Exam Review Algebra II
Chapters 1 – 3

1st Semester

Exam

- 50 Questions; 100 points
- #1-15 Short Answer
- #16-25 Chapter 1
- #26-39 Chapter 2
- #40-50 Chapter 3
- Bring a calculator. No iPads
- I will have scrap

Chapter 1: Quadratic Functions

- **Terms**:
  - Graph: Parabola
  - Forms: Standard, Vertex, Intercept
  - Ways to solve a Quadratic: Factoring, Completing the Square, Quadratic Formula
  - Minimum or maximum point: Vertex
  - Quadratic Formula:
  - Conjugate:
  - Discriminant: $b^2 - 4ac$

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

- To Graph:
  - 1. Find Vertex $\quad$ (x = $\dfrac{-b}{2a}$, y = plug in)
  - 2. Make x/y chart and find 2 points

  - Ex: $y = x^2 + 4x - 3$
  - Vertex: $\quad$ x $= \dfrac{-4}{2(1)}$ = -2 $\quad$ 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 = 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 = x² + 5x + 3

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

- **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. $\dfrac{x^8}{x^5} = x^3$ (subt powers)
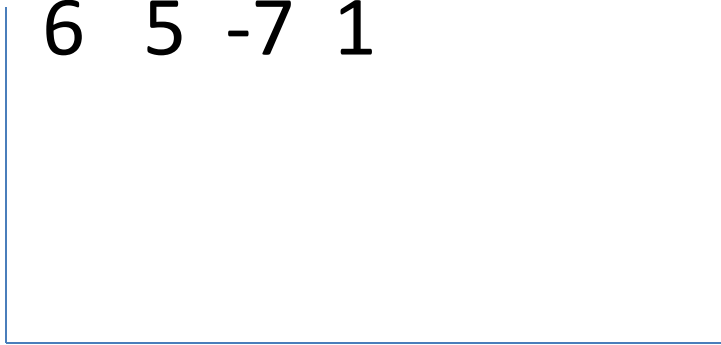- 4. $x^{-2} = \dfrac{1}{x^2}$ (no neg powers)
- 5. $x^0 = 1$

Factor

- Cubes: $x^3 + 8 = (x + 2)(x^2 - 2x + 4)$

- 4 terms: Grouping $\quad 2x^3 + 4x^2 + 7x + 14$

  $(2x^3 + 4x^2) + (7x + 14)$

  $2x^2(x + 2) + 7(x + 2)$

  $(2x^2 + 7)(x + 2)$

Synthetic Division

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

- 4 | 6 5 -7 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

Chapter 3: Rational Exponents and Radical Functions

- **Terms**:

- Function:

- Inverse:

- Domain: x values

- Range: y-values

- **Evaluate:** cubes and rational powers
- **Simplify:** use exponents,
  - know rules of exponents
- **Functions:** add, subtract, f(g(x))
- **Graph**: cube root, square root
- **Solve:** roots and rational powers