Seventh Grade

Math Curriculum

Pre-Algebra

- **Properties of The Real Numbers**
  - **Know and use the associative, commutative, and distributive properties by name and in**
  - **Simplifying expressions involving numbers and variables. Understand absolute value and evaluate expressions such as |2x - 3|+ 3x.**
- **Linear Applications and Proportionality**
  - **Know the concept of slope.**
  - **Translate situations of proportionality into equations of the form y = mx, where m is the constant of proportionality or slope; specifically know and understand d = rt and i = prt.**
  - **Show situations of constant proportionality as a line on the coordinate plane.**
  - **Introduce the concept of a function and determine the equation of a linear function given its slope and intercepts in the form y = mx + b.**
  - **Estimate the values of b and m from a given linear graph.**

Pre-Algebra

- Polynomial Arithmetic
  - Add, subtract, multiply, and divide monomials and polynomials (divide polynomials by monomials only).
  - Factor binomials that have a common monomial factor.
- Equivalent Equations and Inequalities
  - Review equality properties for equations.
  - Know that addition or subtraction of the same value from both sides of an inequality maintains the inequality.
  - Know that multiplying or dividing both sides of an inequality by a positive number maintains the inequality, but multiplying or dividing by a negative number reverses the inequality; show why using a number line.
  - Simplify and solve linear equations in one variable such as 3(2x - 5) + 4x = 12(x
- Simplify and graph solutions.

Pre-Algebra

- **Integer Exponents**
  - **Know the meaning of an exponent n when n is positive or negative.**
  - **Know that a non-zero number to the zero power is one.**
  - **Understand why a negative number to an even power is positive and a negative number to odd power is negative.**
  - **Know the multiplication properties of exponents:**
    - **Product of powers: (am)(an) = a(m+n)**
    - **Power of a power: (am)n= a mn**
    - **Power of a product: (ab) m = (am)(bm).**
  - **Convert decimal numbers to and from scientific notation.**
  - **Know the proper order of operations with exponents.**

Geometry

- **Three-Dimensional Objects**
  - **Describe and construct simple right prisms, cylinders, cones, and spheres using the concepts of parallel and perpendicular; calculate the surface areas and volumes of these objects.**
  - **Know that the section created by the intersection of a plane and a sphere is a circle.**
  - **Calculate the surface area of a sphere using the equation SA = 4 π r2.**
  - **Calculate the volume of a sphere using the equation V = (4/3) π r**
- **Angle Pairs**
  - **Construct parallel lines and a transversal using a compass and straight edge.**
  - **Understand congruent angles, vertical angles, complementary angles, supplementary angles, adjacent angles, corresponding angles, and alternate interior and alternate exterior angles.**

Geometry

- **Triangles**
  - Know that a triangle is determined by its three sides or by two sides and the included angle (SSS and SAS triangle congruence) and solve problems.
  - Use SSS to prove that the construction of the bisector of an angle is valid.
  - Use SSS to prove that the construction of the perpendicular bisector of a segment is valid.
  - Prove that the base angles of an isosceles triangle are congruent.
  - Demonstrate that the sum of the interior angles of a triangle equals 180 degrees.
  - Know that the shape of a triangle is determined by two (hence all three) of its angles (AA(A) triangle similarity) and solve related problems.
  - Construct a circle that circumscribes a triangle using compass and straight edge.
  - Know and understand the Pythagorean Theorem and its converse and use it to find the length of the missing side of a right triangle and lengths of other line segments and, in some situations, empirically verify the Pythagorean theorem by direct measurement and a calculator.
  - Use the Pythagorean Theorem to determine the exact ratios of the sides in 30-60-right triangles and isosceles right triangles.
  - Determine the image of a triangle under translations, rotations, and reflections.

Geometry

- **Measurement**
  - **Choose appropriate units of measure and use ratios to convert within and between measurement systems to solve problems.**
  - **Compare weights, capacities, geometric measures, times, and temperatures within and between measurement systems (for example, miles per hour and feet per second, cubic inches to cubic centimeters).**
  - **Use measures expressed as rates (for example, speed, density) and measures expressed as products (for example, person-days) to solve problems; check the units of the solutions; and use dimensional analysis to check the reasonableness of the answer.**
  - **Compute the perimeter, area, and volume of common geometric objects and use the results to find measures of less common objects.**
  - **Know how perimeter, area, and volume are affected by changes of scale.**
  - **Estimate and compute the area of more complex or irregular two- and three-dimensional figures by breaking the figures down into more basic geometric objects.**
  - **Relate the changes in measurement with a change of scale to the units used (for example, square inches, cubic feet) and to conversions between units (1 square foot = 144 square inches of [1 ft 2= 144 in2], 1 cubic inch is approximately 16.38 cubic centimeters [1 in3] = [16.36 cm 3]).**

Probability and Statistucs

- Show the relationship between two variables using a scatterplot and describe the apparent relationship informally.
- Find the upper and lower quartiles for a data set.
- Understand that if p is the probability of an event occurring, 1 – p is the probability of the event not occurring.
- Understand the difference between independent and dependent events.