

General Equation of a Line

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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 $2x - 3y - 12 = 0$.

Solution: Since the equation is linear, its graph is a line. To draw the graph, it is enough to find any two points on the line. The intercepts are the easiest points to find.

$$x\text{-intercept: Substitute } y = 0, \text{ to get } 2x - 12 = 0 \implies 2x = 12 \implies x = \frac{12}{2} = 6$$

$$y\text{-intercept: Substitute } x = 0, \text{ to get } -3y - 12 = 0 \implies -3y = 12 \implies y = \frac{12}{-3} = -4$$

With these points we can sketch the graph in the Figure below.

