

## 2.3. Advanced Algebra || & ⊥ lines

DATE: 9/9

What is so special about the slopes of parallel lines?

The slopes of parallel lines are the same (equal).

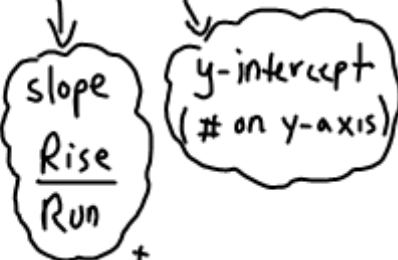
### Example 1

Graph the line through  $(-1, 3)$  that is parallel to the line with the equation  $x + 4y = -4$ .

### Quick Review:

Slope intercept form:

$$y = mX + b$$



Rise is ↑ or ↓  
Run is → or ←

$x + 4y = -4$ . Get in slope intercept form, so solve for y.

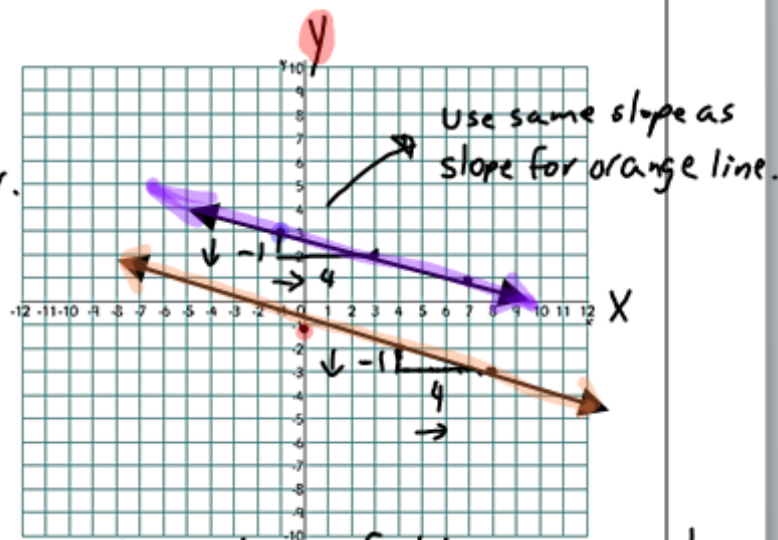
$$\begin{array}{r} x + 4y = -4 \\ -x \qquad -x \\ \hline 4y = -x - 4 \\ \frac{4y}{4} = \frac{-x}{4} - \frac{4}{4} \end{array}$$

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

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

$$m = -\frac{1}{4} \quad y\text{-int} = -1$$

Rise ↓  
Run →



Since slopes of || lines are equal,  
↔ is parallel to ↔

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What is so special about the slopes of perpendicular lines?

The slopes of perpendicular lines are opposite reciprocals. The product of slopes of perpendicular lines is  $-1$ , always. [opposite means minus (-) sign. Reciprocal means flip]

Example 2

Graph the line through  $(-3, 1)$  that is perpendicular to the line with the equation  $2x - 5y = 10$ .

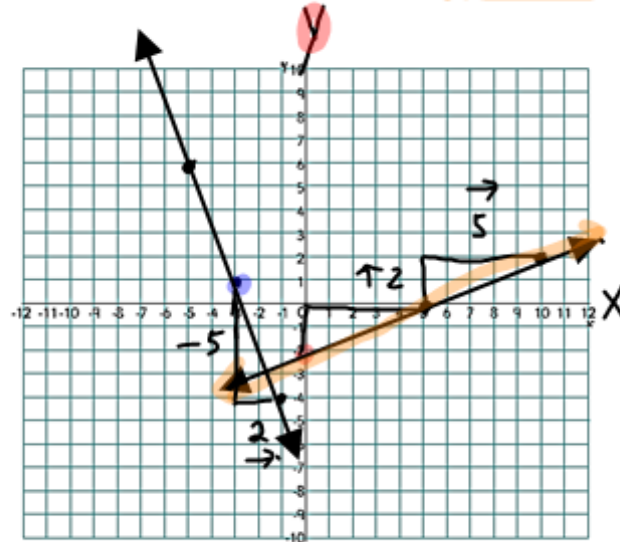
$$\frac{2x - 5y = 10}{-2x \quad -2x} \quad \text{Solve for } y.$$

$$\frac{-5y = -2x + 10}{-5 \quad -5 \quad -5}$$

$$y = \frac{2}{5}x - 2$$

$$m = \frac{2}{5}; \quad y\text{-int} = -2$$

Rise  $\uparrow$   
Run  $\rightarrow$



Since slopes of perpendicular lines are opposite reciprocals, what is opp. recip. of  $\frac{2}{5}$ ? Ans:  $-\frac{5}{2}$  Now use slope  $-\frac{5}{2}$  to graph  $\perp$  line from  $(-3, 1)$ .