

## Algebra 2

### Unit 1 Lesson 4 - Factoring "Basic"

#### Quadratics

- What is a Quadratic Function?
- What is Standard Form for a quadratic?
- How to factor quadratic expressions where  $a = 1$ .

## Identifying Quadratic Functions:

A Quadratic function is one where all of these conditions are met.

- Your function has one variable.
- The exponents on your variables are all positive whole numbers
- The largest exponent on your variable is 2.

$$\text{Ex: } f(x) = x^2 + 2x + 3$$

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Go through the following examples and determine if they are quadratic functions or not.

$$f(x) = 3 - 4x^2 \quad \text{yes}$$

$$y = 2x^2 - 3x^4 + 1 \quad \text{no}$$

$$k(x) = x^2 + 5x - 6 \quad \text{yes}$$

$$y = x^2 - 4 \quad \text{yes}$$

$$g(x) = 2x^2 + 3x^{\frac{1}{2}} + 10 \quad \text{no}$$

Standard form for Quadratic functions:

$$f(x) = \underline{ax^2} + \underline{bx} + \underline{c}$$

Standard form requires that your terms are arranged where the exponents are in descending order (going down).

Write the following quadratics in standard form and state a, b, and c for each.

$$y = 16 - x^2$$

$$-x^2 + 0x + 16$$

$$a = -1 \quad b = 0 \quad c = 16$$

$$y = 12 + x^2 - 5x$$

$$y = x^2 - 5x + 12$$

$$a = 1 \quad c = 12$$

$$b = -5$$

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

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

$$a = -3 \quad b = 1$$

$$c = -9$$

## Lesson 4 - Basic Quadratic Factoring

### Factoring Quadratics where $a = 1$ :

Today we are focusing on factoring quadratics where  $a = 1$ . Let's look at a difference of squares example to get an idea of what is happening.

Factor this using a difference of squares.

$$1x^2 - 25 \quad a = 1$$
$$(x+5)(x-5) \quad b = 0$$

Factored  $c = -25$

Now we will factor it using our method for today. (where  $a = 1$ ,  $b = 0$ , and  $c = -25$ )

What to think about: What two numbers

• Multiply to give you  $C$  but Add to give you  $B$ ?

$$-25 \quad 0$$

+5   -5

Once you figure that out, write out your factors like  $(x+5)(x-5)$

This only works for quadratics where  $a = 1$ .

$$1x^2 - 100 \quad (x+10)(x-10)$$
$$(x+10)(x-10)$$

$b = 0$   
 $c = -100$

## Lesson 4 - Basic Quadratic Factoring

$$f(x) = ax^2 + bx + c$$

Ex: Factor  $f(x) = x^2 - 3x + 2$

$a = 1$

$b = -3$

$c = 2$

mult. to 2

and also Adds to -3

factors of 2 : 1, 2

-1, -2

1

$$(x - 1)(x - 2)$$

## Lesson 4 - Basic Quadratic Factoring

Ex 2:  $g(x) = x^2 + 8x + 15$

$c = 15$  ← mult.

$b = 8$  ← add

$+ 5 + 3$

$(x+5)(x+3)$

**Homework:**

Unit 1 Lesson 4 Worksheet -  
Factoring