Algebra 2 **Name**_____

Notes: 3.1 **Date**_____**Block**_____

Solving Quadratic Equations by Graphing, Using Square Roots, and Factoring

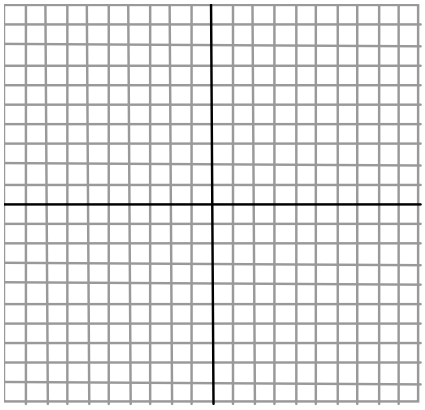
The Basics:

A _____ is an equation that can be written in the standard form _____, where a, b, and c are real numbers and $a \neq 0$. A _____ _____ is a solution of the equation.

I. Solving Quadratic Equations by Graphing

Find the x-intercepts of the related function $y = ax^2 + bx + c$.

Example #1
Find the zeros of $f(x) = -x^2 + 6x - 8$ by using a graph and a table.



II. Solving Quadratic Equations Using Square Roots

Write the equation in the form $u^2 = d$, where u is an algebraic expression, and solve by taking the square root of each side. Remember to account for the positive and negative square root.

Example #2
Solve each equation using square roots.

a) $3x^2 - 4 = 71$

b) $(x - 3)^2 = 16$

c) $4x^2 + 3 = 11$

d) $2(x - 5)^2 = 54$

Additional Examples – Each problem should be solved using square roots.

3. $(x + 6)^2 = 28$

4. $x^2 - 49 = 0$

5. $-2x^2 = -72$

III. Solving Quadratic Equations by Factoring

Zero Product Property:

For all real numbers *a* and *b*, if _____, then _____.

*You can use the Zero Product Property to solve some quadratic equations by factoring.

Example #6

Find the zeros of each function by factoring.

a) $f(x) = x^2 - 8x + 12$

b) $g(x) = 3x^2 + 12x$

c) $h(x) = x^2 - 5x + 6$

Example #7

Find the roots of each equation by factoring.

a) $28x = 4x^2 - 72$

b) $9x^2 = 1$

Additional Examples – Each problem should be solved by factoring.

8. Find the roots of the following equation: $5x^2 + 20 = 20x$

9. Find the zeros of the following function: $g(x) = 9x^2 - x$

10. Find the zeros of the following function: $h(x) = x^2 - 13x + 14$

11. Find the dimensions of a rectangle with an area of 210 cm^2 and whose length is one more than its width.