

Solutions of Linear Equations in Two Variables

An equation in the form of $y = mx + b$ is a linear equation in two variables. The variables are x and y , and m and b represent constants (numerals).

EXAMPLES:

$$y = 2x + 4 \quad m = 2, b = 4$$

$$y = \frac{1}{2}x + 3 \quad m = \frac{1}{2}, b = 3$$

A solution of a linear equation in two variables is an ordered pair of numbers where the first number is the x -value and the second number is the y -value. If we replace x and y in the equation with the solution, we will get a true statement.

EXAMPLE: Check that the ordered pair $(1, 6)$ is a solution of the equation $y = 2x + 4$.

$$\begin{aligned}y &= 2x + 4 \\(6) &= 2(1) + 4 \\6 &= 6\end{aligned}$$

The equation solves to a true equation, 6 does equal 6, therefore $(1,6)$ is a solution.

The ordered pair $(1, 6)$ is a solution of $y = 2x + 4$, It is not the *only* solution. The ordered pairs $(2,8)$, $(3,10)$, $(0,4)$, $(-1,2)$ are also solutions.

Each equation has an infinite number of solutions. Picking **any number** for x and solving for y will give an ordered pair solution.

EXAMPLE: Find the value of y that corresponds to $x = 4$.

$$\begin{aligned}y &= 2x + 4 \\x &= 4 \\y &= 2(4) + 4 \\y &= 8 + 4 \\y &= 12\end{aligned}$$

The point $(4,12)$ is a solution on the graph.

Sometimes you will be given a pair of coordinates and asked to check if they fit the graph.

Example: Does the point (1, 2) fit on the graph of $y = 2x - 1$?

$$(2) = 2(1) - 1$$

$$2 = 2 - 1$$

$$2 = 1$$

False, therefore the point (1,2) does not land on the graph of $y = 2x - 1$?