

Name \_\_\_\_\_

Date \_\_\_\_\_

## 9.6 - The Quadratic Formula & the Discriminant - notes

One more method to go! The *quadratic formula* can be used to solve any quadratic equation.

take note

### Key Concept Quadratic Formula

If  $ax^2 + bx + c = 0$ , and  $a \neq 0$ , then

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

You can use the quadratic formula to solve any quadratic equation.

5. Suppose  $5x^2 - 8x + 3 = 0$ .

Write the values for  $a$ ,  $b$ , and  $c$  in the quadratic formula.

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

Let's try some together:

1.  $9x^2 + 12x + 4 = 0$

2.  $x^2 - 36 = 0$

3.  $4x^2 = -10x + 4$

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

**discriminant**

$$b^2 - 4ac$$

The discriminant is the part of the quadratic formula that appears under the square root sign and can be used to determine the number of solutions. (aka the number of x-intercepts)

**Main Idea:** The value of the **discriminant** tells how many real-number solutions a quadratic equation has.

**Word Origin:** The word **discriminant** comes from the Latin “discriminare,” which means “to distinguish.”

Discriminant $b^2 - 4ac$	positive	zero	negative
Number of Real-Number Solutions	2	1	0

How many solutions do the following quadratics have?

1.  $2x^2 - 3x - 104 = 0$

2.  $3x^2 - 75 = 0$

3.  $6x^2 = -9x - 11$

4.  $4x^2 + 4x + 1 = 0$

There are many methods for solving a quadratic equation. You can always use the quadratic formula, but sometimes another method may be easier.

Method	When to Use
Graphing	Use if you have a graphing calculator handy.
Square Roots	Use if the equation has no $x$ -term.
Factoring	Use if you can factor the equation easily.
Quadratic Formula	Use if the equation cannot be factored easily or at all.