Linear Equations in Two Variables

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What is a Linear Equation?

Linear Equation: an equation in two variables which can be written in the form Ax + By = C, where $A, B \neq 0$, and $A, B, C \in \mathbb{R}$.

1.
$$2x = 4 + y$$

1.
$$2x = 4 + y$$
 YES

1.
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 YES

2.
$$y = 5x$$

- 1. 2x = 4 + y **YES**
- 2. y = 5x **YES**

- 1. 2x = 4 + y **YES**
- 2. y = 5x **YES**
- 3. 2x 1 = y

- 1. 2x = 4 + y **YES**
- 2. y = 5x **YES**
- 3. 2x 1 = y **YES**

1.
$$2x = 4 + y$$
 YES

2.
$$y = 5x$$
 YES

3.
$$2x - 1 = y$$
 YES

4.
$$\frac{1}{4}x = y$$

1.
$$2x = 4 + y$$
 YES

2.
$$y = 5x$$
 YES

3.
$$2x - 1 = y$$
 YES

4.
$$\frac{1}{4}x = y$$
 YES

1.
$$2x = 4 + y$$
 YES

2.
$$y = 5x$$
 YES

3.
$$2x - 1 = y$$
 YES

4.
$$\frac{1}{4}x = y$$
 YES 5. $xy = 2$

5.
$$xy = 2$$

1.
$$2x = 4 + y$$
 YES

2.
$$y = 5x$$
 YES

3.
$$2x - 1 = y$$
 YES

4.
$$\frac{1}{4}x = y$$
 YES
5. $xy = 2$ NO

5.
$$xy = 2$$
 NO

1.
$$2x = 4 + y$$
 YES

2.
$$y = 5x$$
 YES

3.
$$2x - 1 = y$$
 YES

4.
$$\frac{1}{4}x = y$$
 YES

5.
$$\dot{xy} = 2$$
 NO

6.
$$x^2 + y^2 = 1$$

1.
$$2x = 4 + y$$
 YES

2.
$$y = 5x$$
 YES

3.
$$2x - 1 = y$$
 YES

4.
$$\frac{1}{4}x = y$$
 YES

5.
$$xy = 2$$
 NO

6.
$$x^2 + y^2 = 1$$
 NO

1.
$$2x = 4 + y$$
 YES 7. $x = y^2$

2.
$$y = 5x$$
 YES

3.
$$2x - 1 = y$$
 YES

4.
$$\frac{1}{4}x = y$$
 YES

5.
$$xy = 2$$
 NO

6.
$$x^2 + y^2 = 1$$
 NO

1.
$$2x = 4 + y$$
 YES 7. $x = y^2$ **NO**

2.
$$y = 5x$$
 YES

3.
$$2x - 1 = y$$
 YES

4.
$$\frac{1}{4}x = y$$
 YES

5.
$$xy = 2$$
 NO

6.
$$x^2 + y^2 = 1$$
 NO

1.
$$2x = 4 + y$$
 YES 7. $x = y^2$ **NO**

2.
$$y = 5x$$
 YES

3.
$$2x - 1 = y$$
 YES 8. $y = \frac{x}{2}$

4.
$$\frac{1}{4}x = y$$
 YES

5.
$$\vec{x} y = 2$$
 NO

6.
$$x^2 + y^2 = 1$$
 NO

1.
$$2x = 4 + y$$
 YES 7. $x = y^2$ **NO**

2.
$$y = 5x$$
 YES

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$$y = 5x$$
 YES
3. $2x - 1 = y$ YES 8. $y = \frac{x}{2}$ YES

4.
$$\frac{1}{4}x = y$$
 YES

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$$\vec{x} y = 2$$
 NO

6.
$$x^2 + y^2 = 1$$
 NO

1.
$$2x = 4 + y$$
 YES 7. $x = y^2$ NO

2.
$$y = 5x$$
 YES

3.
$$2x - 1 = y$$
 YES 8. $y = \frac{x}{2}$ YES

4.
$$\frac{1}{4}x = y$$
 YES
5. $xy = 2$ NO

9.
$$y = \frac{6}{x}$$

5.
$$xy = 2$$
 NO

6.
$$x^2 + y^2 = 1$$
 NO

1.
$$2x = 4 + y$$
 YES 7. $x = y^2$ **NO**

2.
$$y = 5x$$
 YES

3.
$$2x - 1 = y$$
 YES 8. $y = \frac{x}{2}$ YES

4.
$$\frac{1}{4}x = y$$
 YES
5. $xy = 2$ NO

5.
$$xy = 2$$
 NO

6.
$$x^2 + y^2 = 1$$
 NO

9.
$$y = \frac{6}{x}$$
 NO

1.
$$2x = 4 + y$$
 YES 7. $x = y^2$ NO
2. $y = 5x$ YES
3. $2x - 1 = y$ YES 8. $y = \frac{x}{2}$ YES
4. $\frac{1}{4}x = y$ YES
5. $xy = 2$ NO
6. $x^2 + y^2 = 1$ NO 10. $2x + y = 8$

1.
$$2x = 4 + y$$
 YES 7. $x = y^2$ NO
2. $y = 5x$ YES
3. $2x - 1 = y$ YES 8. $y = \frac{x}{2}$ YES
4. $\frac{1}{4}x = y$ YES
5. $xy = 2$ NO
6. $x^2 + y^2 = 1$ NO 10. $2x + y = 8$ YES

What is a Solution of a Linear Equation?

The solution of a linear equation in two variables is an ordered pair that makes the equation true.

How to Solve a Linear Equation?

1. Choose any value for x.

How to Solve a Linear Equation?

- 1. Choose any value for x.
- 2. Substitute the chosen value for x and solve for y.

