

COMPONENT	OBJECTIVES	COMPETENCY
<p>I Number Sense, Concepts and Operations</p>	<ol style="list-style-type: none"> 1. Explain and explore the concept of absolute value, scientific notation, and exponents. Solve problems involving absolute value, scientific notation, and exponents. (MA.A.1.4.4) 2. Classify real numbers as whole numbers, integers, rational numbers, irrational numbers; justify the classification using manipulatives, Venn diagrams, or graphs. (MA.A.1.4.1) 3. Represent the above classification of real numbers on a number line and explain the representation. Use manipulatives where appropriate. (MA.A.1.4.2) 4. Understand, simplify and evaluate numerical and algebraic expressions, and solve equations. 5. Understand and explain the basic operations of addition, subtraction, multiplication and division on real numbers, including integers, rational numbers, square roots, exponents (i.e., laws of exponents), and inverse relationships. (MA.A.3.4.1) 6. Use technology (i.e., calculators, computers) and manipulatives to discover number patterns; determine whether pen and pencil, mental math (i.e., rules of divisibility) or calculators are the best method for performing manipulation of primes (of numbers and expressions), factors (of numbers and expressions), multiples (of numbers and expressions) and exponents (of numbers and expressions). (MA.A.3.4.3) 7. Apply special number relationships (i.e., sequences and series) to concrete and real world problems. (MA.A.5.4.1) 	<ol style="list-style-type: none"> A. Demonstrate understanding of the different ways numbers are used in the real world. B. Demonstrate understanding of number systems. C. Demonstrate and understanding of the effects of operations on numbers and the relationships among these operations, select appropriate operations, and compute for problem solving.

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<p>II Measurement</p>	<p>8. Use estimation strategies in real-world applications to predict results (i.e., interpolation and extrapolation) and to check the reasonableness of results. (MA.A.4.4.1)</p> <p>9. Explain and explore the properties of real numbers. Justify equivalence, equality and order with real life context. (MA.A.1.4.3)</p> <p>10. Explore basic concepts of limits and infinity (i.e., the real numbers). (MA.A.2.4.1)</p> <p>11. Apply the field properties of real numbers: inverse, identity, commutative, associative and distributive; and the properties of equality: reflexive, symmetric and transitive, to facilitate mathematical computation in real-world problem situations. (MA.A.3.4.2)</p> <p>1. Use concrete and graphical models to derive formulas for finding perimeter, circumference, area, surface area, and volume of two- and three-dimensional shapes. (MA.B.1.4.1)</p> <p>2. Apply and explain formulas relating to perimeter, area, and volume. (MA.B.1.4.1)</p> <p>3. Use concrete and graphic models for finding distance, rate and time; including angle measures and arc lengths. (MA.B.1.4.2)</p> <p>4. Apply and explain formulas relating to distance rate and time (MA.B.1.4.2)</p> <p>5. Solve real-world problems involving measurement (i.e., investigations involving, direct and indirect variation, similarity and proportionality). (MA.B.1.4.3)</p>	<p>D. Use estimations in problem solving and computation.</p> <p>E. Demonstrate understanding of and apply theories related to numbers.</p> <p>A. Measure quantities in the real world and use the measure to solve problems.</p>

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III Geometry	<p>6. Solve real-world problems involving rated measures (i.e., correlate miles per hour, feet per second to the concept of slope). (MA.B.2.4.2)</p> <p>7. Collect, organize and interpret data by constructing charts, tables and graphs to approximate and predict outcomes of time, weight/mass, temperature, money, perimeter - linear, and area - square. (MA.B.3.4.1)</p> <p>8. Investigate and solve problems of standard (customary and metric units) and non-standard measurement and determine reasonableness of results. (MA.B.2.4.1)</p> <p>9. Solve real-world and mathematical problems involving exact/estimates of measurement (i.e., time, weight/mass, temperature, money, perimeter - linear, area - square, and volume - cubic) and the effects of measurement errors on calculations. (MA.B.3.4.1)</p> <p>1. Develop formal and informal arguments of proof for the properties of geometric shapes. (MA.C.1.4.1)</p> <p>2. Investigate the properties of lines (i.e., perpendicularity and parallelism) and concepts of congruency, similarity, and symmetry of geometric shapes (MA.C.2.4.1)</p> <p>3. Represent and apply geometric properties and relationships to solve real-world mathematical problems (i.e., ratio, proportion and properties of right triangles: 45°-45°-90°, 30°-60°-90°, and the ratios of sine, cosine, and tangent). (MA.C.3.4.1)</p>	<p>B. Compare, contrast, and convert within systems of measurement (both standard/non-standard and metric/customary).</p> <p>C. Estimate measurements in real-world problem situations.</p> <p>A. Visualize and illustrate ways in which shapes can be combined, subdivided, and changed.</p>

