Solving Quadratics- Quadratic Formula

Secondary Math II

The Quadratic Formula

$$x = \frac{\_\_\_\_ + \sqrt{\_\_\_\_ - \_\_\_\_\_}}{\_\_\_\_}$$

Identify a,b, & c in the following equation and plug into the Quadratic formula.

$$x^2 + 4x + 3 = 0$$

$$x = \frac{\_\_\_\_ + \sqrt{\_\_\_\_ - \_\_\_\_\_}}{\_\_\_\_}$$

Solve Using the Quadratic Formula – The good

A. $x^2 - 5x + 6 = 0$

$x = \frac{5 \pm \sqrt{25 - 4(1)(6)}}{2(1)}$

$x = \frac{5 \pm \sqrt{25 - 24}}{2}$

$x = \frac{5 \pm \sqrt{1}}{2}$

$x = \frac{5 \pm 1}{2}$

$x = 2, 3$

B. $2x^2 - 9x = 5$

$2x^2 - 9x - 5 = 0$

$x = \frac{9 \pm \sqrt{81 - 4(2)(-5)}}{2(2)}$

$x = \frac{9 \pm \sqrt{81 + 40}}{4}$

$x = \frac{9 \pm \sqrt{121}}{4}$

$x = -\frac{1}{2}, 5$

Solve Using the Quadratic Formula - The bad

A. $x^2 + 25 = 0$

$x = \frac{0 \pm \sqrt{0 - 4(1)(25)}}{2(1)}$

$x = \frac{\pm\sqrt{-100}}{2}$

$x = \frac{\pm 10i}{2}$

$x = \pm 5i$

B. $4x^2 = -9$

$4x^2 + 9 = 0$

$x = \frac{0 \pm \sqrt{0 - 4(4)(9)}}{2(4)}$

$x = \frac{\pm\sqrt{-144}}{8}$

$x = \frac{\pm 12i}{8}$

$x = \frac{3i}{2}, \frac{-3i}{2}$

Solve Using the Quadratic Formula – The ugly

C. $x^2 - 17 = 0$

$$x = \frac{0 \pm \sqrt{0 - 4(1)(17)}}{2(1)}$$

$$x = \frac{\pm\sqrt{-68}}{2}$$

$$x = \frac{\pm 2\sqrt{17}i}{2}$$

$$x = \pm\sqrt{17}i$$

D. $4x^2 - 3x + 1 = 0$

$$x = \frac{-4 \pm \sqrt{9 - 4(4)(1)}}{2(4)}$$

$$x = \frac{-4 \pm \sqrt{9 - 16}}{8}$$

$$x = \frac{-4 \pm \sqrt{-7}}{8}$$

$$x = \frac{-4 \pm \sqrt{7}i}{8}$$

E. $2x^2 + 3x + 2 = 9x$

$2x^2 - 6x + 2 = 0$

$$x = \frac{6 \pm \sqrt{36 - 4(2)(2)}}{2(2)}$$

$$x = \frac{6 \pm \sqrt{36 - 16}}{4}$$

$$x = \frac{6 \pm \sqrt{20}}{4}$$

F. $2x^2 - 6x + 4 = x^2$

$x^2 - 6x + 4 = 0$

$$x = \frac{6 \pm \sqrt{36 - 4(1)(4)}}{2(1)}$$

$$x = \frac{6 \pm \sqrt{36 - 16}}{2}$$

$$x = \frac{6 \pm \sqrt{10}}{2}$$

Is there a way to determine what kind of solutions we will have?

Discriminant: The discriminant of a Quadratic is given by the expression (b^2 -4ac). Notice that this is the expression that is under the radical in the quadratic formula.

Use the discriminant to determine the type of solution for each of the quadratic equations below. Note that discriminant only gives the *type* of solutions, not the solutions themselves.

A. $9x^2 - 6x + 1 = 0$

1 repeated real solution

B. $3x^2 + 7x + 10 = 0$

2 complex solutions

C. $3x^2 + 7x - 10 = 0$

2 separate real solutions