

Algebra 2A Notes

Name: _____

4-7 The Quadratic Formula

Date: _____ Hr: _____

Objective:

- To solve quadratic equations using the Quadratic Formula
- To determine the number of solutions by using the discriminant

Common Core Content Standard:

Reviews A.REI.4.b. Solve quadratic equations by The quadratic formula....

Besides factoring or completing the square, another way to solve a quadratic equation $ax^2 + bx + c = 0$ is to use the _____.

Take Note

Key Concept The Quadratic Formula

To solve the quadratic equation $ax^2 + bx + c = 0$, use the Quadratic Formula.

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

Example 1: Using the Quadratic Formula

What are the solutions? Use the Quadratic Formula.

$$5x^2 - 2x = 2$$

Example 2: Applying the Quadratic Formula

You sell wrapping paper as a charity fundraiser. The equation $p = -6x^2 + 280x - 1200$ models the total profit p as a function of the price x per roll of paper. What is the smallest amount in dollars you can charge per roll of wrapping paper to make a profit of \$1500?

A quadratic equation can have two, one, or zero real solutions. The value $b^2 - 4ac$ under the radical in the quadratic formula tells you how many real number solutions exist. It is called the

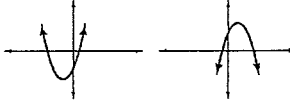
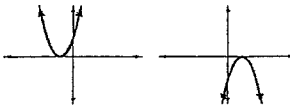
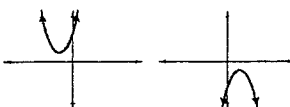
Take note

Key Concept Discriminant

The discriminant of a quadratic equation in the form $ax^2 + bx + c = 0$ is the value of the expression $b^2 - 4ac$.

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

Discriminants and Solutions of Quadratic Equations

Value of the Discriminant	Number of Solutions for $ax^2 + bx + c = 0$	x-intercepts of Graph of Related Function $y = ax^2 + bx + c$
$b^2 - 4ac > 0$	two real solutions	two x-intercepts 
$b^2 - 4ac = 0$	one real solution	one x-intercept 
$b^2 - 4ac < 0$	no real solutions	no x-intercepts 

Example 3: Using the Discriminant

What is the number of real solutions?

a.) $-x^2 + 14x = 49$

b.) $2x^2 - 3x + 7 = 0$

c.) $x^2 = 6x + 5$

Example 4: Using the Discriminant to Solve a Problem

A rocket is launched from the ground with an initial vertical velocity of 150 ft./s. The function $h = -16t^2 + 150t$ models the height in feet of the rocket at time t in seconds. Will the rocket reach a height of 300 ft? Explain your answer.

