Adopted June, 2010

Algebra 1-2

1. Students will communicate number sense concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines. Students will:

Number System:
- Compare, contrast and apply the properties of numbers and the real number system, including rational and irrational numbers. MA 12.1.1.b

Operations:
- Use drawings, words, and symbols to explain the effects of such operations as multiplication and division, and computing positive powers and roots on the magnitude of quantities (e.g., if you take the square root of a number, will the result always be smaller than the original number? (e.g., \( \sqrt{\frac{1}{4}} = \frac{1}{2} \)) MA 12.1.2.a
- Use drawings, words, and symbols to explain that the distance between two numbers on the number line is the absolute value of their difference. MA 12.1.2.b

Computation:
- Compute accurately with real numbers MA 12.1.3.a
- Simplify exponential expressions (e.g., powers of \(-1, 0, \frac{1}{2}, 3^2 \times 3^4 = 3^6\)) MA 12.1.3.b
- Multiply and divide numbers using scientific notation MA 12.1.3.c
- Select, apply, and explain the method of computation when problem solving using real numbers (e.g., models, mental computation, paper-pencil, or technology) MA 12.1.3.d

Estimation:
- Use estimation methods to check the reasonableness of real number computations and decide if the problem calls for an approximation or an exact number (e.g., \(10 \pi \) (pi) is approximately 31.4, square and cube roots) MA 12.1.4.a
- Distinguish relevant from irrelevant information, identify missing information and either find what is needed or make appropriate estimates MA 12.1.4.b

2. Students will communicate geometric concepts and measurement concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines. Students will:

Coordinate Geometry:
- Use coordinate geometry to analyze geometric situations (e.g., parallel lines, perpendicular lines) MA 12.2.2.a

Measurement:
- Apply appropriate units and scales to solve problems involving measurement MA 12.2.5.b
- Convert equivalent rates (e.g., feet/second to miles/hour) MA 12.2.5.d
- Know that the effect of a scale factor \( k \) on length is to multiply each by \( k \) MA 12.2.5.g
3. Students will communicate algebraic concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines. Students will:

**Relationships:**
- Represent, interpret, and analyze functions with graphs, tables, and algebraic notation and convert among these representations (e.g., linear, non-linear)  MA 12.3.1.a
- Identify domain and range of functions represented in either symbolic or graphical form (e.g., linear, non-linear) MA 12.3.1.b
- Identify the slope and intercepts of a linear relationship from an equation or graph  MA 12.3.1.c
- Identify characteristics of linear and non-linear functions  MA 12.3.1.d
- Graph linear functions MA 12.3.1.e
- Compare and analyze the rate of change by using ordered pairs, tables, graphs, and equations  MA 12.3.1.f
- Graph and interpret linear inequalities MA 12.3.1.g
- Represent, interpret, and analyze linear functions and their inverses MA 12.3.1.h
- Determine if a relation is a function MA 12.3.1.i

**Modeling:**
- Model contextualized problems using various representations (e.g., graphs, tables, one variable equalities, one variable inequalities, linear equations in slope intercept form, inequalities in slope intercept form, system of linear equations with two variables) MA 12.3.2.a
- Represent a variety of quantitative relationships using linear equations and one variable inequalities MA 12.3.2.b
- Analyze situations to determine the type of algebraic relationship (e.g., linear, nonlinear) MA 12.3.2.c
- Model contextualized problems using various representations for non-linear (quadratic and absolute value) functions MA 12.3.2.d

**Procedures:**
- Explain/apply the reflexive, symmetric, and transitive properties of equality MA 12.3.3.a
- Simplify algebraic expressions involving exponents (e.g., $(3x^3)^2$) MA 12.3.3.b
- Add and subtract polynomials MA 12.3.3.c
- Multiply and divide polynomials (e.g., divide $x^3 - 8$ by $x - 2$, divide $x^4 - 5x^3 - 2x$ by $x^3$) MA 12.3.3.d
- Factor polynomials MA 12.3.3.e
- Identify and generate equivalent forms of linear equations MA 12.3.3.f
- Solve linear equations and inequalities including absolute value MA 12.3.3.g
- Identify and explain the properties used in solving equations and inequalities MA 12.3.3.h
- Solve quadratic equations (e.g., factoring, graphing, quadratic formula) MA 12.3.3.i
- Evaluate polynomial and rational expressions and expressions containing radicals and absolute values at specified values of their variables MA 12.3.3.j
- Solve an equation involving several variables for one variable in terms of the others MA 12.3.3.o
- Analyze and solve systems of two linear equations in two variables algebraically and graphically MA 12.3.3.p

4. Students will communicate data analysis/probability concepts using multiple representations to reason, solve problems, and make connections within mathematics and across disciplines. Students will:

**Display and Analysis:**
- Interpret data represented by the normal distribution and formulate conclusions MA 12.4.1.a
- Compute, identify, and interpret measures of central tendency (mean, median, mode) when provided a graph or data set MA 12.4.1.b
- Explain how statistics are used or misused in the world MA 12.4.1.e
- Create scatter plots, analyze patterns, and describe relationships in paired data MA 12.4.1.f

**Predictions and inferences:**
- Compare data sets and evaluate conclusions using graphs and summary statistics MA 12.4.2.a
- Support inferences with valid arguments MA 12.4.2.b
- Develop linear equations for linear models to predict unobserved outcomes using a line of best fit MA 12.4.2.c

**Probability:**
- Construct a sample space and a probability distribution MA 12.4.3.a
- Determine the relative frequency of a specified outcome of an event to estimate the probability of the outcome MA 12.4.3.e