Date:

<u>Chapter:</u> Chapter 5:6 --> The Quadratic Formula and Discriminant

Objectives: Solve quadratic equations by using the Quadratic Formula.

Use the discriminant to determine the number and types of roots.

Algebra II

Notes:

Pumpkin catapult is an event in which a contestant builds a catapult and launches a pumpkin at a target. The path of the pumpkin can be modeled by the quadratic function $h = -4.9t^2 + 117t + 42$ where h is the height of the pumpkin and t is the number of seconds.

To predict when the pumpkin will hit the target, you can solve the equation by putting in 0 for h.

$$h = -4.9t^{2} + 117t + 42$$

$$O = -4.9t^{2} + 117t + 42$$

$$\frac{-42}{-49} = -4.9t^{2} + 117t$$

$$\frac{-42}{-49} = -4.9t$$

*Quadratic Formula = Method used to solve any quadratic equation.

How to derive the Quadratic Formula....

$$\frac{ax^{2} + bx + c = 0}{a}$$

$$x^{2} + \frac{bx + c}{a} = 0$$

$$x^{2} + \frac{b}{a}x + \frac{c}{a} = 0$$

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

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

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

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

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

*<u>Discriminant</u> = The number under the radical in the Quadratic Formula.

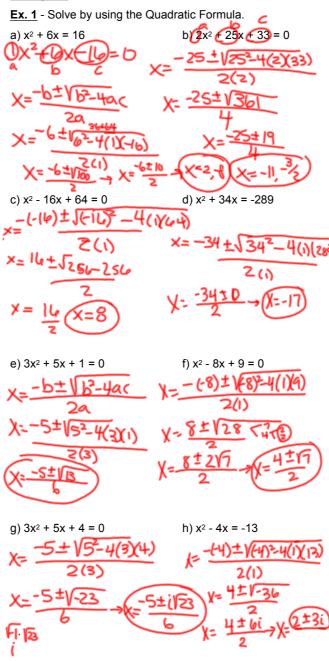
How to get the Discriminant

b² - 4ac

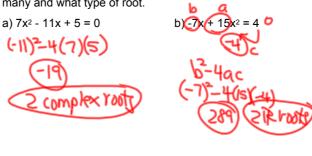
Three Types of Discriminants

- 1) Positive --> 2 Real Roots
- 2) Negative --> 2 Complex Roots
- 3) Zero --> 1 Real Root

Examples:



<u>Ex. 2</u> - Find the value of the discriminant then state how many and what type of root.



Homework:

p. 298 (#14-18 Evens, 22-32 Evens, 43, 50-52)

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