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NOTES: Section 4.3 – Solve $x^2 + bx + c = 0$ by Factoring

Goals: #1 - I can factor a quadratic in the form $ax^2 + bx + c$ when $a = 1$

#2 - I can factor a difference of two squares.

#3 - I can factor a perfect square trinomial.

#4 - I can use the zero product property to solve $ax^2 + bx + c = 0$ by factoring when $a = 1$

Homework: Lesson 4.3 Worksheet

Warm Up: Graph each function on the same coordinate plane. Identify the graph's axis of symmetry, vertex, *y*-intercept, whether the graph opens up or down, and its maximum/minimum value.

1. $f(x) = -2(x+2)^2 + 6$

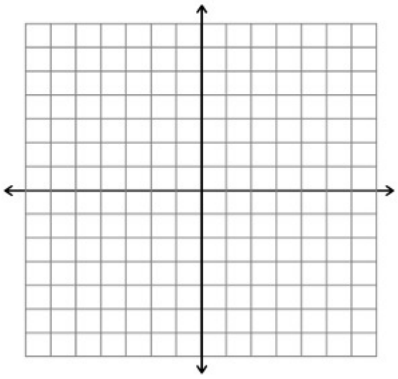
AOS: _____

vertex: _____

y-int: _____

opens: _____

max./min. value: _____



x					
y					

work:

2. $g(x) = \frac{1}{3}(x-1)(x+5)$

AOS: _____

vertex: _____

y-int: _____

opens: _____

max./min. value: _____

x					
y					

work:

Exploration #1: Work with a partner. Find the product.

1. $(m-8)(m-9)$

2. $(y+20)(y-20)$

CHALLENGE: Can you go backwards? Break $x^2 - 9x + 20$ into factors.

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Notes:

A _____ is an expression that is either a number, a variable, or the product of a number and one or more variables.

Examples:

A _____ is the sum of two monomials.

Examples:

A _____ is the sum of three monomials.

Examples:

Example #1: Factor the expression.

1. $x^2 - 9x + 20$ *Factors of 20:*

2. $x^2 + 3x - 12$ *Factors of -12:*

3. $x^2 - 3x - 18$ *Factors of -18:*

4. $r^2 + 2r - 63$ *Factors of -63:*

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Notes:

There are _____ factoring patterns we can look for!

- _____ :

  Examples:

- _____ :

  Examples:

Example #2: Factor the expression.

1. $x^2 - 49$
2. $d^2 + 12d + 36$
3. $q^2 - 9$
4. $y^2 + 16y + 64$

Notes:

We can use _____ to solve certain _____.

We set the quadratic equation equal to _____ and use the _____.

- **Zero Product Property:**

The solutions of a quadratic equation are called the _____ of the equation.

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Example #3: Solve the equation.

1. $x^2 + 2x - 35 = 0$
2. $u^2 = -9u$

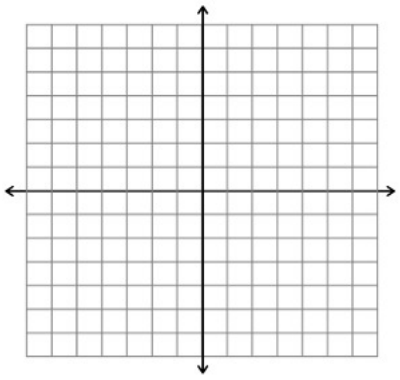
Example #4: Find the roots of the equation.

1. $r^2 + 2r = 80$
2. $a^2 - 49 = 0$

Exploration #1: Work with a partner and answer the following questions.

1. Rewrite the quadratic function in <u>intercept form</u>: $y = x^2 - x - 12$

2. Graph the function you found in #1.



   a. x-int(s):_____

   b. What is the y-value of the x-intercepts?

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Notes:

Recall the _____ of a quadratic function: _____.

Because quadratic function's values are _____ when _____ and _____, these are also called _____ of the function.

Example #5: Find the zeros of the function by rewriting the function in intercept form.

1. $y = x^2 + 12x + 36$
2. $y = x^2 - 7x - 30$

Example #6: The function $y = -1.17(x - 6)^2 + 42$ models the leap of a gymnast where x is the horizontal distance (in inches) and y is the corresponding height (in inches). What is the gymnast's maximum height? How far does she leap?