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IV Algebraic Thinking	<ol style="list-style-type: none"> 4. Use transformations (i.e., reflections, translations, rotations, and dilation) to describe geometric patterns in the Cartesian plane. (MA.C.2.4.1) 5. Graph and solve linear equations and systems in a coordinate plane, and relate the geometric solution to the algebraic solution, with and without technology. (MA.C.3.4.2) 6. Apply the properties and algebraically verify the concepts of distance, midpoint, and slope, using graphs in the Cartesian plane. (MA.C.3.4.2) 1. Identify and classify polynomials (i.e., number of terms, degree, leading coefficient). (MA.D.1.4.1) 2. Describe and represent patterns and algebraic relationships found in charts, tables and graphs and draw conclusions/predictions (i.e., interpolate, extrapolate). (MA.D.1.4.1) 3. Solve concrete and real world problems using patterns and functions. (MA.D.1.4.1) 4. Identify, analyze and explain characteristics of linear and quadratic graphs (i.e., range, domain, relation/function, x and y intercepts, roots or zeroes of a function). (MA.D.1.4.2) 5. Understand the concept of variable, expression and equation; is able to translate English phrases and sentences into algebraic expressions and equations, and vice-versa. (MA.D.1.4.1) 	<ol style="list-style-type: none"> B. Use coordinate geometry to locate objects in two dimensions and to describe objects algebraically. A. Describe, analyze, and generalize a wide variety of patterns, relations and functions. B. Use expressions, equations, inequalities, graphs, and formulas to represent and interpret situations.

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<p>V Data Analysis and Probability</p>	<p>6. Represent through modeling, real-world problem situations using finite graphs, matrices, sequences and series. (MA.D.2.4.1)</p> <p>7. Solve real-world problems using a system of two first-degree equations and inequalities in two variables. (MA.D.2.4.2)</p> <p>8. Model equations and polynomial operations graphically (i.e., area models). (MA.D.2.4.2)</p> <p>1. Collect, organize, analyze and interpret data by constructing charts, tables, and graphs to predict and explain outcomes. (MA.E.1.4.1)</p> <p>2. Explore the concepts of central tendency (i.e., mean, median, mode) and dispersion (i.e., range, standard deviation and variance) for real world data using graphing calculator and/or computer. (MA.E.1.4.2)</p> <p>3. Collect, organize, analyze and interpret data by investigating the measures of central tendency and dispersion to make predictions of larger populations with the use of graphing calculators. (MA.E.1.4.3)</p> <p>4. Solve problems using the algebraic concepts related to probability and statistics (i.e., tree diagrams). (MA.E.2.4.1)</p> <p>5. Explore and simulate the possible outcomes for probability of simple and compound events, including independent and dependent events. (MA.E.2.4.2)</p> <p>6. Investigate experimental design using more than one variable; analyze and interpret results. (MA.E.3.4.1)</p>	<p>A. Demonstrate understanding and use of the tools of data analysis for managing information.</p> <p>B. Identify patterns and make predictions from an orderly display of data using concepts of probability and statistics.</p>

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	<p>7. Demonstrate the use and limitations of statistics in real-world problems and justify the conclusions or lack of conclusions through valid arguments. (MA.E.3.4.2)</p>	<p>C. Use statistical methods to make inference and valid arguments about real-world situations.</p>