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

$$x = \text{———————————}$$

(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.

$(\boldsymbol{A})$ $x^2 + 6x - 7 = 0$

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

$(\boldsymbol{C})$ $4x^2 - 4x + 1 = 0$

PRACTICE Find the solution(s) using the quadratic formula.

$(\boldsymbol{A})$ $4(x-2)^2 - 5 = x + 7$

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

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The Discriminant

◆ You can find **how many real** or **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.

$(\boldsymbol{A})$ $2x^2 + 3x - 2 = 0$	$(\boldsymbol{B})$ $4x^2 + x + 2 = 0$	$(\boldsymbol{C})$ $x^2 - 10x + 25 = 0$
$b^2 - 4ac$ is: [+ | 0 | −]	$b^2 - 4ac$ is: [+ | 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.

$(\boldsymbol{A})$

$$x^2 + 8x + 16 = 0$$

$(\boldsymbol{B})$

$$-4x^2 + 4x + 5 = 0$$