Algebra I Lesson #5 Unit 13 Class Worksheet #5 For Worksheets #6 & #7

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Subtract c from both sides.

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Divide the coefficient of x by 2. (This is the value of A.)

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Square A. (This is the term that must be added to 'complete the square'.)

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$$x^{2} + \frac{b}{a}x = \frac{-c}{a}$$

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$$(x + \frac{b}{2a})^{2}$$

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Step 2: Complete the square. Write the equation in the form $(x + A)^2 = k$.

Divide the coefficient of x by 2. (This is the value of A.)

Square A. (This is the term that must be added to 'complete the square'.)

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

$$ax^{2} + bx = -c$$

$$x^{2} + \frac{b}{a}x = \frac{-c}{a}$$

$$x^{2} + \frac{b}{a}x + \frac{b^{2}}{4a^{2}} = \frac{b^{2}}{4a^{2}} + \frac{-c}{a}$$

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Step 3: Apply the square root property. Write the equation in the form

$$\mathbf{x} + \mathbf{A} = \pm \sqrt{\mathbf{k}}$$

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If $N^2 = k$ and k > 0, then $N = \pm \sqrt{k}$.

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Add $\frac{-b}{2a}$ to both sides.

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 $\mathbf{x} =$

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$$X = \frac{-b}{2a} \pm$$

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Step 5: Express the solutions in 'best from'.

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

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

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$$x^{2} + \frac{b}{a}x = \frac{-c}{a}$$

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

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$$x = \frac{-b}{2a}$$

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

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

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$$(x + \frac{b}{2a})^{2} = \frac{b^{2} - 4ac}{4a^{2}}$$

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

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

$$x = \frac{-b \pm b}{2a}$$

Step 5: Express the solutions in 'best from'.

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

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

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

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

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

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

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$$x^{2} + \frac{b}{a}x = \frac{-c}{a}$$

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This is a quadratic equation written in standard form. The 'complete the square' process can be used to solve for x in terms of a, b, and c.

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The quadratic formula can be used to solve any second degree equation. The purpose of the remainder of this lesson is to demonstrate how to use it.

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

Solve each of the following using the quadratic formula.

1.
$$3x^{2} + 2x - 5 = 0$$

 $a = 3$ $b = 2$ $c = -5$

$$x = \frac{-2 \pm \sqrt{4 - (4)(3)(-5)}}{6} = \frac{-2 \pm \sqrt{64}}{6} = \frac{-2 \pm 8}{6}$$

$$x = \frac{-2 + 8}{6} \text{ or } x = \frac{-2 - 8}{6}$$

$$x = 1 \text{ or } x = \frac{-5}{3}$$

Step 1: Identify the values of a, b, and c.

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Solve each of the following using the quadratic formula.

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 $a = 1$

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Solve each of the following using the quadratic formula.

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

 $a = 1$ $b = 0$

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

 $a = 1$ $b = -3$

Step 1: Identify the values of a, b, and c.

Step 2: Substitute the value of a, b, and c into the quadratic formula.

Step 3: Evaluate the discriminant: $b^2 - 4ac$.

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$$ax^2 + bx + c = 0$$
, then $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Solve each of the following using the quadratic formula.

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

 $a = 1$ $b = -3$ $c = 1$

$$\mathbf{x} =$$

Step 1: Identify the values of a, b, and c.

Step 2: Substitute the value of a, b, and c into the <u>quadratic formula</u>.

Step 3: Evaluate the discriminant: $b^2 - 4ac$.

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If
$$ax^2 + bx + c = 0$$
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2.
$$x^2 - 3x + 1 = 0$$

 $a = 1$ $b = -3$ $c = 1$

$$\mathbf{x} = \frac{3}{}$$

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$$x^2 - 3x + 1 = 0$$

 $a = 1$ $b = -3$ $c = 1$

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

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$$ax^2 + bx + c = 0$$
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Solve each of the following using the quadratic formula.

2.
$$x^{2} - 3x + 1 = 0$$

 $a = 1$ $b = -3$ $c = 1$
 $x = \frac{3 \pm \sqrt{9}}{}$

Step 1: Identify the values of a, b, and c.

Step 2: Substitute the value of a, b, and c into the quadratic formula.

Step 3: Evaluate the discriminant: $b^2 - 4ac$.

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If
$$ax^2 + bx + c = 0$$
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Solve each of the following using the quadratic formula.

