

## 3 - 3 / 3 - 4 Slope of Lines

## Slope

To find the slope of a line when given two ordered pairs, use the following formula:

$$\text{rate of change} = \text{slope} = m = \frac{y_2 - y_1}{x_2 - x_1}$$

### EXAMPLE:

Find the slope of the line that passes through the following points:  
(-2, -5), (4, 7)

$$\frac{7 - (-5)}{4 - (-2)} = \frac{7 + 5}{4 + 2} = \frac{12}{6} = 2$$

## Parallel and Perpendicular Lines

\* Two lines that are parallel will have the same slope

\* Two lines that are perpendicular have negative reciprocal slopes. (EX:  $m = 2$  and  $m = -1/2$ )

### PARALLEL

$$y = 3x - 4$$

$$y = 3x + 1$$

### PERPENDICULAR

$$y = 3x - 4$$

$$y = -(1/3)x + 1$$

## SLOPE-INTERCEPT FORM

$$y = mx + b$$

$m$  = slope

$b$  = y-intercept (location where graph crosses the y-axis; best represented as an ordered pair (0,  $b$ ))

\* Best used when given the slope and the y-intercept OR when slope and y-intercept are easy to calculate.

### POINT-SLOPE FORM

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

*\* Best used when given the slope and a single point OR when calculating slope can be done given two specific points.*

### EXAMPLES:

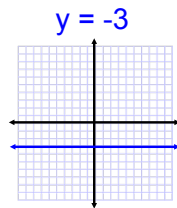
Find the linear equation, in slope-intercept form, that satisfies the conditions below.

1)  $m = 4$ , through  $(0, -3)$

2)  $(2, 4)$  and  $(-1, 7)$

### HORIZONTAL LINES

- Lines, when graphed, go left and right
- Slope = 0
- ALWAYS in the form  $y = \#$
- Has NO x-intercept



### VERTICAL LINES

- Lines, when graphed, go up and down
- Slope = undefined
- ALWAYS in the form  $x = \#$
- Has NO y-intercept

