Factoring

Solving Quadratic Equations by Factoring

Quadratic Equations

A **quadratic equation** is given by

$$ax^2 + bx + c = 0$$

where a, b, and c are real numbers with a≠0. We refer to this form as the **standard form** of the equation.

A quadratic equation has an _____ sign whereas a quadratic expression does not. Therefore, a quadratic equation can be _____ for a variable, but a quadratic expression can only be _____.

Example of a quadratic expression:_____

Example of a quadratic equation:_____

The Zero Product Principle

If the product of two or more numbers is equal to zero, then at least one of the numbers must be zero. For real numbers or expressions A and B, if AB = 0, then A = 0 or B = 0.

Example: Solve the following quadratic equations using the Zero Product Principle.

$(x-5)(x+1)=0$

The solution set is_____

$(3x+4)(2x-1)=0$

The solution set is_____

Solving Quadratic Equations by Factoring

1) Simplify the equation by using distribution and combining like terms, if necessary.
2) Move all terms onto one side of the equation so that the other side is 0. This should be in standard form $ax^2 + bx + c = 0$.
3) Factor the expression.
4) Apply the zero product principle, setting each factor equal to zero.
5) Solve the equation(s) that result after the zero product principle was applied.
6) Check that the proposed solution(s) are correct.

Example: Find the solution(s) to the following quadratic equations. Check your solution(s) and state the solution set.

$x^2 - 8x + 15 = 0$

The solution set is_____

$-3x^2 - 3x + 18 = 0$

The solution set is_____

Example: Find the solution(s) to the following quadratic equations. Check your solution(s) and state the solution set.

$y^2 - 25 = 0$

The solution set is_____

$9t^2 = 4$

The solution set is_____

Example: Find the solution(s) to the following quadratic equations. Check your solution(s) and state the solution set.

$x^2 = 8(x-2)$

The solution set is_____

$2x^2 - x + 15 = 30$

The solution set is_____

Example: Find the solution(s) to the following quadratic equations. Check your solution(s) and state the solution set.

$y^3 + 9y^2 = -20y$

The solution set is_____

$(x+2)(2x-5) = x^2 - 4$

The solution set is_____

Example: Two numbers have a sum of 5 and product of -84. Find the numbers.

Example: A rectangle's base is 6in longer than 4 times its height. The area of the rectangle is 28 in^2. Find the rectangle's dimensions.

The rectangle's height is _____. The rectangle's base is _____.