**8th Grade Advanced Algebra Concepts**

**Section Breakdown**

**Section 1**

Addition

 Multi-digit with and without carrying

Subtraction

 With and without borrowing

Multiplication

 Multi-digit

Division

 With and without remainders

Order of Operations

 Using all four operations

Same operations with decimals

Same operations with fractions

Same operations with positives and negatives

All of Section 1 to be done WITHOUT calculators

**Section 2**

What is a Rate and a ratio?

Setting up proportions and using equivalent fractions

Means and extremes

Setting up and solving word problems with proportions

**Section 3**

Algebraic Properties

Algebraic process to solving problems

 How to “undo” a problem

Setting up and solving one-step problems

 Use all four operations

Setting up and solving two-step problems

 Using add/subtract with multiply/divide

Like and unlike terms

Solving Multi-step problems

Exponents:

 How they are read and used

 Squares and square roots chart

 Cubes and cubed roots chart

Simplifying radicals

Numerical hierarchy

**Section 4**

Geometric problems:

 Creation of formulas – history:

 Polygons and names of the figures

Using formulas to measure distance:

 Perimeter

 Square

 Rectangle

 Other polygons

 Circumference

Using formulas to measure area:

 Rectangle

 Square

 Triangle

 Trapezoid

 Parallelogram

 Circles

Using formulas to measure surface area:

 Cube

 Rectangular solid

 Sphere

 Cylinder

 Cone

Using formulas to measure volume:

 Cubes

 Rectangular solid

 Triangular solid

 Spheres

 Cylinders

 Cones

Pythagorean Theorem

Applying problem solving technique to geometric problems

**Section 5**

Introduction to polynomials

 Monomials, binomials, trinomials, polynomials

 Constant, linear, quadratic, cubic

 Understanding exponents and degree of a polynomial

Add/Subtract - like terms

Multiplying – distributive property

Rules of exponents when combining

Factoring – basic

**Section 6**

Linear functions

Understanding linear equations – graphing

Understanding slope and y-intercept and effects on graph

 Parallel and perpendicular lines

**Section 7**

Understanding all parts of y = x2 and y = ax2 + bx + c

 How quadratics are graphed and the parabolas they make

 Line of symmetry

 Vertex

**Section 8**

Factoring Quadratics

 Reading to factor

 Completing the square

 Quadratic formula