

8.8 Solving Quadratics by Graphing

SWBAT solve quadratic equations by graphing and using square roots.

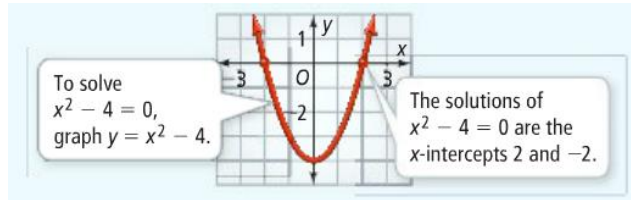
Take note

Key Concept Standard Form of a Quadratic Equation

A **quadratic equation** is an equation that can be written in the form $ax^2 + bx + c = 0$, where $a \neq 0$. This form is called the **standard form of a quadratic equation**.

Roots! Solutions! X-Intercepts! Zeros!

They all mean the same thing! What is the value of x when y is zero?!
The solutions of the equation are the x -intercepts of the related function.

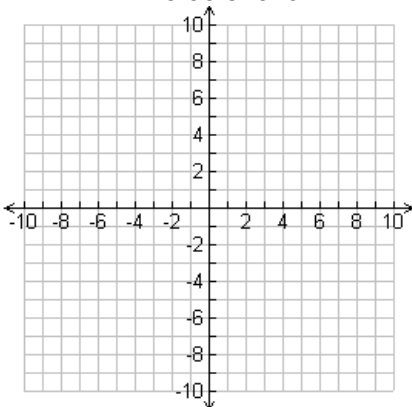


The solutions of a quadratic equation and the x -intercepts of the graph of the functions are called **roots of the equations** or **zeros of the function**.

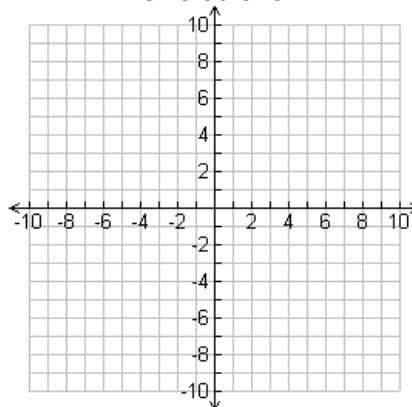
Notes on Video:

Number of Solutions.

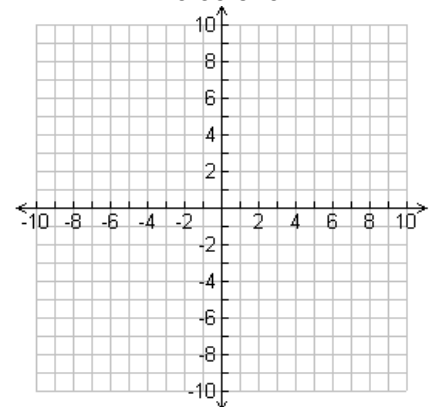
$x^2 - 1 = 0$
Two Solutions



$x^2 = 0$
One Solution



$x^2 + 1 = 0$
No Solution



Practice: a. $x^2 - 16 = 0$

b. $3x^2 + 6$

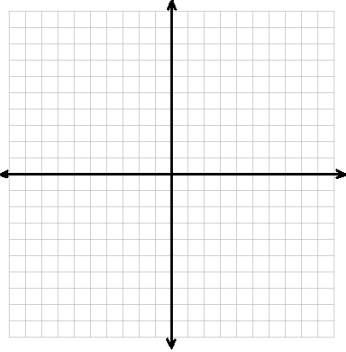
c. $x^2 - 25 = -25$

To Solve Quadratic Equations By Graphing

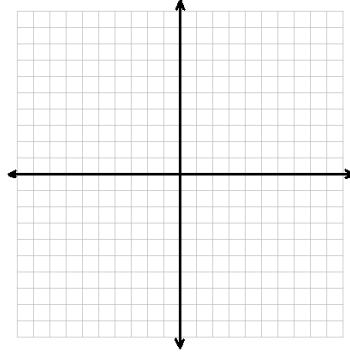
- 1.
- 2.
- 4.

Practice:

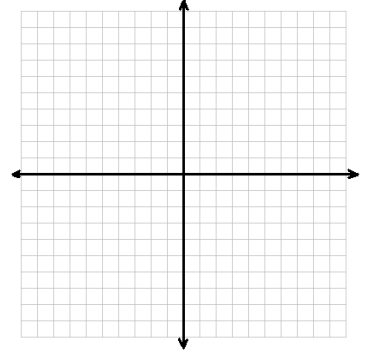
a. $x^2 - 3x = 10$



b. $x^2 + 3 = -2x$



c. $x^2 - 3x = 10$



Steps to Solve for "X" by Graphing

Step 1: Set the equation equal to zero.

Step 2: Put the equation into $Y_1 =$ enter

Step 3: 2^{nd} → TRACE → Zero

Step 4: Move Cursor to left of first x intercept for left bound. Press Enter

Step 5: Move Cursor to right of first x intercept. Press Enter

Step 6: Press Enter. Focus on the value of "x" (that's what we are solving for!)

Step 7: Repeat steps 4, 5, 6 until you have found the value for all x-intercepts

Remember answer is an ordered pair

Using the graphing calculator graph $x^2 - 6x + 3$. Draw copy of calculator screen

Steps to Solve for Using Table Feature

Step 1: 2^{nd} → WINDOW (tblset)

Step 2: Δ Tbl to value you want

Step 3: Set **Indpnt** to AUTO

Step 4: Set **Depend** to AUTO

Remember: The graph crosses the x-axis when the values for y change signs.

Example 1: What are the solutions of each equation? Solve by graphing.

a) $x^2 = 1$

b) $x^2 = 4x + 5$

c) $x^2 - 6x = 9$

d) $x^2 = -5$

Practice: Pg. 554 complete problems 1 – 6. Write equations, solve on calculator and write answer as ordered pair.

Notes on Video:

Solving Using Square Roots

Step 1: Make sure you have a binomial in the form $y = ax^2 + c$

Step 2: Get the variable by itself.

Step 3: How do you get rid of a square? Square root it!

if you get an error message – it means we have No Solution

Step 4: Remember – square roots always have **two** solutions (positive and negative)

Example 2: What are the solutions of each equation? Solve by taking square roots.

a) $3x^2 - 75 = 0$

b) $m^2 - 36 = 0$

c) $3x^2 + 15 = 0$

d) $4d^2 + 16 = 16$

Example 3: Choosing a Reasonable Solution

Aquarium An aquarium is designing a new exhibit to showcase tropical fish. The exhibit will include a tank that is a rectangular prism with a length ℓ that is twice the width w . The volume of the tank is 420 ft^3 . What is the width of the tank to the nearest tenth of a foot?

