ACADEMIC COURSE OUTLINE

Department	Mathematics	**Course Title**	Math 7 Accelerated	**Course Length**	1 year
Grade Level(s)	6 and 7	**Short Name**	Math 7 Acc	**Course Code**	8773

COURSE OVERVIEW:

Math 7 Accelerated compacts all of the grade 7 Common Core State Standards and half of the grade 8 Common Core State Standards into a one-year course. Students who successfully complete Math 7 Accelerated will take Algebra 1 next.

The seventh grade mathematics standards are about (1) developing understanding of and applying proportional relationships; (2) working with expressions and linear equations; (3) working with two- and three-dimensional shapes to solve problems involving area, surface area, and volume; and (4) drawing inferences about populations based on samples.

The eighth grade mathematics standards are about (1) formulating and reasoning about expressions and equations and solving linear equations and systems of linear equations; (2) grasping the concept of a function and using functions to describe quantitative relationships; (3) analyzing two- and three-dimensional space and figures using distance, angle, similarity, and congruence, and understanding and applying the Pythagorean Theorem.

COURSE CONTENT AND TIME ALLOTMENT:

Content sequencing, activities and time allocations may be adjusted by the content team to suit student needs.

Unit 1: Operations with Rational Numbers

Duration: 4 weeks (August/September)

Description:
Students continue to build an understanding of the number line in Unit 1 from their work in 6th grade. Students convert between the fraction form to decimal form of a rational number using long division. They learn to add, subtract, multiply, and divide integers, while maintaining the properties of operations and the relationships between addition and subtraction, and multiplication and division. Students will then apply their understanding to perform the four operations on positive and negative rational numbers in the context of real-world situations.

Materials: Go Math - Modules 1 - 3

Standards Addressed: CCSS 7.NS.1, 7.NS.2, 7.NS.3, 7.EE.3

Priority Standard: 7.NS.3 Solve real-world and mathematical problems involving the four operations with rational numbers.

Unit 2: Expressions and Equations

Duration: 5 weeks (September/October)

Description:
Unit 2 consolidates and expands students' previous work with generating equivalent expressions and solving

equations. They apply the properties of operations as strategies to factor and expand linear expressions with rational coefficients. Students extend their understanding of solving linear equations in one variable to solving equations with variables on both sides of the equal sign. Students analyze and solve linear equations in one variable with one solution, infinitely many solutions, or no solutions. Students will extend their knowledge of equations into solving two-step inequalities.

Materials: Go Math - Modules 6 - 7, 18

Standards Addressed: CCSS 7.EE.1, 7.EE.4, 8.EE.7

Priority Standard: 8.EE.7 Solve linear equations in one variable.

Unit 3: Proportional Relationships and Percents

Duration: 5 weeks (October/November)

Description:
In Unit 3, students build on their 6th grade experiences with ratios, unit rates, and fraction division to analyze proportional relationships. They decide whether two quantities are in a proportional relationship, identify constants of proportionality, and represent the relationship by tables, graphs, and equations. Students will extend their understanding of ratios and proportionality to solve a wide variety of percent problems. Problems in this unit include simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, and percent error.

Materials: Go Math - Modules 4 - 5

Standards Addressed: CCSS 7.RP.1, 7.RP.2, 7.RP.3

Priority Standard: 7.RP.3 Use proportional relationships to solve multistep ratio and percent problems.

Unit 4: Connect Proportions and Linear Equations

Duration: 4 weeks (December/January)

Description:
In Unit 4, students learn about linear equations in two variables. Students explore concepts of slope and intercepts as they write and graph linear equations in two variables.

Materials: Go Math - Modules 16 and 17

Standards Addressed: CCSS 8.EE.5, 8.EE.6

Priority Standard: 8.EE.6 Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; 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.

Unit 5: Geometrical Figures

Duration: 5 weeks (January/February)

Description:
In Unit 5, students will begin to explore the concepts of congruency and similarity by investigating the relationships between angles formed by intersecting lines, constructing geometrical figures with given conditions and using scale-drawings. Students will explore the relationships between interior and exterior angles of triangles and angles formed by parallel lines that are cut by a transversal. Also in Unit 5, students study congruency and similarity by experimenting with dilations, rotations, reflections, and translations of geometrical figures.

Materials: Go Math - Modules 8, 19 - 21

Standards Addressed: CCSS 7.G.1, 7.G.2, 7.G.3, 7.G.5, 8.G.1, 8.G.2, 8.G.3, 8.G.4, 8.G.5

Review Priority Standards: 7.NS.3, 8.EE.7, 7.RP.3, 8.EE.6

Unit 6: Area, Surface Area, and Volume

Duration: 4 weeks (February/March)

Description:
In Unit 6, students will solve problems involving area and circumference of circles. Additionally, students examine cross-sections of three-dimensional figures. Their work with expressions and equations is applied to solving problems involving area, surface area, and volume.

Materials: Go Math - Modules 9 and 22

Standards Addressed: CCSS 7.G.4, 7.G.6, 8.G.9

Review Priority Standards: 7.NS.3, 8.EE.7, 7.RP.3, 8.EE.6

Unit 7: Statistics and Probability

Duration: 3 weeks (March/April)

Description:
In Unit 7, students learn to develop, use and evaluate probability models through the study of chance processes. Students continue the development of their understanding of statistical variability. Instead of looking at just one population, they are comparing the variability of two populations. They learn to draw inferences about populations based on random samples.

