Grade 8 – Mathematics
Common Core State Standards

Standards for Mathematical Practice – "HOW"

My student can:

make sense of problems, persevere in solving them, and check the reasonableness of answers.

reason with and flexibly use math symbols, numbers, and operations.

construct mathematical arguments (using stated assumptions, definitions, previously established results, and logical progressions) and critique the math reasoning of others.

recognize math in everyday life and use math to solve real problems.

use tools (e.g., protractor, calculator) strategically to solve problems and deepen understanding.

calculate accurately, use precise math definitions and vocabulary, and express math ideas clearly.

look for and make use of patterns and structure in math.

discern when calculations are repeated, and look both for general methods and for shortcuts.

Math Content Standards – "WHAT"

The Number System

My student can:

understand that numbers that are not rational are called irrational. *8.NS.1*

understand informally that every number has a decimal expansion. *8.NS.1*

for rational numbers, show that the decimal expansion repeats eventually. *8.NS.1*

convert a decimal expansion that repeats into a rational number. *8.NS.1*

determine rational approximations of irrational numbers. *8.NS.2*

locate irrational numbers approximately on a number line diagram. *8.NS.2*

use approximations to compare the size of the irrational numbers. *8.NS.2*

use approximations of irrational numbers to estimate the value of expressions (e.g., $\sqrt{2}, \pi^2$). *8.NS.2*

Expressions and Equations

My student can:

work with radicals and integer exponents. *8.EE.1-4*

understand and apply the properties (multiplication, division, distributing, negatives) of integer exponents to generate equivalent expressions (e.g., 3^2 x 3^{-5} = 3^{-3} = $1/3^3$ = 1/27). *8.EE.1*

use square root and cube root symbols to represent solutions to square and cube equations in the form x^2 = p and $x^3 = p$, where p is a positive rational number. *8.EE.2*

find the square roots of small perfect squares and the cube roots of small perfect cubes. *8.EE.2*

understand that the square roots of all non perfect squares are irrational (e.g., $\sqrt{2}$ is irrational). *8.EE.2*

use numbers expressed in the form of a single digit times a whole-number power of 10 to estimate very small or very large quantities (scientific notation). *8.EE.3*

compare numbers in scientific notation and express how many times as much one is than the other. *8.EE.3*

perform operations (+, -, x, ÷) with numbers written in scientific notation. *8.EE.4*

use scientific notation & choose appropriate units for measurements of very large or very small quantities. *8.EE.4*

interpret scientific notation that has been generated by technology. *8.EE.4*

understand the connections between proportional relationships, lines, and linear equations. *8.EE.5-6*

graph proportional relationships, identifying the unit rate as the slope; find the slope of a graph. *8.EE.5*

compare two different proportional relationships represented in different ways (e.g., compare a distance-time graph with a distance-time equation to determine which of the two moving objects has greater speed). *8.EE.5*

use similar triangles to explain why the slope *m* is the same between any two points on a non-vertical line in the coordinate plane. *8.EE.6*

derive the equation *y = mx* for a line through the origin and the equation *y= mx + b* for a line intercepting the vertical axis at *b.* *8.EE 6*

solve linear equations in one variable. *8.EE.7*

give examples of linear equations with one solution, infinitely many solutions, or no solutions. *8.EE.7A*

solve linear equations with rational number coefficients. *8.EE.7B*

use the distributive property and collect like terms to solve linear equations. *8.EE.7B*

analyze and solve pairs of simultaneous linear equations. *8.EE.8*

solve systems of two linear equations in two variables algebraically; estimate solutions by graphing the equations; solve simple cases by inspection *(e.g., 3x+2y=5 and 3x+2y=6 have no solution because 3x+2y cannot simultaneously be 5 and 6). 8.EE.8B*

solve real-world and mathematical problems leading to two linear equations in two variables. *8.EE.8C*

Functions

My student can:

define, evaluate, and compare functions. *8.F.1-3*

understand that a function is a rule that assigns to each input exactly one output; the graph of a function is the set of ordered pairs consisting of an input and the corresponding output. *8.F.1*

compare properties of two functions each represented in a different way (algebraically, on a graph, in a table, or by verbal descriptions). *8.F.2*

understand that the equation $y = mx + b$ defines a linear function whose graph is a straight line. *8.F.3*

give examples of functions that are not linear. *8.F.3*

construct a function to model a linear relationship between two quantities. *8.F.4*

determine the rate of change and initial value of a linear function from a description of a relationship or from two *(x,y)* values, including values from a table or a graph. *8.F.4*

describe the functional relationship between two quantities by analyzing a graph. *8.F.5*

create a graph that shows the features of a function that has been described verbally. *8.F.5*

Geometry

My student can:

understand congruence and similarity using physical models, transparencies, or geometry software. *8.G.1-5*

understand and verify experimentally the properties of rotations, reflections, and translations *8.G.1*

explain that a two-dimensional figure is congruent to another if it can be obtained from the first by a sequence of rotations, reflections, or translations. *8.G.2*

describe the effect of dilations, translations, rotations, & reflections on 2-D figures using coordinates. *8.G.3*

understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations. *8.G.4*

given two similar two-dimensional figures, describe a sequence that shows the similarity between them. *8.G.4*

use informal reasoning to establish facts about the angle sum and exterior angle of triangles. *8.G.5*

use arguments to establish facts about the angles created when parallel lines are cut by a transversal. *8.G.5*

use arguments to establish facts about the angle-angle criterion for similarity of triangles. *8.G.5*

understand and apply the Pythagorean Theorem. *8.G.6-8*

explain a proof of the Pythagorean Theorem and its converse. *8.G.6*

apply the Pythagorean Theorem to determine unknown side lengths in right triangles. *8.G.7*

apply the Pythagorean Theorem to find the distance between two points in a coordinate system. *8.G.8*

solve real-world and mathematical problems involving volume of cylinders, cones, and spheres. *8.G.9*

write and use the formulas for the volume of cones, cylinders, and spheres. *8.G.9*

Statistics and Probability

My student can:

investigate patterns of association in bivariate data. *8.SP*

make and interpret a scatter plot for bivariate measurement data to investigate patterns of association. *8.SP.1*

describe patterns like clustering, outliers, positive/negative association, and linear & nonlinear association. *8.SP.1*

understand that straight lines are widely used to model relationships between two quantitative variables. *8.SP.2*

find the slope and the y-intercept in linear equations in order to solve real-world measurement problems. *8.SP.3*

understand that patterns of association can also be seen in a bivariate categorical data by displaying frequencies and relative frequencies in a two-way table; construct & interpret a two-way table summarizing data. *8.SP.4*