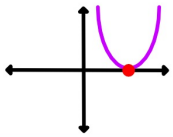
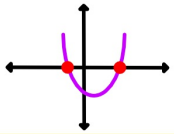
of solutions to a Quadratic Equation:

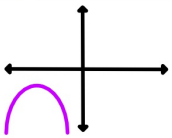
1 Real Solution



2 Real Solutions



No Real Solution



Solutions to a Quadratic Equation are x-intercepts of the graph!

Solutions, x-intercepts, Zeros, and Roots are all the SAME thing.

Solving Quadratic Equations:

- Factoring
- Square Roots
- Graphing
- Completing the Square
- Quadratic Formula

Solve this quadratic by factoring.

$-12x^2 + 27 = 0$

$3(-4x^2 + 9) = 0$

$3(9 - 4x^2) = 0$

$3(3 \pm 2x) = 0$

$x = \frac{-3}{\pm 2}$

$-3(4x^2 - 9) = 0$

$-3(2x \pm 3) = 0$

$x = \frac{\pm 3}{2}$

these are the same answer!

My suggestion when factoring is to factor out a negative in the GCF if the first term is negative.

What numbers could you square and get 25? ± 5

What are the square roots of 100? ± 10

What are the square roots of -49? -49 has no REAL square roots

Every Positive Number has exactly TWO square roots $\pm$

Another way to solve the following quadratic equation:

$-12x^2 + 27 = 0$

$-27 \quad -27$

$\frac{-12x^2}{-12} = \frac{-27}{-12}$

$\sqrt{x^2} = \sqrt{\frac{9}{4}}$

$x = \pm \frac{3}{2}$

Why can I solve $-12x^2 + 27 = 0$ using Square Roots

BUT,

I CAN'T solve $18x^2 + 5x - 2 = 0$ using Square Roots

$+2 \quad +2$

$18x^2 + 5x = 2 - 5x$

$-5x$

$\frac{18x^2}{18} = \frac{2 - 5x}{18}$

$\sqrt{x^2} = \sqrt{\frac{2 - 5x}{18}}$

If you try the same technique as the previous problem you would end up with an X but when you solve for X you can't have X in the answer!

Solving Quadratic Equations with Square Roots:

You can use Square Roots to solve a Quadratic Equation

ONLY IF there is no linear term (b = 0)..... if there is an x^2 there can't also be an x.

In other words, the equation has to have the following form in order to solve with Square Roots: $ax^2 + c = 0$ or $ax^2 = c$

Steps to follow if solving using square roots:

1. Isolate x^2 or $(x\ \ )^2$ on one side of the equation
2. Take the square root of both sides
3. Finish solving for x (if necessary)

Find the exact solutions to each by using Square Roots.

1. $6x^2 - 7 = 17$

$+7 \quad +7$

$\frac{6x^2}{6} = \frac{24}{6}$

$\sqrt{x^2} = \sqrt{4}$

$x = \pm 2$

2. $6x^2 - 7 = 137$

$+7 \quad +7$

$\frac{6x^2}{6} = \frac{144}{6}$

$\sqrt{x^2} = \sqrt{24}$

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

$x = \pm 2\sqrt{6}$

What are the solutions to this equation?

$x^2 + 81 = 0$

$-81 \quad -81$

$\sqrt{x^2} = \sqrt{-81}$ there is no real square root of -81

No Real Solutions

Find the exact solutions to each by using Square Roots.

1. $2(x + 3)^2 - 8 = 0$

$+8 \quad +8$

$\frac{2(x+3)^2}{2} = \frac{8}{2}$

$\sqrt{(x+3)^2} = \sqrt{4}$

$x + 3 = \pm 2$ (+2 −3, −2 −3)

$-3 \quad -3$

$x = -1, -5$

2. $6(x - 1)^2 + 2 = 32$

$-2 \quad -2$

$\frac{6(x-1)^2}{6} = \frac{30}{6}$

$\sqrt{(x-1)^2} = \sqrt{5}$

$x - 1 = \pm\sqrt{5}$

$+1 \quad +1$

$x = 1 \pm \sqrt{5}$

You can now finish Hwk #19

Sec 5-5

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Problems 2, 3, 6, 7, 10, 11, 14, 15, 35, 51, 52