

Solving Linear Equations by Graphing

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Solve by Graphing

- A linear function is a function for which the graph is a line.
- The simplest linear function is $f(x) = x$ and is called a parent function of the family of linear functions.
- A family of graphs is a group of graphs with one or more similar characteristics.

Solve by Graphing

- A root or solution of an equation is any value that makes the equation true. A linear equation has at **most** one root.
- You can find the root of an equation by graphing its related function. To write the related function for an equation, replace 0 with $f(x)$.

Linear Equation	Related Function
$2x - 8 = 0$	$f(x) = 2x - 8$ or $y = 2x - 8$

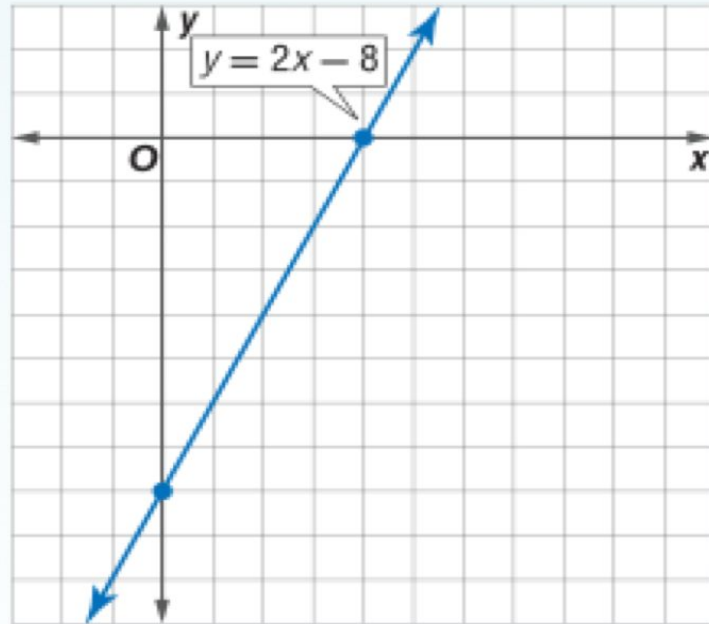
Solve by Graphing

- Values of x for which $f(x)=0$ are called zeros of the function.
- The zero of a function is located at the x -intercept of the function.
- The root of an equation is the value of the x -intercept.

Solve by Graphing

Example 1: $2x - 8 = 0$

- 4 is the x-intercept of $2x-8=0$
- 4 is the solution of $2x-8=0$
- 4 is the root of $2x-8=0$
- 4 is the zero of $2x-8=0$



Finding Roots

Method 1: Solve Algebraically

Example 1:

$$0 = \frac{1}{3}x - 2$$

Finding Roots

Method 2: Solve by Graphing

Example: $3x + 1 = -2$

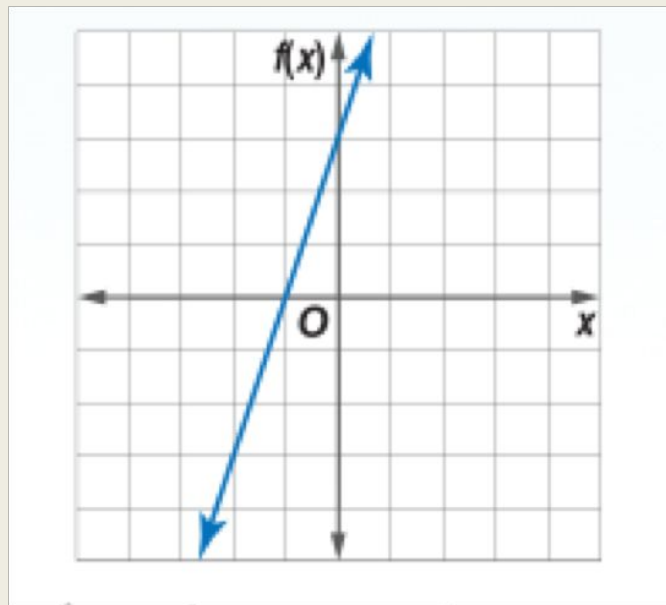
Rewrite the equation with zero on the right side:

$$3x + 3 = 0$$

Finding Roots

To graph make a table:

X	$f(x) = 3x + 3$	$f(x)$	$(x, f(x))$
0	$f(0) = 3(0) + 3$	3	(0, 3)
-1	$f(-1) = 3(-1) + 3$	0	(-1, 0)
-2	$f(-2) = 3(-2) + 3$	-3	(-2, -3)



Real World Example

Emily is going to a local carnival. The function $m = 20 - 0.75r$ represents the amount of money m she has left after r rides.

Find the zero of this function. Describe what this value means in this context.

Solve Algebraically and by Graphing.