

Study Guide

Quadratic Formula 02/29/2012

Quadratic Formula

A quadratic equation is a polynomial equation in which the highest power of the unknown variable is two.

An example of a quadratic equation is below.

$$x^2 + 6x - 91 = 0.$$

The format of a quadratic equation is $ax^2 + bx + c = 0$. Quadratic equations can be solved by factoring, graphing, or by using the quadratic formula. The quadratic formula is as follows:

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

It can be found in any algebra textbook. This formula should be memorized.

To apply the formula to a quadratic equation, use the quadratic equation format given above as a guideline.

Example 1: Solve the quadratic equation.

$$\begin{array}{ccc} x^2 + 6x - 91 = 0 & & \\ \text{(1)} & \text{(2)} & \text{(3)} \\ x = \frac{-6 \pm \sqrt{6^2 - 4(1)(-91)}}{2(1)} & x = \frac{-6 \pm \sqrt{400}}{2} & x = \frac{-6 \pm 20}{2} \\ \text{(4)} & & \\ x = \frac{-6 + 20}{2} \text{ and } x = \frac{-6 - 20}{2} & & \\ x = \frac{14}{2} & x = \frac{-26}{2} & \\ x = 7 \text{ and } x = -13 & & \end{array}$$

Step 1: Determine the values of a, b, and c and substitute them into the quadratic formula. a = 1, b = 6, and c = -91

Step 2: Determine the value under the radical symbol. 6 squared is 36 and -91 times -4 equals 364. $36 + 364 = 400$

Step 3: The square root of 400 is 20 ($20 \times 20 = 400$).

Step 4: Split the remaining problem into two problems: $(-6 + 20) \div 2$ and $(-6 - 20) \div 2$ and solve the two problems.

The answers are $x = 7$ and $x = -13$.

Example 2: Solve the quadratic equation.

$$5x^2 + 2x + 8 = 4x^2 - 2x + 4$$

