

Sec. 3.5 - Solving Quadratic Functions

Learning Goal: By the end of today, I will be able to use a variety of methods to solve quadratic problems:

- (i) graphing approach
- (ii) factoring
- (iii) completing the square (algebraic method)
- (iv) quadratic formula

Oct 14-10:21 PM

Warm Up

Solve the following

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

May 18-12:48 PM

Warm Up

Solve the following

$$x^2 = 49$$

Method One - Factoring

Method Two - Algebraic

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Warm Up

Solve the following

$$(x + 3)^2 = 16$$

Method One - Factoring

Method Two - Algebraic

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Warm Up

Solve the following

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

Method One - Factoring

Method Two - Algebraic

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Warm Up

Solve the following

$$(x - 5)^2 - 7 = 0$$

Method One - Factoring

Method Two - Algebraic

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Recall:

- find max/min means **VERTEX** form
- solve, find zeros, find roots, etc. means find **x intercepts**, usually by factoring

But... what happens if you can't factor?

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Ex: Solve:

$$2x^2+4x-10 = 0$$

Not factorable!!!!

so....

Complete the square instead...

$$2(x+1)^2-12=0$$

Now, rearrange and solve for x...

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That seems like a lot of work...

Let's solve for the standard $ax^2+bx+c=0$

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

$$a\left(x^2 + \frac{b}{a}x\right) + c = 0$$

$$\left[\frac{b}{a}\left(\frac{1}{2}\right)\right]^2 = \left[\frac{b}{2a}\right]^2 = \frac{b^2}{4a^2}$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

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The Quadratic Formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

where $ax^2 + bx + c = 0$

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Notice... there are 2 possible answers because of the \pm sign.

Ex: Solve $2x^2+4x-10=0$

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Solve

$$2x^2+5x-7=0$$

Method One - Factoring

Method Two - Algebraic

Method 3 - QF

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Solving Quadratics

Factoring Approach $A \times B = 0$

Pros

-quick if factored to start or can be factored quickly

$$0 = (x - 1)(x - 3)$$

Cons

-if quadratics can't be factored, you can't use this technique

Nov 5-9:37 AM

Algebra/complete the square approach

Pros

- short questions \rightarrow works well

ie $\sqrt{x^2} = \sqrt{49}$

$$x = \pm 7$$

↑

$$(x+5)^2 - 16 = 0$$

$$\sqrt{(x+5)^2} = \sqrt{16}$$

$$x+5 = \pm 4$$

$$x = -5 \pm 4$$

$$x = -9 \text{ or } -1$$

Cons

-can be a lot of algebra

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Quadratic formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

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



Pros - Solves any problem

Cons- BEDMAS must be perfect

-LONG

Nov 5-9:46 AM

Solve

$$-4x^2 + 24x = 0$$

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Solve

$$3x^2 - 7x = 12$$

Nov 5-9:57 AM

Homework

Pg. 177 #1-4, 6,8, 10, 13

May 10-2:00 PM