Standard Form of a Quadratic Function

$$y = ax^2 + bx + c$$

Standard Form of a Quadratic Equation

$$ax^{2} + bx + c = 0$$

Ways to solve Quadratic Equations:

- Factoring
- Square Roots
- Quadratic Formula
- Graphing

Solving Quadratic Equations by Factoring:

1st: Make sure one side = 0

2nd: Factor completely

3rd: Solutions are zeros of each factor (x-intercepts)

Solve by factoring

$$12x^2 + 8x = 0$$

Take out the GCF and find the zeros of the factors

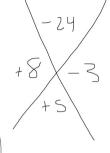
$$\frac{(4x)(3x+2)=0}{(x=0)^{-2/3}}$$

Solve by factoring.

$$6x^2 + 5x = 4$$

$$6x^{2} + 5x - 4 = 0$$

$$(5x+4)(zx-y=0$$



Solve by factoring.

$$X = -3,6$$

$$5x^2 - 90 = 15x$$

$$5x^2 - 15x - 90 = 0$$

 $\frac{1}{2}\left(x+\frac{2}{3}\right)\left(x-\frac{1}{6}\right)=0$

Solve by factoring.

$$4x^2 - 25 = 0$$

 $(2x \pm 5) - 2x + 5 = 0$

$$\times = \pm \frac{5}{2}$$

What are the square roots of 100?

±10

Every Positive Number has two square roots ±

Solve using square roots.

Solve: $\sqrt{x^2} = \sqrt{25}$

Solve: $4x^2 - 25 = 0$ +25 + 25 $4x^2 = 25$ $4x^2 = 25$ $4x^2 = 25$ $4x^2 = 25$

What are the solutions to this equation?

$$x^2 + 81 = 0$$
 $-81 - 81$

No Real Solutions

Why can't you solve the following equation using square roots?

$$x^2 - 16x + 49 = 0$$

Because of the -16x. There can't be a linear term and solve with square roots. You can only solve a quadratic equation using square roots if the equation is:

- 1. In Standard Form $(ax^2 + bx + c = 0)$ and there is no linear term. $ax^2 + c = 0$
- 2. In Vertex Form.

Steps to solving with square roots.

- 1. Arrange the equation so whatever is being squared is alone on one side.
- 2. Find the square roots of both sides
- 3. Complete solving for x

Find the exact solutions to each using square roots.

1.
$$6x^{2}-24=0$$
 $+24+24$
 $6x^{2}=24$
 $\sqrt{2}$
 $\sqrt{2}$

2.
$$27 - 2x^2 = 5$$
 $-27 - 27$
 $-2x^2 = -27$
 $x^2 = -27$
 $x^2 = 11$

Find the exact solutions to each using square roots.

3.
$$2(x-10)^2 - 32 = 0$$
 $+3z$
 $+3z$
 $+3z$
 $+3z$
 $+3z$
 $+4+10 = 14$
 $+10 = 6$

4.
$$3(x+5)^2 - 21 = 0$$
 $+21$
 $3(x+5)^2 = 21$
 $3(x+5)^2 = 21$
 $3(x+5)^2 = 21$
 $x+5 = \pm \sqrt{7}$
 $-5 - 5$
 $x=-5 \pm \sqrt{7}$