

Section 4.6 Slope Intercept Form

Linear equations can be written in the form $y = mx + b$ where the m is the slope and the b is the y -intercept. The slope is the number in front of the x and the y -intercept is the number by itself.

Examples: Write the equations in slope intercept form and then state the slope and the y -intercept.

$y = 2x + 7$ This equation is already in slope intercept form ($y = mx + b$).
Slope = 2 y -intercept = 7 (0,7)

$x + y = 5$ Put in slope intercept form by subtracting x from both sides:
 $x + y + (-x) = 5 + (-x)$
 $y = 5 - x$ slope = -1
 $y = -x + 5$ y -intercept = 5 (0,5)

$3x + 2y = 8$ Put in slope intercept form:
 $3x + 2y = 8$ $y = 4 - \frac{3}{2}x$ Slope = $-\frac{3}{2}$
 $2y = 8 - 3x$
 $y = \frac{8}{2} - \frac{3}{2}x$ $y = -\frac{3}{2}x + 4$ y -intercept = 4

To graph a line using the slope and y -intercept, use the following procedure.

Step 1: Put the line in slope intercept form and identify the x and y -intercepts.

Step 2: Plot the y -intercept.

Step 3: Use the slope to find another point by remembering that $slope = \frac{rise}{run}$

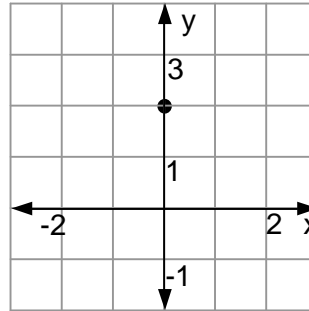
Step 4: Repeat step 3 as many times as you wish to get as many points as you want.

Example: Graph $2x + 3y = 9$ using the slope and y -intercept.

Step 1: Put in slope intercept form.

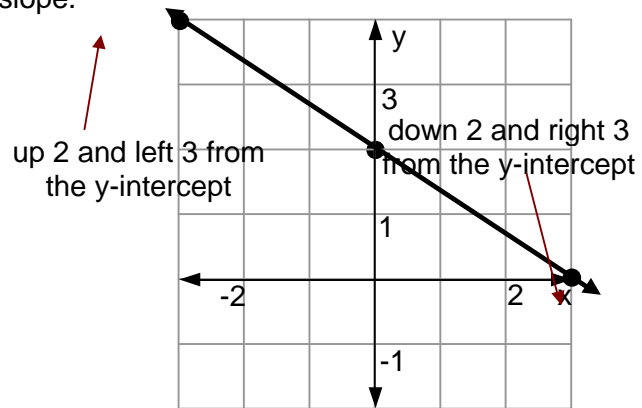
$2x + 3y = 9$ $y = 3 - \frac{2}{3}x$ Slope = $-\frac{2}{3}$
 $2x + 3y - 2x = 9 - 2x$
 $3y = 9 - 2x$ $y = -\frac{2}{3}x + 3$ y -intercept = 3
 $\frac{3y}{3} = \frac{9 - 2x}{3}$ (0,3)

Step 2: Plot the y-intercept



Step 3: Find more points using the slope.

$$m = -\frac{2}{3} = \frac{\text{down}2}{\text{right}3} \text{ or } \frac{\text{up}2}{\text{left}3}$$



Parallel Lines: Lines are parallel if they never cross. Parallel lines have identical slopes. To determine if two lines are parallel, simply find the slope for each line. If the slopes are equal then the lines are parallel.

Example: Determine if $y = 3x + 2$ is parallel to $6x + 2y = 12$

Line 1: $y = 3x + 2$ The slope is 3

Line 2: $6x + 2y = 12$

$$3x + y = 6 \quad \text{divide both sides by 2}$$

$$y = -3x + 6 \quad \text{subtract 3x from both sides}$$

The slope is -3 .

The slopes are not equal so the lines are **NOT** parallel.