Units 11, 12, & 13 Exam Review
Quadratic Functions & Applications

- **Standard form of a Polynomial** $y = ax^2 + bx + c$
  - Exponents arranged in descending order (highest to lowest)
- **Naming Polynomials**
  - First Name based on degree
  - Last Name based on number of terms
- **Simplifying Polynomials**
  - Combine terms with the same exponent
  - The exponent does NOT change when adding/subtracting terms; only the coefficients change!
- **Multiplying Polynomials**
  - FOIL
    - First, Outside, Inside, Last
  - Squaring a Binomial
    - Multiply binomial times itself
- **Factoring Polynomials**
  - Greatest Common Factors
    - Largest degree/number that can be factored out of ALL terms
  - Given 4 terms – Grouping
    Step 1: Factor out GCF of all 4 terms
    Step 2: Group the first two terms together and the last two terms
    Step 3: Factor out the GCF of each group
  - Step 4: Your GCF's are one factor and what's in the ( ) are the other→ Make sure the parenthesis match!
  - Given 3 terms – Grouping and M|A Chart T-chart+
    1) Factor out any GCF of all 3 terms
    2) Calculate "***ac***" and construct M|A chart
    3) Look for factors of "***ac***" that add up to "***b***"
    4) Rewrite "***bx***" term to make 4 terms using those values
    5) Group the
  - Given a subtracted binomial – use Difference of Squares
    1) Determine what is being squared
    2) Write the factors as conjugates (_x+___)(_x-___) from what you determined was being squared in Step 1.
- **Quadratics with a Calculator**
  - Vertex: 2nd CALC → 3:minimum or 4:maximum
  - X – intercepts: 2nd CALC→ 2:zeros
  - Y – intercepts or for a given x-value: 2nd CALC → 1:value
- **Solving Quadratics**
  - Solutions, Zeros, X-intercepts – all asking for same thing!
  - Find the x-intercepts by graphing
  - Factor the polynomial and set each factor equal to zero to solve
- **Projectile Motion**
  - What is the min/max? Find vertex
  - When does it hit the ground? Find x-intercept(s) "zero"
  - When is it at a certain height? Set equal to equation and subtract to get equal to zero, then find x-intercept(s)
  - What height is it at certain time? Go to table, find x-value for that time
- **Area/ Consecutive Integer Problems**
  - Set length and width factors equal to area
  - Solve by graphing or factoring (must be equal to zero first!)

Degree	First Name
0	Constant
1	Linear
2	Quadratic
3	Cubic
4	Quartic
5	Quintic

Number of Terms	Last Name
1	Monomial
2	Binomial
3	Trinomial
4	Polynomial
5	Polynomial

$(2x-3)(x+5)$

$2x^2 + 10x - 3x - 15$

$2x^2 + 7x - 15$

$(8y^3 - y + 7) - (6y^3 + 3y - 3)$

$-6y^3 - 3y + 3$

$2y^3 - 4y + 10$

$3x^2 + 10x + 3$ $\quad a \cdot c \quad b$

9	10
9·1	

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

$3x(x+3)\ 1(x+3)$

$(x+3)(3x+1)$

$4x^2 - 81$

$(2x+9)(2x-9)$