

General Equation of a Line

The graph of every **linear equation**

$$Ax + By + C = 0 \quad (A, B \text{ not both zero})$$

is a line. Conversely, every line is the graph of a linear equation.

EXAMPLE: Sketch the graph of the equation $4x = 2 - 3y$.

Solution: Since the equation $4x = 2 - 3y$ can be rewritten as $4x + 3y - 2 = 0$, it is linear. Therefore its graph is a line. To draw the graph, it is enough to find any two points on the line. In order to do that we first solve $4x = 2 - 3y$ for y :

$$4x = 2 - 3y \implies 3y + 4x = 2 \implies 3y = 2 - 4x \implies y = \frac{2 - 4x}{3}$$

Now we can plug any two numbers in for x . For example, if $x = -1$, then

$$y = \frac{2 - 4(-1)}{3} = \frac{2 + 4}{3} = \frac{6}{3} = 2$$

Similarly, if $x = 2$, then

$$y = \frac{2 - 4(2)}{3} = \frac{2 - 8}{3} = \frac{-6}{3} = -2$$

With the points $(-1, 2)$ and $(2, -2)$ we can sketch the graph of the equation $4x = 2 - 3y$.

x	y
-1	2
2	-2

