

Graph this system of equations on the graphing calculator:

$$y = x^2 + 2x - 8$$

$$y = -x^2 + 3x + 7$$

What is the solution to this system of equations?

Graph equations separately and find points of intersection (answers are the x-coordinates only).  $x = -2.5, 3$

How could you solve this system of quadratic equations without graphing?

$$y = x^2 + 2x - 8$$

$$y = -x^2 + 3x + 7$$

Solve using substitution.

$$-x^2 + 3x + 7 = x^2 + 2x - 8$$

$$0 = 2x^2 - x - 15$$

$$0 = (2x + 5)(x - 3)$$

$$x = -5/2, 3$$

How many solutions could a system of quadratic equations have?

What would the graph of each look like?

No Solutions



two Solutions

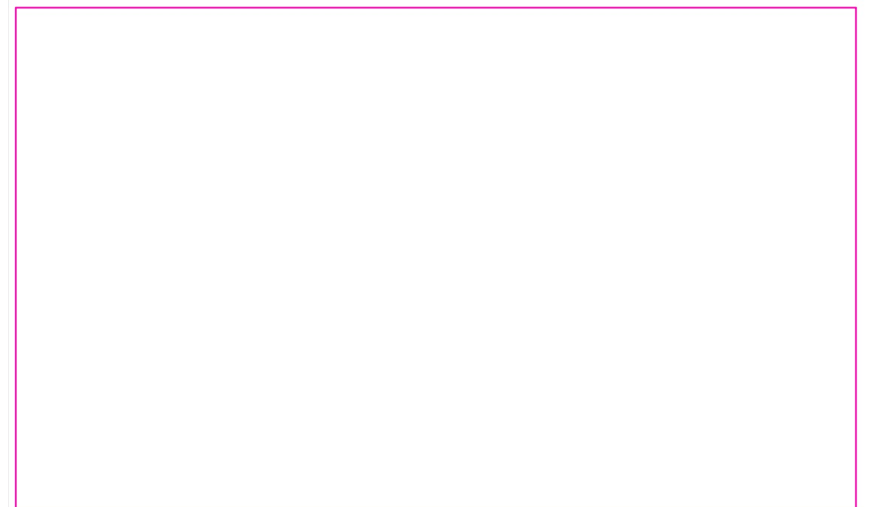


One Solution



Many Solutions

Same parabolas.





Simplify each.

1.  $\sqrt{24}$

$$= \sqrt{4 \cdot 6}$$

$$= 2\sqrt{6}$$

2.  $\sqrt{150}$

$$= \sqrt{25 \cdot 6}$$

$$= 5\sqrt{6}$$

$$\sqrt{50} =$$

What's the difference?

$$\sqrt{50} = 5\sqrt{2} \longrightarrow \text{Exact Value}$$

$$\sqrt{50} = 7.0711 \longrightarrow \begin{array}{l} \text{Approximate Value} \\ \text{or} \\ \text{Rounded Value} \end{array}$$

Simplify each:

1.  $(18)^2 = 324$

2.  $(-18)^2 = 324$

3. What are the square roots of 324?

$\pm 18$

4. Every positive number has how many square roots?

Two

5. Find the square roots of 729

$\pm 27$

6. What is the only number that has only one square root?

Zero

7. What numbers have no real square roots? Negative #'s

Solve this equation:

$$x^2 = 625$$

$$x = \pm 25$$

### Principal Square Root:

When a number has two square roots, the positive root is called the Principal Square Root.



The radical symbol means the Principal Square Root.

What symbol means the negative square root? —



What symbol means both square roots?  $\pm$



1. Solve.

$$\frac{2x^2}{2} = \frac{288}{2}$$

$$x^2 = 144$$

$$\sqrt{144} = \boxed{12}$$

2. A square has an area of  $196 \text{ in}^2$ . Find the length of each side.

$$\sqrt{\text{in}^2} = \sqrt{196}$$

$$\text{in} = \pm 14$$

$$\boxed{14}$$

-14 doesn't make sense for the length of a side of square.

### Solving Quadratic Equations using Square Roots:

- Only when  $b=0$
- Get  $x^2$  or  $( )^2$  by itself on one side of the  $=$  sign
- Take the square root of both sides

Solve this equation using square roots:

$$\begin{array}{l} 5x^2 - 3 = 42 \\ +3 \quad +3 \end{array} \quad \frac{5x^2}{5} = \frac{45}{5} \quad \sqrt{x^2} = \sqrt{9} \\ x = \pm 3$$

Solve

$$\begin{array}{l} 2x^2 - 1 = 149 \\ \frac{2x^2}{2} = \frac{250}{2} \\ \sqrt{x^2} = \sqrt{125} \\ x = \sqrt{125} \cdot 3 \\ x = \pm 5\sqrt{3} \end{array}$$