Jackson Area Catholic Schools

Mathematics Academic Standards
for
Seventh Grade

Number and Operations

A. Understand derived quantities

N.MR.07.01 The student will solve problems involving derived quantities such as density, velocity, and weighted averages.

B. Understand and solve problems involving rates, ratios, and proportions

N.FL.07.02 The student will calculate rates of change including speed.

N.MR.07.03 The student will convert ratio quantities between different systems of units, such as feet per second to miles per hour.

N.FL.07.04 The students will solve proportion problems using such methods as unit rate, scaling, finding equivalent fractions, and solving the proportion equation a/b = c/d; know how to see patterns about proportional situations in tables.

C. Recognize irrational number

N.Mr.07.05 The student will understand the concept of square root and cube root, and estimate using calculators.

D. Compute with rational numbers

N.Fl.07.06 The student will solve problems involving operations with integers and rational numbers.

N.FL.07.07 The student will add, subtract, multiply, and divide positive and negative rational numbers fluently.

N.FL.07.08 The student will estimate results of computations with rational numbers.

Mathematics Standards **Seventh Grade**

Algebra

A. Understand and apply directly proportional relationships and relate to linear relationships

A.PA.07.01 The student will recognize when information given in a table, graph or formula suggests a directly proportional or linear relationships.

A.RP.07.02 The student will represent directly proportional and linear relationships using verbal descriptions, tables, graphs, and formulas, and translate among these representations.

A.PA.07.03 The student, given a directly proportional or other linear situation, will graph and interpret the slope and intercept(s) in terms of the original situation: evaluate $y = mx + b$ for specific x values (e.g., weight vs. volume of water, base cost plus cost per unit).

A.PA.07.04 The student will, for directly proportional or linear situations, solve applied problems using graphs and equations (e.g., the heights and volume of a container with uniform cross-section; height of water in a tank being filled at a constant rate; degrees Celsius and degrees Fahrenheit; distance and time under constant speed).

A.PA.07.05 The student will recognize and use directly proportional relationships of the form $y = mx$, and distinguish from linear relationships of the form $y = mx + b$, b non-zero; understand that in a directly proportional relationship between two quantities one quantity is a constant multiple of the other quantity.

B. Understand and represent linear functions

A.PA.07.06 The student will calculate the slope from the graph of a linear function as the ratio of "rise/run" for a pair of points on the graph, and express the answer as a fraction and a decimal; understand that linear functions have slope that is a constant rate of change.

A.PA.07.07 The student will represent linear functions in the form $y = mx + b$, and graph, interpreting slope and y– intercept.

B. Understand and represent linear functions (cont.)

A.FO.07.07 The student will find and interpret the x– and/or y– intercepts of a linear equation or function. Know that the solution to a linear equation of the form $ax + b = 0$ corresponds to the point at which the graph of $y = ax + b$ crosses that x-axis.

C. Understand and solve problems about inversely proportional relationships

A.PA.07.09 The student will recognize inversely proportional relationships in contextual situations; know that quantities are inversely proportional if their product is constant (e.g., the length and width of a rectangle with fixed area) and that an inversely proportional relationship is of the form $y = k/x$ where k is some non-zero number.

A RP.07.10 The student will know that the graph of $y = k/x$ is not a line, know its shape, and know that it crosses neither the x- nor the y-axis.

D. Apply basic properties of real numbers in algebraic contexts

A.PA.07.11 The student will understand and use basic properties of real numbers: additive and multiplicative identities, additive and multiplicative inverses commutativity, associativity, and the distributive property of multiplication or addition.

E. Combine algebraic expressions and solve equations

A.FO.07.12 The student will add, subtract, and multiply simple algebraic expressions of the first degree [e.g., $(92x + 8y) – 5x + y$ or $x(x + 2)$] and justify using properties of real numbers.

A.FO.07.13 The student will solve linear equations of the form $ax + b = c$ and $ax + b = cx + d$.

A.FO.07.14 The student will understand and graph simple inequalities.

Mathematics Standards **Seventh Grade**

Geometry

A. Draw and construct geometric objects

G.SR.07.01 The student will use a ruler and other tools to draw squares, rectangles, triangles, and parallelograms with specified dimensions.

G.SR.07.02 The student will use compass and straightedge to perform basic geometric constructions: the perpendicular bisector of a segment, and equilateral triangle, and the bisector of an angle; understand informal justifications.

B. Understand the concept of similar polygons, and solve related problems

G.TR.07.03 The student will understand that in similar polygons, corresponding angles are congruent and the ratios of corresponding sides are equal; understand the concepts of similar figures and scale factor.

G.TR.07.04 The student will solve problems about similar figures and scale drawings.

G.TR.07.05 The student will show that two triangles are similar using the criteria: corresponding angles are congruent (AAA similarity); the ratios of two pairs of corresponding sides are equal and the included angles are congruent (SAS similarity); ratios of all pairs of corresponding sides are equal (SSS similarity); use these criteria to solve problems and to justify arguments.

G.TR.07.06 The student understand and use the fact that when two triangles are similar with scale factor of r, their areas are related by a factor of r^2.

Data and Probability

A. Represent and interpret data

D.RE.07.01 The student will represent and interpret data using circle graphs, stem and leaf plots, histograms, and box-and-whisker plots, and select appropriate representation to address specific questions.

D.AN.07.02 The student will create and interpret scatter plots and find line of best fit; use an estimated line of best fit to answer questions about the data.

B. Compute statistics about data sets

D.AN.07.03 The student will calculate and interpret relative frequencies and cumulative frequencies for given data sets.

D.AN.07.04 The student will find and interpret the median, quartiles, and interquartile range of a given set of data.