2.
$$x^{2}-3x+1=0$$

 $a = 1$ $b = -3$ $c = 1$
 $x = \frac{3 \pm \sqrt{9-1}}{2}$

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Step 2: Substitute the value of a, b, and c into the quadratic formula.

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$$x^{2} - 3x + 1 = 0$$

 $a = 1$ $b = -3$ $c = 1$
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$$x^{2}-3x+1=0$$

 $a = 1$ $b = -3$ $c = 1$
 $x = \frac{3 \pm \sqrt{9-(4)(1)}}{2}$

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

 $a = 1$ $b = -3$ $c = 1$
 $x = \frac{3 \pm \sqrt{9 - (4)(1)(1)}}{2}$

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The Quadratic Formula
If
$$ax^2 + bx + c = 0$$
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Solve each of the following using the quadratic formula.

$$3. \quad 2x^2 + 5x + 1 = 0$$

Step 1: Identify the values of a, b, and c.

Step 2: Substitute the value of a, b, and c into the quadratic formula.

Step 3: Evaluate the discriminant: $b^2 - 4ac$.

The Quadratic Formula

If
$$ax^2 + bx + c = 0$$
, then $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Solve each of the following using the quadratic formula.

$$3. \quad 2x^2 + 5x + 1 = 0$$

Step 1: Identify the values of a, b, and c.

Step 2: Substitute the value of a, b, and c into the quadratic formula.

Step 3: Evaluate the discriminant: $b^2 - 4ac$.

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If
$$ax^2 + bx + c = 0$$
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Solve each of the following using the quadratic formula.

$$3. \quad 2x^2 + 5x + 1 = 0$$

Step 1: Identify the values of a, b, and c.

Step 2: Substitute the value of a, b, and c into the quadratic formula.

Step 3: Evaluate the discriminant: $b^2 - 4ac$.

The Quadratic Formula
If
$$ax^2 + bx + c = 0$$
, then $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Solve each of the following using the quadratic formula.

3.
$$2x^2 + 5x + 1 = 0$$
 $a =$

Step 1: Identify the values of a, b, and c.

Step 2: Substitute the value of a, b, and c into the quadratic formula.

Step 3: Evaluate the discriminant: $b^2 - 4ac$.

The Quadratic Formula
If
$$ax^2 + bx + c = 0$$
, then $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Solve each of the following using the quadratic formula.

3.
$$2x^2 + 5x + 1 = 0$$

 $a = 2$

Step 1: Identify the values of a, b, and c.

Step 2: Substitute the value of a, b, and c into the quadratic formula.

Step 3: Evaluate the discriminant: $b^2 - 4ac$.

The Quadratic Formula
If
$$ax^2 + bx + c = 0$$
, then $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Solve each of the following using the quadratic formula.

3.
$$2x^2 + 5x + 1 = 0$$

 $a = 2$ $b = 0$

Step 1: Identify the values of a, b, and c.

Step 2: Substitute the value of a, b, and c into the quadratic formula.

Step 3: Evaluate the discriminant: $b^2 - 4ac$.

The Quadratic Formula
If
$$ax^2 + bx + c = 0$$
, then $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Solve each of the following using the quadratic formula.

3.
$$2x^2 + 5x + 1 = 0$$

 $a = 2$ $b = 5$

Step 1: Identify the values of a, b, and c.

Step 2: Substitute the value of a, b, and c into the quadratic formula.

Step 3: Evaluate the discriminant: $b^2 - 4ac$.

The Quadratic Formula
If
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, then $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Solve each of the following using the quadratic formula.

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 $a = 2$ $b = 5$ $c =$

Step 1: Identify the values of a, b, and c.

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Step 1: Identify the values of a, b, and c.

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If
$$ax^2 + bx + c = 0$$
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Solve each of the following using the quadratic formula.

3.
$$2x^2 + 5x + 1 = 0$$

 $a = 2$ $b = 5$ $c = 1$

Step 1: Identify the values of a, b, and c.

Step 2: Substitute the value of a, b, and c into the quadratic formula.

Step 3: Evaluate the discriminant: $b^2 - 4ac$.

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$$2x^2 + 5x + 1 = 0$$

 $a = 2$ $b = 5$ $c = 1$

$$\mathbf{x} = \frac{-5}{}$$

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$$2x^{2} + 5x + 1 = 0$$

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Solve each of the following using the quadratic formula.

