# Lesson 9-6 The Quadratic Formula

Name:____________________

Now that we have the formula, let's use it to solve some quadratic equations! All we need is the values of $a$, $b$, and $c$ to substitute into the formula. When written in standard form, the coefficient of the quadratic term is called $a$, the coefficient of the linear term is called $b$, and the constant term is called $c$.

**The Quadratic Formula** (Part of Skill 17)

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

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Example 1: Solve $x^2 - x - 5 = 0$

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

Substitute into the formula

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

$$x = \frac{1 \pm \sqrt{1+20}}{2}$$

$$x = \frac{1 \pm \sqrt{21}}{2}$$ This is **simplest radical form**

$$x = \frac{1 \pm \sqrt{21}}{2}$$

$$x = \frac{(1+\sqrt{21})}{2} = 2.7912..$$

$$x = \frac{(1-\sqrt{21})}{2} = -1.7912$$

$x = -1.79$ or $x = 2.79$

Example 2: Solve $2x^2 - 5x + 1 = 0$

$a =$ ___ , $b =$ ___ , and $c =$ ___

Substitute into the formula

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

$x =$

$x =$

$x =$ _______

$x =$_______ or $x =$_______

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Use the *quadratic formula* to solve each quadratic equation.

1. $x^2 - 3 = 0$

2. $x^2 = 12$

3. $14n = 12n^2 + 3$

4. $x^2 + 2x = 4$

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

6. $4n^2 - 6n + 1 = 0$

7. $5x^2 - 8x + 2 = 0$

8. $y^2 + y = 11$

9. $3n^2 - 14n = 1$

10. $8p + 7p^2 = 5$

# More Lesson 9-6 The Discriminant

The **discriminant** is the portion of the quadratic formula located UNDER the square root, $b^2 - 4ac$. (The discriminant does **NOT** include the square root, just $b^2 - 4ac$.)

Find the discriminant for each of the following quadratic equations:

1. $x^2 + 2x + 1 = 0$
2. $x^2 + 4 = 0$
3. $x^2 - 8x + 7 = 0$

The <u>discriminant</u> can tell us how many solutions there will be to a quadratic equation (0, 1, or 2). Here's how:

**Using the Discriminant to Identify the Number of Solutions**

In the quadratic formula, $b^2 - 4ac$ is called the **discriminant**.

When $b^2 - 4ac > 0$, there is/are _____ solution(s).

When $b^2 - 4ac = 0$, there is/are _____ solution(s).

When $b^2 - 4ac < 0$, there is/are _____ solution(s).

Use the above principles to identify ***<u>the number of solutions</u>*** to each equation. Remember, only find the discriminant and then describe how many solutions the quadratic equation has based on whether the discriminant is Positive, Negative or equal to zero (use the chart above).
Show your work.

1. $x^2 + 4x - 3 = 0$
2. $2x^2 + x + 5 = 0$

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

4. $3x^2 + 5x = 1$

5. $x^2 = -3$

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

7. $x^2 + x + 1 = 0$

8. $6x + 9 = -x^2$

9. $2x^2 + 5 = 7x$

10. $5x^2 + 3x - 3 = 0$

Mastery Algebra 1 Practice 9-6 Name:______________________________

Per: ____

**9-6 The Quadratic Formula**

**Answer each question as directed.**

1. Given the quadratic equation

$$5x^2 + 9x = -4$$

   a. What value should be used for a in the quadratic formula?

   b. What value should be used for b in the quadratic formula?

   c. What value should be used for c in the quadratic formula?

2. Given the quadratic equation

$$2x^2 + 3x - 20 = 0$$

   a. What is the value of the discriminant?

   b. Use the discriminant to tell how many solutions the equation will have.

Solve each quadratic equation using the quadratic formula. Give your answer in the form indicated.

3. **Give your answer in simplified radical form.**

$$x^2 + 6x = 52$$

Answer: ______________________________

4. **Give your answer rounded to the nearest hundredth.** $8x^2 + 7x - 8 = 0$

Answer: ______________________________