**Quadratic Equation** (2nd degree polynomial)

**Quadratic Equation:** *ax*2 + *bx* + *c* = 0, *a* ≠ 0, where *a*, *b*, and *c* are real numbers.

**Quadratic Function:**  *f* (*x*) = *ax*2 + *bx* + *c*, *a* ≠ 0, where *a*, *b*, and *c* are real numbers.

Both can have real-number or imaginary-number solutions.

***Zeros:*** *Solutions* of *ax*2 + *bx* + *c* = 0.

**Discriminant**

When you apply the quadratic formula to any quadratic equation, you find the value of *b*2 − 4*ac*, which can be positive, negative, or zero. This expression is called the discriminant.

**For *ax*2 + *bx* + *c* = 0, where *a*, *b*, and *c* are real numbers:**

***b*2 − 4*ac* = 0 One real-number solution;**

***b*2 − 4*ac* > 0Two different real-number solutions;**

***b*2 − 4*ac* < 0Two different imaginary-number solutions, complex conjugates.**

**Example 1:** Find the discriminant, and then determine whether one real –number solution, two different real-number solutions, or two different imaginary number solution exists.



**Quadratic Formula: The** solutions of *ax*2 + *bx* + *c* = 0, *a* ≠ 0, are given by **.** This formula can be used to solve any quadratic equation.

**Example 2-6:** **Find the Discriminant, Type of solutions, and solve using the Quadratic Formula.**

**Example 2:**

**Example 3:**

**Example 4:**

**Example 5:**

**Example 6:** **2*x*2 + 5 = 3x**