3.
$$2x^{2} + 5x + 1 = 0$$

 $a = 2$ $b = 5$ $c = 1$
 $x = \frac{-5 \pm \sqrt{25}}{25}$

Step 1: Identify the values of a, b, and c.

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Step 3: Evaluate the discriminant: $b^2 - 4ac$.

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 $a = 2$ $b = 5$ $c = 1$
 $x = \frac{-5 \pm \sqrt{25 - 1}}{25 - 1}$

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

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3.
$$2x^2 + 5x + 1 = 0$$

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

Step 1: Identify the values of a, b, and c.

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Step 3: Evaluate the discriminant: $b^2 - 4ac$.

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4.
$$x^2 - 6x - 3 = 0$$

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$$x^2 - 6x - 3 = 0$$

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4.
$$x^{2}-6x-3=0$$

 $a = 1$ $b = -6$ $c = -3$
 $x = \frac{6 \pm \sqrt{36}}{36}$

Step 1: Identify the values of a, b, and c.

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

Solve each of the following using the quadratic formula.

6.
$$5x^2 - 5x + 1 = 0$$

 $a = 5$ $b = -5$ $c = 1$

$$x = \frac{5 \pm \sqrt{25 - (4)(5)(1)}}{10} = \frac{5 \pm \sqrt{5}}{10}$$

$$x = \frac{5 \pm \sqrt{5}}{10}$$

Step 1: Identify the values of a, b, and c.

Step 2: Substitute the value of a, b, and c into the quadratic formula.

Step 3: Evaluate the discriminant: $b^2 - 4ac$.

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Solve each of the following using the quadratic formula.

7.
$$3x^2 + 8x + 2 = 0$$

Step 1: Identify the values of a, b, and c.

Step 2: Substitute the value of a, b, and c into the quadratic formula.

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$$3x^2 + 8x + 2 = 0$$

 $a = 3$

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$$3x^2 + 8x + 2 = 0$$

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

Solve each of the following using the quadratic formula.

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$$3x^2 + 8x + 2 = 0$$

 $a = 3$ $b = 8$

Step 1: Identify the values of a, b, and c.

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Step 3: Evaluate the discriminant: $b^2 - 4ac$.

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If
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Solve each of the following using the quadratic formula.

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$$3x^2 + 8x + 2 = 0$$

 $a = 3$ $b = 8$ $c = 0$

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$$3x^2 + 8x + 2 = 0$$

 $a = 3$ $b = 8$ $c = 2$

$$\mathbf{x} = \frac{-8}{}$$

Step 1: Identify the values of a, b, and c.

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Step 3: Evaluate the discriminant: $b^2 - 4ac$.

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If
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 $a = 3$ $b = 8$ $c = 2$

$$X = \frac{-8 \pm}{}$$

Step 1: Identify the values of a, b, and c.

Step 2: Substitute the value of a, b, and c into the <u>quadratic formula</u>.

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The Quadratic Formula
If
$$ax^2 + bx + c = 0$$
, then $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Solve each of the following using the quadratic formula.

7.
$$3x^{2} + 8x + 2 = 0$$

 $a = 3$ $b = 8$ $c = 2$
 $x = \frac{-8 \pm \sqrt{}}{}$

Step 1: Identify the values of a, b, and c.

Step 2: Substitute the value of a, b, and c into the quadratic formula.

Step 3: Evaluate the discriminant: $b^2 - 4ac$.

The Quadratic Formula
If
$$ax^2 + bx + c = 0$$
, then $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Solve each of the following using the quadratic formula.

7.
$$3x^{2} + 8x + 2 = 0$$

$$a = 3 \quad b = 8 \quad c = 2$$

$$x = \frac{-8 \pm \sqrt{64}}{}$$

Step 1: Identify the values of a, b, and c.

Step 2: Substitute the value of a, b, and c into the quadratic formula.

Step 3: Evaluate the discriminant: $b^2 - 4ac$.

The Quadratic Formula
If
$$ax^2 + bx + c = 0$$
, then $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Solve each of the following using the quadratic formula.

7.
$$3x^{2} + 8x + 2 = 0$$

$$a = 3 \quad b = 8 \quad c = 2$$

$$x = \frac{-8 \pm \sqrt{64 - 2}}{2}$$

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Step 3: Evaluate the discriminant: $b^2 - 4ac$.

