Name: Date: Period:

An equation of the second degree, such as $x^2 - 3x - 10 = 0$ is called a Q**uadratic Equation**. A quadratic equation is in **standard form** when all the terms on one side of the equation are in descending order of exponents and the other side of the equation is zero.

Transforming Equations into Quadratics in Standard Form

Sometimes a Quadratic Equation is disguised. Before you can solve a Quadratic, you must transform it into standard form with one side of the equation equaling zero. (Word of advice: Try to not have a negative x^2 term when transforming.) Transform the following equations into Standard Quadratics.

1. $x^2 + 9x = 10$	2. $x^2 = 3x - 8$	3. $3x^2 = 27x$	4. $x^2 = 2(x + 2)$
5. $x(x - 4) = 5$	6. $2x^2 = 72$	7. $x^2 - 12x = -36$	8. $4x(x - 7) = -48$

Solving Quadratic Equations

For a quadratic that has **at least** an x^2 and an x-term (It may or may not have a constant).

1. Transform into standard form.
2. Factor the non-zero side.
3. Split and set each factor equal to zero.
   Reason: In a multiplication problem, for a product of zero, **at least** one factor must be zero.
4. Solve for x.
5. Check **EACH** value for x in the original equation.

If you are **missing** a first-degree term (the x-term is missing), it is called an INCOMPLETE quadratic.

1. ISOLATE THE x^2 … (x^2 = the constant).
2. Take the square root of both sides.

   $x = \sqrt{n}$ $x = -\sqrt{n}$
3. Simplify radical (whenever possible).

* Note: If you isolate the radical and the constant term on the other side of the equal sign is negative, you have NO REAL SOLUTIONS.

Example:

$x^2 - 3x = -2$
$x^2 - 3x + 2 = 0$
$(x - 1)(x - 2) = 0$
$x - 1 = 0 \quad x - 2 = 0$
$x = 1 \quad x = 2$

Example:

$x^2 - 15 = 0$
$+15 \quad +15$
$x^2 = 15$
$x = \sqrt{15}$
$x = +\sqrt{15}, -\sqrt{15}$

Example:

$x^2 + 25 = 0$
$-25 \quad -25$
$x^2 = -25$
$x = \sqrt{-25}$
No REAL solutions

Let's do some together:

1. $x^2 - 8x + 16 = 0$	2. $x^2 - 7x = -10$	3. $x^2 + 8x + 15 = 0$	4. $x^2 - 3x = 40$
5. $7y^2 = 3y^2 + 36$	6. $4x^2 - 14 = 2x^2$	7. $4y^2 - 13 = y^2 + 14$	8. $\frac{x}{9} = \frac{4}{x}$