

# Unit 2 Review

## factoring POLYNOMIALS

- Is there a **GCF**?
- Can you factor by the **DOTS** method?
- Is it a **TRINOMIAL**?
- Can you **FACTOR BY GROUPING**?
- Did your break down all of the factors into **PRIME** factors?

Factor By Grouping 3 times!

1. Factor each of the following completely:

a.  $(2ax + 3a) + (4x + 6)$       b.  $(x^3 - x^2 - 10x + 10) - 3x^2 + 3x$       c.  $6x^2 + 27x - 15$

a.  $a(2x+3) + 2(2x+3)$   
 $(2x+3)(a+2)$

$x^2(x-1) - 10(x-1) - 3x(x-1)$   
 $(x-1)(x^2 - 10 - 3x)$  } Rewrite  
 $(x-1)(x^2 - 3x - 10)$  } Regular trinomial  
 $(x-1)(x-5)(x+2)$

d.  $81x^8 - 1$

$(9x^4 + 1)(9x^4 - 1)$   
 $(9x^4 + 1)(3x^2 + 1)(3x^2 - 1)$

$3(2x^2 + 9x - 5)$   
 $3(x^2 + 9x - 10)$   
 $3(x + \frac{10}{2})(x - \frac{1}{2})$   
 $3(x+5)(2x-1)$

## Roots

- What is another word to represent the **ROOTS** of a function?
- What **TYPE** of roots are there?
- How do you determine how **MANY** roots a function has?
- How do you **WRITE** a **FACTOR** if you know a **ROOT**?

3 ROOTS!

2. Determine algebraically the roots of the function  $f(x) = x^3 - x^2 - 12x$ .

$x(x^2 - x - 12) = 0$   

$x$	$(x-4)$	$(x+3) = 0$
$x=0$	$x-4=0$	$x+3=0$
	$x=4$	$x=-3$

ROOTS  
 $x = 0, 4, -3$

3. Given the graph to the right,

a. Write the zeros of the function.

$$x = -4$$

$$x = A$$

$$x = B$$

b. List out all of the factors of the function.

$$(x+4)$$

$$(x-A)$$

$$(x-B)$$

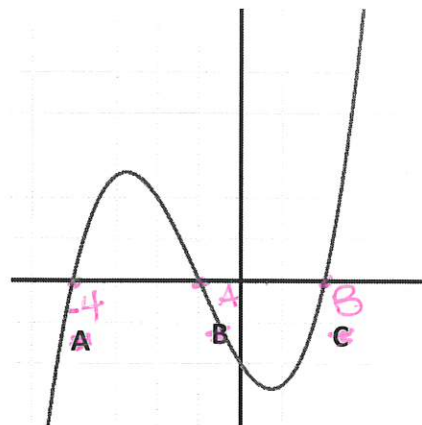
c. Determine the sign of "a".

a is (+)

d. Write a possible equation for the function.

$$f(x) = (x+4)(x-A)(x-B)$$

$$f(x) = (x^2 - Ax + 4x - 4A)(x-B)$$



## Solving Quadratic Equations

- What is **STANDARD FORM** of a quadratic equation?
- What are the **4** different methods for **SOLVING** a quadratic equation?
- When you solve for "**x**", what does that value represent on the **GRAPH** of a quadratic function?

4. Solve the equation  $3x^2 - 2x + 2 = 0$ . Express the answer in simplest  $a + bi$  form.

$$a = 3$$

$$b = -2$$

$$c = 2$$

$$x = \frac{2 \pm \sqrt{(-2)^2 - 4(3)(2)}}{2(3)}$$

$$x = \frac{2 \pm \sqrt{-20}}{6} = \frac{2 \pm 2i\sqrt{5}}{6} = \boxed{\frac{1}{3} \pm \frac{i\sqrt{5}}{3}}$$

5. Solve algebraically for all values of x:

$$\sqrt{2(-2)+13} - 5 \stackrel{?}{=} -2$$

$$3 - 5 = -2 \checkmark$$

$$\sqrt{2(-6)+13} - 5 = -6$$

$$1 - 5 \neq -6$$

$$\sqrt{2x+13} - 5 = x$$

$$(\sqrt{2x+13})^2 = (x+5)^2$$

$$2x+13 = (x+5)(x+5)$$

$$2x+13 = x^2 + 10x + 25$$

$$0 = x^2 + 8x + 12$$

$$0 = (x+2)(x+6)$$

$$x = -2 \quad x = -6$$

$$\boxed{\{-2, -6\}}$$

# Focus and Directrix

- What is **VERTEX** form of a parabola?
- What is the **EQUATION** of a parabola if you know the focus and directrix?
- What does **(h, k)** stand for?
- What does **p** stand for?

6. Given the equation  $y = \frac{-1}{4}(x - 3)^2 + 2$ , determine

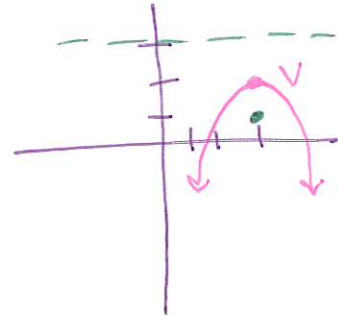
a. The coordinates of the vertex.  $V(3, 2)$

b. The value of "p".  $p = 1$

c. If the parabola opens up or down.  $down$

d. The equation of the directrix.  $y = 3$

e. The coordinates of the focus.  $F(3, 1)$



7. Determine an equation for the parabola with focus  $(-3, 6)$  and directrix  $y = 2$ . (Use of the grid is optional.)

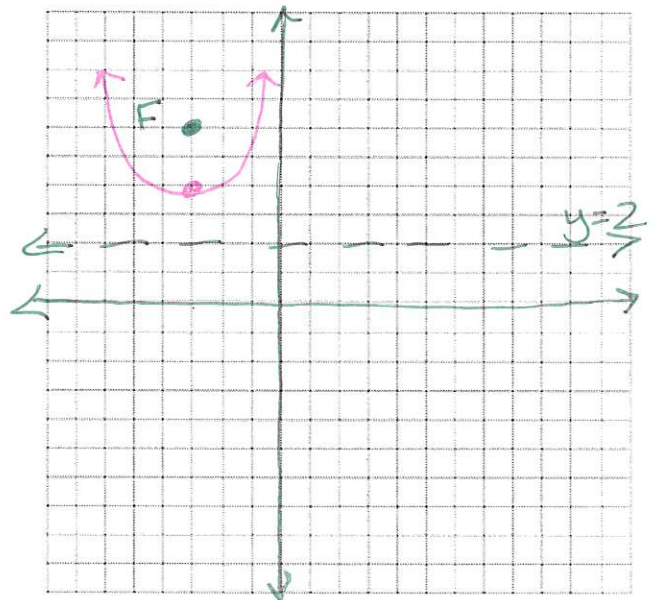
$$p = 2$$

$$a = \oplus$$

$$V(-3, 4)$$

$$y = \frac{1}{4(2)}(x+3)^2 + 4$$

$$y = \frac{1}{8}(x+3)^2 + 4$$



\*\*\*Please be able to recall information from Unit 1, such as Operations with Polynomials, Operations with Complex Numbers, and Simplifying Radicals\*\*\*