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 $a = 3$ $b = 8$ $c = 2$

$$x = \frac{-8 \pm \sqrt{64 - (4)(3)(2)}}{6} = \frac{-8 \pm \sqrt{40}}{6}$$

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If
$$ax^2 + bx + c = 0$$
, then $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Solve each of the following using the quadratic formula.

8.
$$3x^2 - 2x - 1 = 0$$

Step 1: Identify the values of a, b, and c.

Step 2: Substitute the value of a, b, and c into the quadratic formula.

Step 3: Evaluate the discriminant: $b^2 - 4ac$.

The Quadratic Formula
If
$$ax^2 + bx + c = 0$$
, then $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Solve each of the following using the quadratic formula.

$$8. \quad 3x^2 - 2x - 1 = 0$$

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 $a = 3$

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Solve each of the following using the quadratic formula.

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$$3x^2 - 2x - 1 = 0$$

 $a = 3$ $b = 0$

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Solve each of the following using the quadratic formula.

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$$3x^2 - 2x - 1 = 0$$

 $a = 3$ $b = -2$

Step 1: Identify the values of a, b, and c.

Step 2: Substitute the value of a, b, and c into the quadratic formula.

Step 3: Evaluate the discriminant: $b^2 - 4ac$.

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Step 1: Identify the values of a, b, and c.

Step 2: Substitute the value of a, b, and c into the quadratic formula.

Step 3: Evaluate the discriminant: $b^2 - 4ac$.

Step 4: Express the solutions in 'best from'.

The Quadratic Formula
If $ax^2 + bx + c = 0$, then $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Solve each of the following using the quadratic formula.

8.
$$3x^2 - 2x - 1 = 0$$

 $a = 3$ $b = -2$ $c = -1$

$$\mathbf{x} = \frac{2}{}$$

Step 1: Identify the values of a, b, and c.

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$$X = \frac{2 \pm}{}$$

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Solve each of the following using the quadratic formula.

8.
$$3x^{2} - 2x - 1 = 0$$

 $a = 3$ $b = -2$ $c = -1$
 $x = \frac{2 \pm \sqrt{}}{}$

Step 1: Identify the values of a, b, and c.

Step 2: Substitute the value of a, b, and c into the quadratic formula.

Step 3: Evaluate the discriminant: $b^2 - 4ac$.

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Solve each of the following using the quadratic formula.

8.
$$3x^2 - 2x - 1 = 0$$

 $a = 3$ $b = -2$ $c = -1$

$$\mathbf{x} = \frac{2 \pm \sqrt{4}}{}$$

Step 1: Identify the values of a, b, and c.

Step 2: Substitute the value of a, b, and c into the quadratic formula.

Step 3: Evaluate the discriminant: $b^2 - 4ac$.

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Solve each of the following using the quadratic formula.

8.
$$3x^2 - 2x - 1 = 0$$

 $a = 3$ $b = -2$ $c = -1$

$$x = \frac{2 \pm \sqrt{4 - 1}}{2 + 2 + 2}$$

Step 1: Identify the values of a, b, and c.

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Step 3: Evaluate the discriminant: $b^2 - 4ac$.

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 $a = 3$ $b = -2$ $c = -1$

$$x = \frac{2 \pm \sqrt{4 - (4)(3)}}{}$$

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8.
$$3x^2 - 2x - 1 = 0$$

 $a = 3$ $b = -2$ $c = -1$

$$x = \frac{2 \pm \sqrt{4 - (4)(3)(-1)}}{2 \pm \sqrt{4 - (4)(3)(-1)}}$$

Step 1: Identify the values of a, b, and c.

Step 2: Substitute the value of a, b, and c into the quadratic formula.

Step 3: Evaluate the discriminant: $b^2 - 4ac$.

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Step 1: Identify the values of a, b, and c.

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Step 3: Evaluate the discriminant: $b^2 - 4ac$.

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$$x = \frac{2 \pm \sqrt{4 - (4)(3)(-1)}}{6} = \frac{2 \pm \sqrt{16}}{6}$$

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$$x = \frac{2 + 4}{6}$$

Step 1: Identify the values of a, b, and c.

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$$x = 1$$

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8.
$$3x^{2} - 2x - 1 = 0$$

 $a = 3$ $b = -2$ $c = -1$

$$x = \frac{2 \pm \sqrt{4 - (4)(3)(-1)}}{6} = \frac{2 \pm \sqrt{16}}{6} = \frac{2 \pm 4}{6}$$

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 $x = \frac{7 \pm \sqrt{49}}{49}$

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