How to Solve a Linear Equation?

1. Choose any value for x.

Let
$$x = 0$$

How to Solve a Linear Equation?

- 1. Choose any value for x.
- 2. Substitute the chosen value for x and solve for y.

Find solutions to y = 2x - 1

Let x = 0:

Let
$$x = 0$$
:

$$y = 2(0) - 1$$

Let
$$x = 0$$
:

$$y = 2(0) - 1$$

$$y = 0 - 1$$

Let
$$x = 0$$
:

$$y = 2(0) - 1$$

$$y = 0 - 1$$

$$y = -1$$

Let
$$x = 0$$
:

$$y = 2(0) - 1$$

$$y = 0 - 1$$

$$y = -1$$

$$\therefore$$
 Solution = $(0, -1)$

Find solutions to y = 2x - 1

Find solutions to y = 2x - 1

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

Find solutions to y = 2x - 1

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

$$y = 2 - 1$$

Find solutions to y = 2x - 1

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

$$y = 2 - 1$$

$$y = 1$$

Let
$$x = 1$$
:

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

$$y = 2 - 1$$

$$y = 1$$

$$\therefore$$
 Solution = $(1, 1)$

Find solutions to y = 2x - 1

Let
$$x = -1$$
:

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

Let
$$x = -1$$
:

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

$$y = -2 - 1$$

Let
$$x = -1$$
:

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

$$y = -2 - 1$$

$$y = -3$$

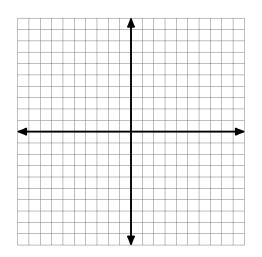
Let
$$x = -1$$
:

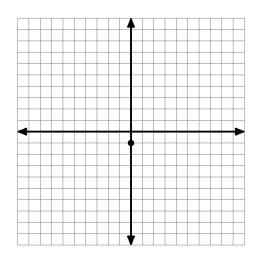
$$y = 2(-1) - 1$$

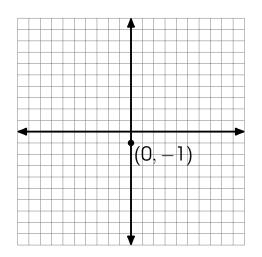
$$y = -2 - 1$$

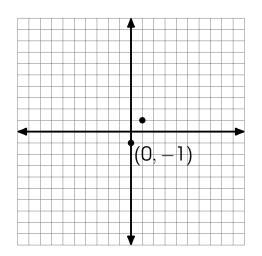
$$y = -3$$

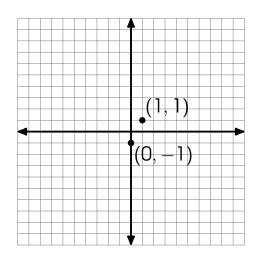
$$\therefore$$
 Solution = $(-1, -3)$

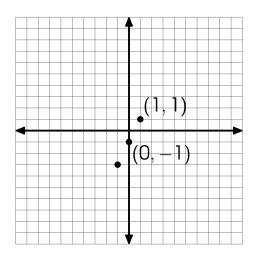


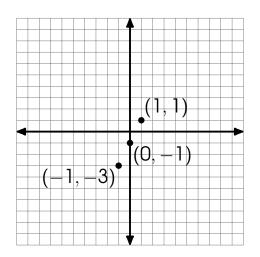


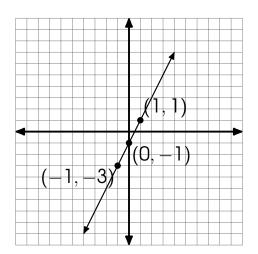












Is (-1, -4) a solution to the equation x - y = 3?

Is (-1, -4) a solution to the equation x - y = 3? Let x = -1:

Is (-1, -4) a solution to the equation x - y = 3?

Let x = -1:

-1 - y = 3

Is (-1, -4) a solution to the equation

$$x - y = 3$$
?

Let
$$x = -1$$
:

$$-1 - y = 3$$

$$-y = 3 + 1$$

Is (-1, -4) a solution to the equation x - y = 3?

$$-1 - y = 3$$

$$-y = 3 + 1$$

$$-y=4$$

Is
$$(-1, -4)$$
 a solution to the equation $x - y = 3$?
Let $x = -1$:
$$-1 - y = 3$$

$$-y = 3 + 1$$

$$-y = 4$$

$$-1(-y) = -1(4)$$

Is
$$(-1, -4)$$
 a solution to the equation $x - y = 3$?
Let $x = -1$:
 $-1 - y = 3$
 $-y = 3 + 1$
 $-y = 4$
 $-1(-y) = -1(4)$
 $y = -4$

Is
$$(-1, -4)$$
 a solution to the equation $x - y = 3$?
Let $x = -1$:
$$-1 - y = 3$$

$$-y = 3 + 1$$

$$-y = 4$$

$$-1(-y) = -1(4)$$

$$y = -4$$

$$\therefore (-1, -4)$$
 is a solution to the equation $x - y = 3$.

Given the equation x + y = 2, what is the value of y if x = -2?

Let x = -2:

Let
$$x = -2$$
:

$$-2 + y = 2$$

Let
$$x = -2$$
:

$$-2 + v = 2$$

$$y = 2 + 2$$

Let
$$x = -2$$
:

$$-2 + y = 2$$

$$y = 2 + 2$$

$$y = 4$$

Let
$$x = -2$$
:

$$-2 + y = 2$$

$$y = 2 + 2$$

$$y = 4$$

$$\therefore$$
 if $x = -2$, then $y = 4$.

Thank you for watching.