

Graphing Linear Equations

Steps in graphing linear equations by plotting points:

1. Isolate y
2. Pick at least three values for x and substitute into the equation
3. Plot the three ordered pairs
4. Connect the points with a straight line

Example 1. Graph $y = x + 3$.

Solution

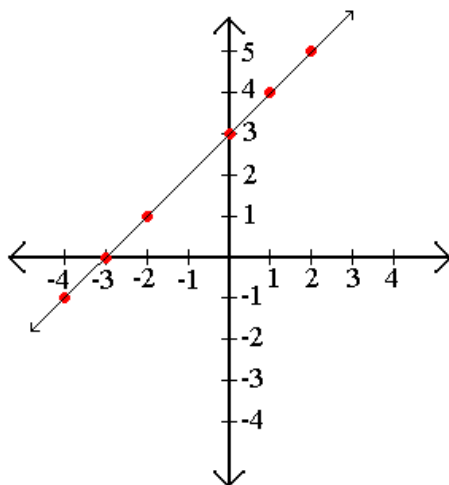
Step 1: Isolate one of the variables.

In this problem y is already isolated. If you wanted to isolate x you would have to subtract 3 from both sides and get $x = y - 3$ as a final equation.

Step 2: Substitute values of x to yield y values.

x	$y = x + 3$	y
0	$y = 0 + 3$	3
1	$y = 1 + 3$	4
2	$y = 2 + 3$	5
-3	$y = -3 + 3$	0
-2	$y = -2 + 3$	1
-4	$y = -4 + 3$	-1

Step 3: Plot and Graph.



When a point sits on an axis it is known as an intercept.

If the point is on the x axis it is a x *intercept*. All x intercepts have a y value of zero, $(\pm x, 0)$.

If the point is on the y axis it is a y *intercept*. All y intercepts have a x value of zero, $(0, \pm y)$.

Should the point be at the origin, its values are $(0, 0)$.

With this knowledge the intercepts of any equation, if they exist, may be found by either substituting zero for the x or y values in an equation.

Example 2: Find the x and y intercepts of the equation $y = x - 3$ and then graph the equation.

$$\begin{aligned} \text{x intercept:} \\ y = x - 3 \\ \text{Let } y = 0 \\ 0 = x - 3 \\ 3 = x \\ (3, 0) \end{aligned}$$

$$\begin{aligned} \text{y intercept:} \\ y = x - 3 \\ \text{Let } x = 0 \\ y = 0 - 3 \\ y = -3 \\ (0, -3) \end{aligned}$$

$$\begin{aligned} \text{3}^{\text{rd}} \text{ point:} \\ y = x - 3 \\ \text{Let } x = 5 \\ y = 5 - 3 \\ y = 2 \\ (5, 2) \end{aligned}$$

