2 = -3 + b \\ +3 \quad +3 \\ 1 = b \end{array} \rightarrow \boxed{y = 3x + 1}$$

4-4 Parallel and Perpendicular Lines

⊥

I can determine if lines are perpendicular and write equations for perpendicular lines.
which lines are perpendicular?

$$y = 3x - 2$$

$$y = -3x + 5$$

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

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

$$y = 2x + 4$$

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

* the slopes always have to be different signs (1 positive * 1 negative)

What is the ⊥ slope for the following equations...

$$y = 12x - 3$$

$$m = 12 \quad \perp m = -\frac{1}{12}$$

$$y = -7x + 4$$

$$m = -7 \quad \perp m = \frac{1}{7}$$

$$2y - 6 = -4x$$

$$+6 \quad +6$$

$$\frac{2y}{2} = \frac{-4x + 6}{2}$$

$$y = -2x + 3$$

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

Are these equations perpendicular?

$$8x - 2y = 6$$

$$\begin{array}{r} -8x \\ -2y = -8x + 6 \\ \hline -2 \quad -2 \quad -2 \\ y = 4x - 3 \end{array}$$

$$y = 4x - 3$$

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

$$x + 4y = -12$$

$$\begin{array}{r} -x \\ 4y = -x - 12 \\ \hline 4 \quad 4 \quad 4 \end{array}$$

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

(y's)

Write an equation in slope-int form for a line that passes through the point and is \perp to the equation given.

$$(4, -1)$$

$$y = -3x + 3$$

$$m = -3 \quad \perp m = \frac{1}{3}$$

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

$$-1 = \frac{1}{3}(4) + b$$

$$-1 = \frac{4}{3} + b$$

$$\begin{array}{r} -\frac{4}{3} \quad -\frac{4}{3} \\ -\frac{7}{3} = b \end{array}$$

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

$$\begin{array}{r} -1 - \frac{4}{3} \\ -\frac{3}{3} - \frac{4}{3} \end{array}$$

$$(-4, -2)$$

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

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

$$x = -4 \quad y = -2 \quad m = 4$$

$$-2 = 4(-4) + b$$

$$-2 = -16 + b$$

$$+16 \quad +16$$

$$14 = b$$

$$\boxed{y = 4x + 14}$$

HW: