Math - Grade 7

Course Description:

The Indian Community School cultivates an enduring cultural identity and critical thinking by weaving indigenous teachings with a distinguished learning environment. The curriculum for this course is developed from the Common Core State Standards for Mathematics and the framework of the ICS Our Ways Cultural Calendar. In this course, seventh grade students will focus on four critical areas: (1) developing understanding of operations with rational numbers and working with expressions and linear equations; (2) developing understanding of and applying proportional relationships; (3) solving problems involving scale drawings and informal geometric constructions, and working with two-and three-dimensional shapes to solve problems involving areas, surface area, and volume; and (4) drawing inferences about populations based on samples.

Enduring Understandings:

- Solving equations and inequalities with multiple steps can be used to solve different kinds of problems and applied to real life situations that include integers.
- Drawing and constructions of Geometric figures can be used to understand the relationship between different and similar figures.
- Graphs and data can be used to describe a set of data from a sample using measures of central tendencies and variation.
- Formulas can be used to calculate surface area and volume of 3 dimensional shapes to solve real-life problems.
- Operations with all Rational Numbers can be used to solve real world situations.
- Mathematical properties can be used to generate equivalent expressions and equations.
- Proportional reasoning can be used to solve multiple real world problems such as tax, interest, markups, and unit rates.
- The probability of a simple event or compound event will be represented as a fraction or decimal to determine the likelihood of its occurrence.

RATIOS AND PROPORTIONAL RELATIONSHIPS

- I can compute unit rates associated with ratios of fractions, including ratios of lengths, areas, and other quantities measure in like or different units. (7.RP.A.1)

- I can represent proportional relationships between quantities. (7.RP.A.2)

- I can decide whether two quantities are in a proportional relationship by testing for equivalent ratios in a table or graphing on a coordinate plane and observing the straight line going through the origin. (7.RP.A.2.A)

- I can solve a problem to find the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. (7.RP.A.2.B)

- I can represent proportional relationships by equations. (7.RP.A.2.C)

- I can explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation with special attention to the points (0,0) and (1, r) where r is the unit rate. (7.RP.A.2.D)

- I can use proportional relationships to solve multistep ratio and percent problems. (7.RP.A.3)

THE NUMBER SYSTEM

- I can solve problems by applying and extending previous understandings of addition and subtraction to add and subtract rational numbers. (7.NS.A.1)

- I can represent addition and subtraction on a horizontal or vertical number line diagram. (7.NS.A.1)

- I can describe situations in which opposite quantities combine to make 0. (7.NS.A.1.A)

- I can solve problems to show p + q are numbers located from a distance │ q │ from p, in the positive or negative direction.(7.NS.A.1.B)

- I can solve problems where a number and its opposite have a sum of 0 (additive inverses) and interpret sums of rational numbers by describing real-world contexts. (7.NS.A.1.B)

- I can solve subtraction of rational numbers as adding the additive inverse, p - q = p + (-q). (7.NS.A.1.C)

- I can apply through a real-world context that the distance between two rational numbers on the number line is the absolute value of their difference. (7.NS.A.1.C)

- I can apply properties of operations as strategies to add and subtract rational numbers. (7.NS.A.1.D)

- I can apply and extend previous understanding of multiplication and division and of fractions to multiply and divide rational numbers. (7.NS.A.2)

- I can solve problems and interpret real-world contexts by using multiplication to extend fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, and the rules for multiplying signed numbers. (7.NS.A.2.A)

- I can solve problems where integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. (7.NS.A.2B)

- I can interpret real-world contexts by knowing that If p and q are integers, then -(p/q) = (-p)/q = p/(-q). (7.NS.A.2.B)

- I can apply properties of operations as strategies to multiply and divide rational numbers. (7.NS.A.2.C)

- I can convert a rational number to a decimal using long division. (7.NS.A.2D)

- I can demonstrate how the decimal form of a rational number terminates in 0s or eventually repeats. (7.NS.A.2.D)

