

Name: _____

8A; Algebra 1

Date: _____

Period _____

How Do We Solve Quadratic Equations?

I. An equation of the **second degree** (highest exponent of 2) is called a

_____. Ex: $x^2 + 4x + 4 = 0$

II. The **standard form** of a quadratic equation in one variable is: _____

where a, b, c are real numbers and $a \neq 0$. (Must be in DPO and = to 0).

**Also, there can be no $-x^2$ (we don't know how to factor a $-x^2$ polynomial)

**Quadratic equations must always be in standard form before you solve them!

Write the following equation in standard form: $-3x - 10 = -x^2$ _____

III. Examples:

Transform the following equations into an equivalent quadratic equation in standard form.

1) $5x^2 - 3x = 15$

2) $10g + 8 = g^2$

3) $w(w - 4) = 5$

IV. The following property is very important in solving equations:

Zero Product Property

If a and b are real numbers, then:

$ab = 0$ if and only if $a = 0$ or $b = 0$

This principle is used to solve quadratic equations. For example, to solve the quadratic equation $x^2 - 3x + 2 = 0$, we can write it as $(x - 2)(x - 1) = 0$. The factors $(x - 2)$ and $(x - 1)$ represent real numbers whose product is 0. The equation will be true if either one of the factors is 0, that is, if $(x - 2) = 0$ or if $(x - 1) = 0$.

★ Steps ★

Example: Solve the following quadratic equation:

Step 1: Make sure the equation is in standard form

Step 2: Factor the equation

Step 3: Set both factors equal to 0 (The "T")

Step 4: Solve both sides of the "T"

Step 5: Check each answer in original equation

Check for $x = 2$:

$$\begin{aligned}x^2 - 3x + 2 &= 0 \\(2)^2 - 3(2) + 2 &= 0 \\4 - 6 + 2 &= 0 \\0 &= 0\end{aligned}$$

Check for $x = 1$

$$\begin{aligned}x^2 - 3x + 2 &= 0 \\(1)^2 - 3(1) + 2 &= 0 \\1 - 3 + 2 &= 0 \\0 &= 0\end{aligned}$$

Solve the following Quadratic Equations:

1) $x^2 - 7x = -10$

2) $2x^2 = 3x$

3) $4z^2 - 36 = 0$

4) $5x^2 - 20 = 0$

$$5) 3x^2 = -5x + 2$$

$$6) \frac{x}{2} = \frac{2}{x}$$

$$7) \frac{x+5}{3} = \frac{10}{x-8}$$

$$*8) \frac{x-2}{x} = \frac{5}{x}$$

$$9) \frac{x+2}{2} = \frac{12}{x}$$

$$10) x(x+3) = 40$$