Materials: Go Math - Modules 10 - 13

Standards Addressed: CCSS 7.SP.1, 7.SP.2, 7.SP.3, 7.SP.4, 7.SP.5, 7.SP.6, 7.SP.7, 7.SP.8

Review Priority Standards: 7.NS.3, 8.EE.7, 7.RP.3, 8.EE.6

Unit 8: Radicals and Integer Exponents

Duration: 3 weeks (April/May)

Description:
Students will use properties of exponents to generate equivalent expressions in Unit 8. Students will express very large quantities and very small quantities using scientific notation. Their study of exponents and scientific notation will culminate with students performing operations with numbers written in scientific notation. Students will begin working with square roots and cube roots and will understand how to solve an equation containing a root.

Materials: Go Math - Modules 14 and 15

Standards Addressed: CCSS 8.NS.1, 8.NS.2, 8.EE.1, 8.EE.2, 8.EE.3, 8.EE.4

Review Priority Standards: 7.NS.3, 8.EE.7, 7.RP.3, 8.EE.6

GRADE WEIGHTING

 Assessments - 70% (Includes: Test, Quizzes, Group Tests)
 Assignments - 20% (Includes: Homework, Classwork, Notes, Tasks)
 Fluency Quizzes - 10% (Includes: Weekly Fluency Quizzes)

LATE WORK POLICY

Students can complete two assignments for full credit using a homework pass. Students can turn in late work for 50% credit up to the unit test without a homework pass.

REQUIREMENTS FOR ALGEBRA

3.0 GPA and an 85% or higher on the final exam
OR 2.75 GPA and a 75% or higher on the final exam

COMPLETE LIST OF STANDARDS BY UNIT

UNIT 1: Apply Understanding of Operations with Rational Numbers
7.NS.1 Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.
7.NS.1a Describe situations in which opposite quantities combine to make 0. For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged.
7.NS.1b Understand p + q as the number located a distance |q| from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real- world contexts.
7.NS.1c Understand subtraction of rational numbers as adding the additive inverse, p – q = p + (–q). Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.
7.NS.1d Apply properties of operations as strategies to add and subtract rational numbers.
7.NS.2 Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.
7.NS.2a Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as (–1)(–1) = 1 and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.

7.NS.2b Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then –(p/q) = (–p)/q = p/(–q). Interpret quotients of rational numbers by describing real world contexts.
7.NS.2c Apply properties of operations as strategies to multiply and divide rational numbers.
7.NS.2d Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.
7.NS.3 Solve real-world and mathematical problems involving the four operations with rational numbers.
7.EE.3 Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. 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. For example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.

UNIT 2: Generate Equivalent Expressions and Solve Multi-Step Equations and Inequalities

7.EE.1 Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.
7.EE.4 Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.
7.EE.4a 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. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?
7.EE.4b 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. Graph the solution set of the inequality and interpret it in the context of the problem. For example: As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the solutions.
8.EE.7 Solve linear equations in one variable.
8.EE.7a Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form x = a, a = a, or a = b results (where a and b are different numbers).
8.EE.7b Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.

UNIT 3: Analyze and Use Proportional Relationships to Solve Problems, Including Percent Problems

7.RP.1 Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. For example, if a person walks 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction (1/2)/(1/4) miles per hour, equivalently 2 miles per hour.
7.RP.2 Recognize and represent proportional relationships between quantities.
7.RP.2a Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.

7.RP.2b Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
7.RP.2c Represent proportional relationships by equations. For example, if total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as t = pn.
7.RP.2d 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.3 Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.
7.EE.2 Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. For example, a + 0.05a = 1.05a means that "increase by 5%" is the same as "multiply by 1.05."

UNIT 4: Understand Connections between Proportions and Linear Equations

8.EE.5 Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.
8.EE.6 Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; 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.

UNIT 5: Draw, Construct, and Describe Geometrical Figures

7.G.1 Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.
7.G.2 Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.
7.G.3 Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.
7.G.5 Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.
8.G.1 Verify experimentally the properties of rotations, reflections, and translations:
8.G.1a Lines are taken to lines, and line segments to line segments of the same length.
8.G.1b Angles are taken to angles of the same measure.
8.G.1c Parallel lines are taken to parallel lines.
8.G.2 Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.
8.G.3 Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.
8.G.4 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; given two similar two-dimensional figures, describe a

sequence that exhibits the similarity between them.
8.G.5 Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so.

UNIT 6: Calculate Circumference, Area, and Volume

7.G.4 Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.
7.G.6 Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.
8.G.9 Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.

UNIT 7: Draw Statistical Inferences and Probability

7.SP.1 Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.
7.SP.2 Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.
7.SP.3 Informally 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 a measure of variability. For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable.
7.SP.4 Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.
7.SP.5 Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.
7.SP.6 Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.
7.SP.7 Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.
7.SP.7a Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected.
7.SP.7b Develop a probability model (which may not be uniform) by observing frequencies in data generated from a

chance process. For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?

7.SP.8 Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.

7.SP.8a Understand 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.8b Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., "rolling double sixes"), identify the outcomes in the sample space which compose the event.

7.SP.8c Design and use a simulation to generate frequencies for compound events. For example, use random digits as a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least
4 donors to find one with type A blood?

UNIT 8: Interpret and Solve Problems with Radicals and Integer Exponents

8.NS.1 Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion, which repeats eventually into a rational number.

8.NS.2 Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π^2). For example, by truncating the decimal expansion of $\sqrt{2}$, show that $\sqrt{2}$ is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.

8.EE.1 Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, $3^2 \times 3^{-5} = 3^{-3} = (1/3)^3 = 1/27$.

8.EE.2 Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational.

8.EE.3 Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. For example, estimate the population of the United States as 3×10^8 and the population of the world as 7×10^9, and determine that the world population is more than 20 times larger.

8.EE.4 Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.