

SECTION 1-3

SLOPE

There are three ways to determine slope.

- I. $y = mx + b$, where m stands for slope.
Examples: Determine the slope for each equation.

1) $y = -\frac{3}{5}x + 9$

$$m = -\frac{3}{5}$$

2) $2x - 3y = 18$

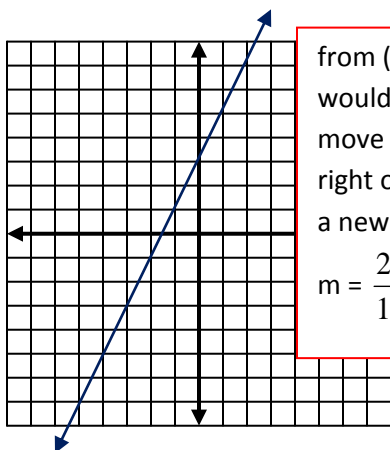
$$\begin{aligned} -3y &= -2x + 18 \\ y &= \frac{2}{3}x - 6 \quad m = \frac{2}{3} \end{aligned}$$

3) $2y + 1 = 9$

$$\begin{aligned} 2y &= 8 \\ y &= 4 \\ \text{horizontal line} &= \text{zero slope} \end{aligned}$$

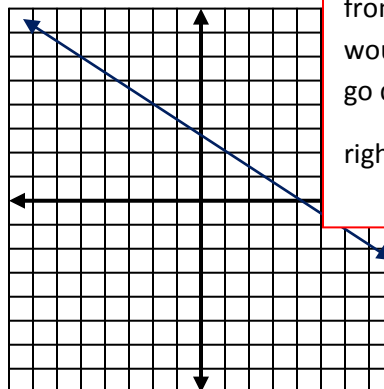
- II. From the graph. Count the rise over the run and you've got a fraction that represents the slope.
Examples: Determine the slope for each line shown.

4)



from (0,3) you would need to move up 2 and right one to get to a new grid mark
 $m = \frac{2}{1}$ or just 2

5)



from (-2,4) you would need to go down 2 and right 3, $m = -\frac{2}{3}$

- III. Given two (or more) sets of coordinates. Do you remember the formula?

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

Examples:

- 5) passes thru (-1, 6) and (5, 8)

$$\begin{aligned} \frac{8 - 6}{5 - (-1)} \\ = \frac{2}{6} = \frac{1}{3} \end{aligned}$$

- 6) passes thru (-9, 2) and (-5, -22)

$$\begin{aligned} \frac{-22 - 2}{-5 - (-9)} \\ = \frac{-24}{4} = -6 \end{aligned}$$

- 7) passes thru (-0.6, 11) and (-0.6, 6)

$$\begin{aligned} \frac{6 - 11}{-0.6 - (-0.6)} = \frac{-5}{0} \\ m = \text{no slope or undefined} \end{aligned}$$

Parallel and Perpendicular slopes.

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

$$y = -3x - 6$$

Examples:

Given a linear equation, find the slope of the line, then determine the slope parallel and perpendicular.

8) $y = \frac{4}{5}x - 1$

|| = 4/5

⊥ = -5/4

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

|| = -3

⊥ = 1/3

10) $x = -5$

|| = no slope

⊥ = 0

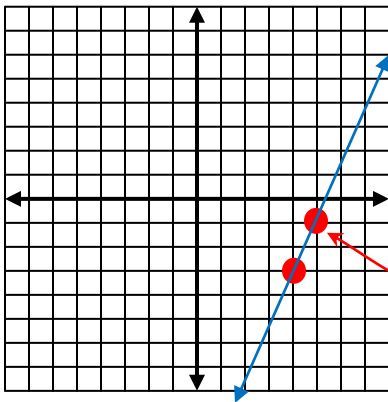
Graphing with Parallel and Perpendicular slopes.

Examples:

Graph each line using the information given.

- 11) passes thru (4, -3)
|| to the graph of $y - 2x = 1$

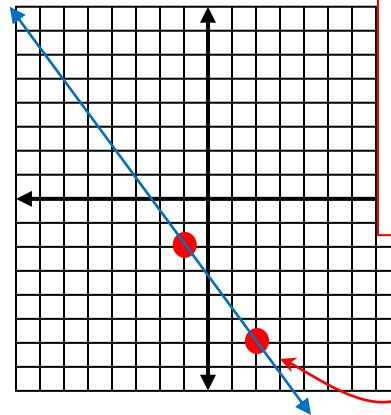
$y = 2x + 1$
slope = 2/1



count up 2, right 1 from (4, -3)

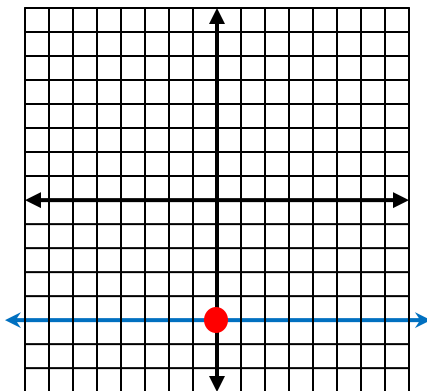
- 12) passes thru (-1, -2)
⊥ to the graph of $4y - 3x = 17$

$4y = 3x + 17$
 $y = 3/4x + 4.25$



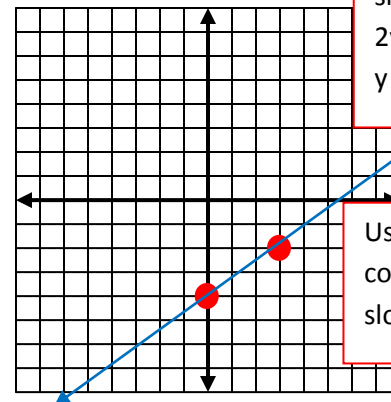
The perp. slope of 3/4 is -4/3. count down 4, right 3 from (-1, -2)

- 13) passes thru (0, -5)
|| to the graph of $-3y = 12$



- 14) perpendicular to the graph of $3x + 2y = -8$ and intersects that graph at its y-intercept

slope-int form
 $2y = -3x - 8$
 $y = -3/2x - 4$



Use y-int. of -4, count perp. slope = 2/3