

# **Exam Review Algebra II**

## **Chapters 1 – 2**

1st Semester

# Exam

- 43 Questions; 100 points
- #1-15 Short Answer
- #16-28 Chapter 1
- #29-43 Chapter 2
- Bring a calculator. No iPads
- I will have scrap

# Chapter 1: Quadratic Functions

- **Terms:**

- A Quadratic Equation:  $x^2$
- Graph: Parabola
- Forms: Standard, Vertex, Intercept
- Ways to solve a Quadratic: Factoring, Completing the Square, Quadratic Formula
- Minimum or maximum point: Vertex
- Quadratic Formula:  $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
- Conjugate:
- Discriminant:  $b^2 - 4ac$

# Standard Form

$$y = ax^2 + bx + c$$

- To Graph:

- 1. Find Vertex  $(x = \frac{-b}{2a}, y = \text{plug in})$

- 2. Make x/y chart and find 2 points

- Ex:  $y = x^2 + 4x - 3$

- Vertex:  $x = \frac{-4}{2(1)} = -2$   $y = (-2)^2 + 4(-2) - 3 = -7$

- $(-2, -7)$

# Vertex Form

$$y = a(x - h)^2 + k$$

- To Graph:
  - Find Vertex  $(h,k)$
  - Make x/y chart and find 2 points
  
  - Ex:  $y = 3(x - 2)^2 - 5$
  - Vertex  $(2,-5)$

# Intercept Form

$$y = (x - p)(x - q)$$

- To Graph:

- 1. Plot x-intercepts  $p$  and  $q$ . (2 of them)

- 2. Find vertex. ( $x = \frac{p+q}{2}$ ,  $y = \text{plug in}$ )

- Ex:  $y = (x - 4)(x + 6)$

- Vertex  $x = \frac{4+(-6)}{2} = -1$   $y = (-1 - 4)(-1 + 6) = -25$

- $(-1, -25)$

# To Solve Quadratic Equations

- 1. By Factoring:  $y = x^2 + 5x + 4$ 
  - $(x + 4)(x + 1) = 0$   $x = -4, -1$
- 2. By Square Root:  $(x+3)^2 = 24$ 
  - $x + 3 = \sqrt{24}$   $x = \pm 2\sqrt{6} - 3$
- Complete Square  $y = x^2 + 6x - 7$ 
  - $x^2 + 6x + 9 = 7 + 9$   $(x + 3)^2 = 16$

- By Quadratic Formula:  $y = x^2 + 5x + 3$

- $x = \frac{-5 \pm \sqrt{5^2 - 4(1)(3)}}{2(1)} = \frac{-5 \pm \sqrt{13}}{2}$



- **Complex Numbers**

- Simplify

- Add, Subtract – like terms

- Multiply:  $i^2 = -1$

- Rationalize the denominator: use conjugate

# Ch. 2 Polynomials and Polynomial Functions

## Terms:

Polynomial: degree 2 (quadratic), degree 3 (cubic)

If  $(x - k)$  is a factor then  $f(k) = 0$

End Behavior: even same, odd different

Degree = number of solutions

Imaginary and Irrational come in pairs

# Rules of Exponents

- 1.  $x^3 \cdot x^5 = x^8$  (add powers)
- 2.  $(x^3)^2 = x^6$  (mult powers)
- 3.  $\frac{x^8}{x^5} = x^3$  (subt powers)
- 4.  $x^{-2} = \frac{1}{x^2}$  (no neg powers)
- 5.  $x^0 = 1$

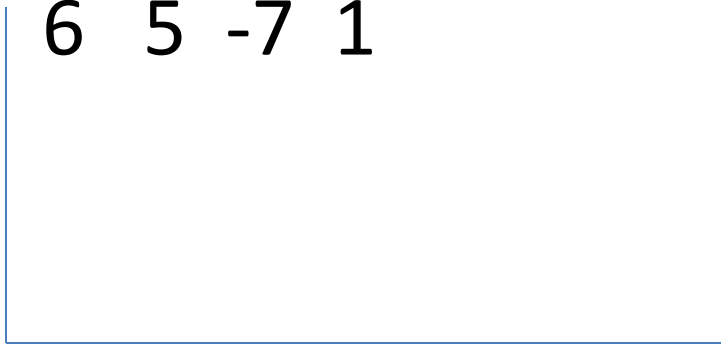
# Factor

- Cubes:  $x^3 + 8 = (x + 2)(x^2 - 2x + 4)$
- 4 terms: Grouping  $2x^3 + 4x^2 + 7x + 14$   
 $(2x^3 + 4x^2) + (7x + 14)$   
 $2x^2(x + 2) + 7(x + 2)$   
 $(2x^2 + 7)(x + 2)$

# Synthetic Division

- $(6x^3 + 5x^2 - 7x + 1) \div (x - 4)$

- $4 \quad 6 \quad 5 \quad -7 \quad 1$



# Solve Polynomials

- 1. Use synthetic division with first solution
- 2. Factor answer
- 3. Highest Power indicates the number of solutions; real and/or imaginary

# Write Equation Given Factors

- Put each solution into factors
- Multiply the factors with FOIL

- Ex Zeros: 1, - 2, 3

$$(x - 1)(x + 2)(x - 3)$$

then multiply

# Graph Polynomials

- Know End Behavior
- Make  $x/y$  chart
- If in factored form: Plot  $x$ -intercepts first