Mathematics (6-8)
Graduation Standards and Essential Outcomes

Mathematics Graduation Standard 1

NUMBER AND QUANTITY: Reason and model quantitatively, using units and number systems to solve problems.

Common Core State Standards – Key

EE – Expressions & Equations
G – Geometry
NS – Number System
RP – Ratios & Proportional Relationships
SP – Statistics & Probability

6 Essential Outcomes

A. Solve fractions (including real-world) using each of the four operations. (NS.1)

B. Solve decimals (including real-world) using each of the four operations. (NS.3)

C. Find the GCF and LCM of various sets of numbers. (NS.4)

D. Compare, order and use integers. (NS.5)

E. Understand a rational number as a point on a number line and an ordered pair in any quadrant on the coordinate plane. (NS.6, 8)

F. Understand ordering and absolute value of rational numbers. (NS.7)

G. Understand the relationship between

7 Essential Outcomes

A. Compute unit rates associated with ratios of fractions in like or different units. (RP.1)

B. Recognize and represent proportional relationships between quantities. (RP.2)

C. Analyze proportional relationships and use them to solve real-world and mathematical problems. (RP.3)

D. Perform addition and subtraction with integers. (NS.1)

E. Perform multiplication and division with integers. (NS.2)

F. Apply properties of operations as strategies to perform all four operations on any rational numbers, including real world problems. (NS.1, 2, 3)

8 Essential Outcomes

A. Define irrational numbers, understand their unique properties, and compare the size of irrational numbers using rational approximations. (NS.1, 2)

fractions, decimals, and percent and practice moving fluidly between the three forms. (Local)

H. Understand the concept of a ratio, a unit rate, and use ratio language to describe relationships between two quantities. (RP.1, 2)

G. Know that the decimal form of a rational number terminates in zero or eventually repeats. (NS.2)

Mathematics Graduation Standard 2

ALGEBRA: Interpret, represent, create and solve algebraic expressions.

6 Essential Outcomes

A. Write and evaluate numerical expressions using whole number exponents. (EE.1)

B. Write, read, and evaluate expressions with variables. (EE.2)

C. Apply the properties of operations to generate equivalent expressions and to identify when two expressions are equivalent. (EE.3, 4)

D. Understand that equalities and inequalities are true based on whether a given number in set, when substituted into the problem, makes it true. (EE.5)

E. Write an inequality to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form $x > c$ or $x < c$ have infinitely many

7 Essential Outcomes

A. Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. (EE.1)

B. Write and solve multi-step equations posed with any rational number in any context. Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. (EE.3)

C. Develop an understanding of variables, using words and symbols to represent patterns and relationships in any context, and construct simple equations and inequalities to solve problems. (EE.4)

8 Essential Outcomes

A. Know and apply the properties of integer exponents to generate numerical expressions. (EE.1)

B. Use square root and cube root symbols to represent solutions to equations in the form of $x^2 = p$, where p is a positive rational number. (EE.2)

C. Know and apply the rules of exponents and scientific notation to solve problems. (EE.3, 4)

D. Develop a deep understanding of the concept of slope and understand that unit rate is the slope of the graph. (EE.5, 6)

E. Analyze and solve linear equations. (EE.7)

F. Analyze and solve pairs of simultaneous

solutions; represent solutions of such inequalities on number lines. (EE.8)

F. Use variables to represent two quantities in real-world problems that change in relation to one another (dependent and independent). (EE.9)

G. Draw polygons in the coordinate plane given coordinates for the vertices. Apply these techniques in the context of solving real-world and mathematical problems. (G.A.3)

linear equations. (EE.8)

FUNCTIONS: Interpret, analyze, construct, and solve linear, quadratic, and trigonometric functions.

N/A

N/A

A. Understand that a function is a rule that assigns to each input exactly one output. Understand the graph of a function is the set of ordered pairs consisting of an input and the corresponding output. (F.1)

B. Write, graph, and interpret the equation y = mx + b as defining a linear function whose graph is a straight line. (F.3+EE.6)

C. Write a linear function for pairs of data. (F.4)

D. Interpret or create graphs that represent changing rates, using words such as, increasing, decreasing, and constant. (F.5)

GEOMETRY: Prove, understand, and model geometric concepts, theorems, and constructions to solve problems.

A. Calculate the area of regular and irregular two- dimensional polygons by decomposing them into triangles and rectangles. (G.1)

B. Find the volume of right rectangular prisms and apply relevant formulas including appropriate units. (G.2)

A. Use proportions to solve problems involving scale drawings. (G.1)

B. Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions using a ruler and protractor. (G.2)

C. Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids. (G.3)

D. Find the area and circumference of a circle using formulas. (G.4)

E. Use supplementary, complementary, vertical, and adjacent angles to solve for an unknown angle in a figure. (G.5)

F. Find area, volume, and surface area of complex two- and three-dimensional figures using formulas and models. (G.6)

A. Identify, define, verify, and perform transformations in a coordinate plane using prime notation. (G.1, 2, 3, 4)

B. Describes angle relationships when parallel lines are cut by a transversal. (G.5)

C. Develop, use, and apply the Pythagorean Theorem to solve problems. (G.6, 7)

D. Apply the Pythagorean Theorem to find distances on a coordinate plane. (G.8)

E. Apply formulas for the volumes of cones, cylinders, and spheres. (G.9)

STATISTICS AND PROBABILITY: Interpret, infer, and apply statistics and probability to analyze data and reach and justify conclusions.

A. Recognize the measures of central tendency and measures of variation. (SP.3)

B. Organize, collect, analyze and represent data in a variety of numerical and graphical forms. (SP.4, 5)

C. Understand that a set of data collected to answer a statistical question has a distribution that can be described by its center, spread, and overall shape. (SP.2)

D. Convert measurements within the metric system. (Local)

A. Interpret and analyze data from different sources to draw conclusions and to make predictions. (SP.1, 2)

E. Use measures of central tendency to compare data. (SP.3, 4)

F. Determine the likelihood of the outcome of an event, including probabilities of "1" and "0". (SP.5)

G. Calculate and compare theoretical and experimental probabilities. (SP.6, 7)

H. Find probabilities of compound events using organized lists, tables, tree diagrams, and simulations. (SP.8)

A. Construct and interpret data and organize it into a scatter plot in order to identify correlations. (SP.1)

B. Find and interpret the line of best fit for a set of data to interpret slope and intercept. (SP.2, 3)

C. Convert compound measurements within the same system of measurement (e.g. convert feet/second to miles/hour). (Local)