

### **Overview of Major Math Topics Addressed in Grade 9**

Directions: In addition to the objectives listed in your Algebra 1 textbook, I am providing you with a list of the major topics you are expected to master before June. Any topics not found in the textbook will be provided by my supplementary handouts throughout the year. In the event of an absence, it is very important that all missed notes be copied into your math notebooks.

- Properties of Real Numbers (These should be well memorized by now!)
- Scientific Notation
- Algebra Problems and Word Problems with Fractions, Decimals, Percents, and Proportions
- Factorials: evaluate and simplify expressions
- Calculate Rates Using Appropriate Units: application of proportions
- Conversions within Measurement Systems: include problems with more than one unit given
- Operations with Monomials and Polynomials
- Translate Words into Algebraic Expressions or Equations (and vice versa)
- Solve Simple and Complex Linear Equations (including required checks)
- Solve Linear Inequalities (including multiple checks)
- Graph a Line (ordered pairs, slope, intercepts, slope-intercept form, point-slope form, write an equation for a line)
- Graph a Linear Inequality (solid or dashed reference line, determine where to shade)
- Solve and Check Systems of Equations (graphically and algebraically using the substitution or elimination methods)
- Solve Systems of Inequalities (determine whether a given point is in the solution set)
- Factoring (greatest common monomial factors, difference of two perfect squares, trinomials, factoring out a negative GCF)
- Simplifying Algebraic Fractions
- Add and Subtract Algebraic Fractions (like and unlike denominators)
- Multiply and Divide Algebraic Fractions
- Graph Quadratic Equations (use a table of values, determine axis of symmetry using the formula, determine the vertex algebraically or graphically)
- Solve Quadratic Equations (factoring method, formula for quadratic equation)
- Solve Systems of Linear and Quadratic Equations
- Identify, Graph, and Solve Exponential Functions (include problems involving exponential growth and decay)
- Identify and Graph Absolute Value Functions
- Simplify Radicals (perfect square radicand, radicand with perfect square factor)
- Add and Subtract Like and Unlike Radicands
- Multiply Radical (using the distributive property)
- Divide Radicals

- Applications involving the Pythagorean Theorem
- Applications of Basic Trigonometric Functions (sine, cosine, tangent, SOHCAHTOA)
- Geometry Review: Finding the Perimeter of Figures Algebraically
- Geometry Review: Finding the Area of Figures Algebraically
- Geometry Review: Find the Volume of a Cube, Rectangular Prism, Cylinder
- Geometry Review: Find the Surface Area of a Cube, Rectangular Prism, Cylinder
- Calculate Relative Error
- Set Theory (use set builder and/or interval notation, roster notation, subset, universal set, complement, null set, intersection of sets, union of sets)
- Review of Probability (sample space, simple, independent and dependent events, Fundamental Counting Principle)
- Review of Permutations and Combinations
- Review of Statistics (categorize data, measures of central tendency, histograms, percentiles, box-and-whisker plot, biased data, scatterplots)

The New Common Core clusters many of the above topics in the following five units:

#### Unit 1: Relationships Between Quantities and Reasoning with Equations

- Reason quantitatively and use units to solve problems.
- Interpret the structure of expressions.
- Understand solving equations as a process of reasoning and explain the reasoning.
- Solve equations and inequalities in one variable.

#### Unit 2: Linear and Exponential Relationships

- Extend the properties of exponents to rational exponents.
- Solve systems of equations.
- Represent and solve equations and inequalities graphically.
- Understand the concept of a function and use function notation.
- Interpret functions that arise in applications in terms of a context.
- Analyze functions using different representations.
- Build a function that models a relationship between two quantities.
- Build new functions from existing functions.
- Construct and compare linear, quadratic, and exponential models and solve problems.
- Interpret expressions for functions in terms of situations they model.

#### Unit 3: Descriptive Statistics

- Summarize, represent, and interpret data on a single count or measurement variable.
- Summarize, represent, and interpret data on two categorical and quantitative variables.
- Interpret linear models.

#### Unit 4: Expressions and Equations

- Interpret the structure of expressions.
- Write expressions in equivalent forms to solve problems.
- Perform arithmetic operations on polynomials.
- Create equations that describe numbers or relationships.
- Solve equations and inequalities in one variable.
- Solve systems of equations.

#### Unit 5: Quadratic Functions and Modeling

- Use properties of rational and irrational numbers.
- Interpret functions that arise in applications in terms of a context.
- Analyze functions using different representations.
- Build a function that models a relationship between two quantities.
- Build new functions from existing functions.
- Construct and compare linear, quadratic, and exponential models and solve problems.

***Please Note: This is merely a list of the general areas that need to be mastered. Some of these topics have already been introduced in the lower grades. How many do you instantaneously recall? These are the areas you may consider to be mastered. Focus your study attention on those areas which have not reached the “mastered” status!***

***It is also required that the students obtain a newly revised copy of the Barron’s Regents Review for Algebra 1 Common Core some time over the Christmas recess. Review for these tests begins immediately following the midterm exams. The students are required to complete all work in a separate notebook that may be “spot-checked” at any time.***