- I can solve real-world and math problems involving the four operations with rational numbers including fractions. (7.NS.A.3)

EXPRESSIONS AND EQUATIONS

- I can apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients. (7.EE.A.1)

- I can rewrite an expression in different forms in a problem context to shed light on the problem and how the quantities in it are related. (7.EE.A.2)

- I can solve multi-step real-world problems with positive and negative rational numbers in many forms using tools strategically. (7.EE.B.3)

EXPRESSIONS AND EQUATIONS (continued)

- I can apply properties of operations to calculate with numbers in any form. (7.EE.B.3)

- I can convert between fractions, decimals, percents, and whole numbers using tools strategically. (7.EE.B.3)

- I can use estimation to justify my answers. (7.EE.B.3)

- I can use variables to write inequalities representing real-world situations. (7.EE.B.4)

- I can solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p, q, and r are specific rational numbers. (7.EE.B.4.A)

- I can compare algebraic solutions with arithmetic solutions. (7.EE.B.4.A)

- I can solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p, q, and r are specific rational numbers. (7.EE.B.4.B)

- I can graph the solution set of the inequality and interpret it in the context of the problem. (7.EE.B.4.B)

GEOMETRY

- I can solve problems involving scale drawings of geometric figures by computing actual lengths and areas from scale drawings. (7.G.A.1)

- I can solve problems involving scale drawings by reproducing a scale drawing at a different scale. (7.G.A.1)

- I can draw geometric shapes with given conditions. (7.G.A.2)

- I can focus on constructing triangles from three measures of angles or sides and show when the conditions determine a unique triangle, more than one triangle, or no triangle. (7.G.A.2)

- I can describe two-dimensional figures that result from slicing three-dimensional figures as plane sections of right rectangular prisms and right rectangular pyramids. (7.G.A.3)

- I can solve problems using the formula for area and circumference of a circle. (7.G.B.4)

- I can give an informal derivation of the relationship between the circumference and area of a circle. (7.G.B.4)

- I can use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for unknown angles in a figure. (7.G.B.5)

- I can solve real-world and mathematical problems involving area, volume, and surface area of two-dimensional and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms. (7.G.B.6)

STATISTICS AND PROBABILITY

- I can use statistics to gain information about a population by examining a sample of the population. (7.SP.A.1)

- I can make generalizations about a population from a sample that is valid only if the sample is representative of that population. (7.SP.A.1)

- I can describe random sampling trends to produce representative samples and support valid inferences. (7.SP.A.1)

STATISTICS AND PROBABILITY (continued)

- I can use data from a random sample to draw inferences about a population with an unknown characteristic of interest. (7.SP.A.2)

- I can gauge how far off an estimate or prediction might be. (7.SP.A.2)

- I can generate multiple samples and simulated samples of the same size to gauge in variation in estimates or predictions. (7.SP.B.3)

- I can assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of measure of variability. (7.SP.B.3)

- I can use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. (7.SP.B.4)

- I can solve problems to show probability of a chance event is a number between 0-1 and express the likelihood of that event occurring. (7.SP.C.5)

- I can approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency to predict to approximate relative frequency given the probability. (7.SP.C.6)

- I can develop a probability model and use it to find probabilities of events. (7.SP.C.7)

- I can compare probabilities from a model to observed frequencies and discuss agreements or explain possible sources of discrepancy. (7.SP.C.7)

- I can develop a uniform probability model by assigning equal probability to all outcomes and use the model to determine probabilities of events. (7.SP.C.7A)

- I can develop a probability model by observing frequencies in data generated from a chance process. (7.SP.C.7B)

- I can solve problems including probability of compound events using organized lists, tables, tree diagrams, and simulation. (7.SP.C.8)

- I can solve problems that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs. (7.SP.C.8A)

- I can represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. (7.SP.C.8B)

- I can describe everyday language events to identify the outcomes of organized lists, tables and tree diagrams. (7.SP.C.8B)

- I can design and use a simulation to generate frequencies for compound events. (7.SP.C.8C)