Study Guide for Test #1 – M120 Sp 15

- Sets & Notation
  - Subets of Real Numbers (Symbol: ℝ)
    - ✓ Rational Numbers (Symbol: R)
    - ✓ Rational Numbers (Symbol: Q)
    - ✓ Integers (Symbol: I)
    - ✓ Whole Numbers (Symbol: W)
    - ✓ Counting/Natural Numbers (Symbol: N)
  - Setbuilder Notation
    - ✓ Description
    - ✓ Integers: $\{x \mid p, q \in I, x \in {}^p/_q, q \neq 0\}$
  - Roster Form
    - ✓ List of elements
    - ✓ Not for R, Q (unless finite subset of)
    - ✓ Best for a W, I, N
    - ✓ Integers: {…-3, -2, -1, 0, 1, 2, 3, …}
  - Interval Form
    - ✓ Assumes all real numbers within endpoints
    - ✓ Uses [or] to show endpoint inclusion
    - ✓ Uses (or) to show endpoint not included
    - ✓ Infinity is never included, always (or)
    - ✓ Mimics # Line in order property
  - Union
    - ✓ Mathematical "or"
    - ✓ Symbol: ∪
    - ✓ Collection of all
  - Intersection
    - ✓ Mathematical "and"
    - ✓ Symbol: ∩
    - ✓ Overlap
- Solving Simple Linear Inequalities
  - Just like equation **except** when multiply/dividing by negative
    - ✓ Multiply/divide by negative reverses inequality
- Solving a Compound Linear Inequality
  - Intersection (Mathematical "and") of 2 simple inequalities – middle to left & middle to right
  - Solve simply by solving 3 parts
- Function Details
  - Domain, Input, Independent Variable
  - Range, Output, Dependent Variable
- Distinguish Function
  - One input yields ONLY one output
    - ✓ See multiple of same x with different y's is not a function
    - ✓ Multiple outputs same is OK
  - Vertical Line Test
    - ✓ Graph of a function – any vertical line can only touch graph once
  - Recognizing Special Functions Helps
    - ✓ Quadratic, Cubic, Absolute Value, Square Root, Vertical & Horizontal Lines

- Distinguish a LINEAR function & NONLINEAR functions
  - Constant rate of change
- Function Notation
  - $f(x)$ means the dependent value (output)
  - x is the independent value (input)
- All Previous Knowledge Using Function Notation
  - Evaluation of an expression using
  - Values from graphs
  - Values from tables
- Absolute Value Equations & Inequalities
  - Equality – solve with 2 opposite endpoints
  - Inequality
    - ✓ > or ≥ is a union of two
      - ➢ < neg endpoint or > pos endpoint
    - ✓ < or ≤ is an intersection of two
      - ➢ trapped between neg endpoint and pos endpoint as a compound inequality
- Factoring Strategies
  - GCF
    - ✓ Only Factor Method
    - ✓ As a first step
  - By Grouping
  - Trinomials
    - ✓ Perfect Square Trinomial
    - ✓ Leading Coefficient 1
    - ✓ Leading Coefficient not 1
    - ✓ By Grouping
    - ✓ Traditional Method
  - Binomials
    - ✓ Difference of 2 Perfect Squares $a^2 - b^2 = $ (root of 1st + root of 2nd)(root of 1st – root of 2nd)
    - ✓ Sum of 2 Perfect Squares – Prime
    - ✓ Sum & Difference of 2 Cubes $a^3 + b^3 = (a + b)(a^2 - ab + b^2)$ & $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$
- Solving Quadratic Equations
  - Zero Factor Property
    - ✓ Std. Form, Factor & Set Factors Equal to Zero to Solve
- Applications of Quadratics
  - Parabolic Motion Problems to find time at given height or when object hits the ground
  - Areas of Geometric figures & Pythagorean Theorem Problems
  - X-Intercepts of a parabola