**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