

TOPIC: THE QUADRATIC FORMULA

Intro to the Quadratic Formula

◆ The solution(s) to _____ quadratic equation $ax^2 + bx + c = 0$ can be found using the **quadratic formula**.

New

$$x = \underline{\hspace{10em}}$$

(The Quadratic Formula)

EXAMPLE

Find the solution(s) using the quadratic formula.

(A) $2x^2 - 3x - 5 = 0$

(B) $x^2 - 8x + 16 = 0$

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PRACTICE

Find the solution(s) using the quadratic formula.

(A) $x^2 + 6x - 7 = 0$

(B) $\frac{3}{2}z^2 - \frac{5}{4}z - 1 = 0$

(C) $4x^2 - 4x + 1 = 0$

PRACTICE

Find the solution(s) using the quadratic formula.

(A) $4(x - 2)^2 - 5 = x + 7$

(B) $\frac{3}{2}(x + 5)^2 - 4 = x + 1$

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The Discriminant

◆ You can find **how many real** of **imaginary** solutions a quadratic has *WITHOUT* solving by using the discriminant.

► **Discriminant:** the expression under the radical in the quadratic formula.

► _____ determines number/type of solutions: Discriminant is **Positive** = ____ real solution(s)

Zero = ____ real solution(s)

Negative = ____ real solution(s)

_____ solutions

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

(Quadratic Formula)



(Discriminant)

EXAMPLE: For the following quadratic equations, determine the number and type of solutions. Do not solve.

(A) $2x^2 + 3x - 2 = 0$

$b^2 - 4ac$ is: [+ | 0 | -]

(B) $4x^2 + x + 2 = 0$

$b^2 - 4ac$ is: [+ | 0 | -]

(C) $x^2 - 10x + 25 = 0$

$b^2 - 4ac$ is: [+ | 0 | -]

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PRACTICE

Determine the number and type of solutions of the given quadratic equation. Do not solve.

(A)

$$4(x - 2)^2 - 5 = x + 7$$

(B)

$$\frac{3}{2}(x + 5)^2 - 4 = x + 1$$

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Choosing a Method to Solve Quadratic Equations

◆ You won't always be told what method to use, so you'll have to **choose** the **best** one to solve any given quadratic.

	Factoring	Sq. Root Property	Complete The Square	Quadratic Formula
USE IF	• Has obvious factors OR • $c = 0$	• $(x + h)^2 = k$ OR • $b = 0$	• Leading Coeff. is 1 AND • b is even	• Can't easily factor • Unsure what method to use
STEPS	1) Write eqn in standard form 2) Factor completely 3) Set factors = 0, solve for x 4) Check solutions	1) Isolate squared expression 2) Take + & - square root 3) Solve for x 4) Check solutions	1) Simplify leading coeff. to 1 2) Split b and fill in sq. diagram 3) Rewrite as perf sq. trinomial 4) Solve w/ Sq. Root Property	1) Write eqn in standard form 2) Plug a, b, c, in quad. formula $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ 3) Simplify solution(s)

EXAMPLE

Identify the best method to solve each quadratic equation. Do not solve.

(A) $x^2 + 3x = 0$

(B) $x^2 + 6x + 1 = 0$

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

(D) $2x^2 + 7x + 3 = 0$

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PRACTICE

Determine the most appropriate method and solve the following equation.

(A) $x^2 - 7x + 10 = 0$

- A. Factoring
- B. Square-Root Property
- C. Quadratic Formula
- D. Complete the Square

(B) $x^2(z - 4)^2 = 49$

- A. Factoring
- B. Square-Root Property
- C. Quadratic Formula
- D. Complete the Square

PRACTICE

Determine the most appropriate method and solve the following equation.

(A) $2x^2 - 3x - 5 = 0$

(B) $x^2 + 6x + 5 = 0$