

Course Description: Integrated Math 3 builds on students' understanding of algebra, geometry, statistics, and functions by exploring increasingly sophisticated mathematical concepts and their real-world applications. Students deepen their ability to reason mathematically, model complex situations, and communicate solutions using multiple representations, including equations, graphs, tables, and geometric models. Throughout the course, learners strengthen problem-solving skills while making connections among mathematical concepts that are traditionally taught as separate subjects.

The course begins with a review of essential algebraic concepts before extending student learning to polynomial, logarithmic, rational, and trigonometric functions. Students investigate quadratic and polynomial equations, sequences and series, probability and statistics, geometric transformations, congruence and similarity, trigonometric ratios, conic sections, area, and volume. They develop fluency in solving mathematical problems analytically and graphically while using mathematical models to analyze patterns, make predictions, and justify conclusions.

Emphasis is placed on mathematical reasoning, precision, and perseverance as students apply mathematics to authentic contexts. Through inquiry-based learning, modeling activities, and technology-enhanced instruction, students build the knowledge and skills needed for higher-level mathematics, including Precalculus and Calculus, as well as college, career, and technical pathways that require advanced quantitative reasoning. The course aligns with state and national mathematics standards and prepares students to confidently solve complex problems across a variety of mathematical domains.

Module	Lesson Title	Objectives
Module 1 Tools of the Trade	1.1 Properties of Real Numbers	• Use properties to simplify expressions. • Classify real numbers.
	1.2 Absolute Value Equations	• Evaluate expressions with absolute value. • Solve absolute value equations.
	1.3 Relations and Functions	• Identify domains and ranges of functions. • Identify equations of relations and functions.

Module	Lesson Title	Objectives
	1.4 Writing Linear Equations	- Write an equation of a line, given the slope and a point on the line. - Write an equation of a line parallel or perpendicular to a given line.
	1.5 Graphing Quadratic Functions	- Find the maximum and minimum values of a quadratic function. - Determine if the vertex is a maximum or minimum. - Graph quadratic functions.
	1.6 Solving by Graphing	Solve quadratic equations by graphing.
	1.7 Solving by Factoring	- Write quadratic equations in standard form. - Solve quadratic equations by factoring.
	1.8 Solving Using Perfect Patterns	Solve quadratic equations by factoring using perfect squares and difference of squares.
	1.9 Completing the Square	Solve quadratic equations by completing the square.
	1.10 The Discriminant	- Solve quadratic equations using the quadratic formula. - Use the discriminant to find the type and number of roots of a quadratic equation.
	1.11 Quadratic Inequalities	- Graph quadratic inequalities. - Solve quadratic inequalities.
Module 2 Polynomial	2.1 The Remainder & Factor Theorem	- Divide and evaluate polynomials using synthetic division. - Determine if a binomial is a factor of a polynomial using the Factor Theorem. - Use the Remainder Theorem to evaluate polynomials at a given value.

Module	Lesson Title	Objectives
& Log Functions	2.2 Fundamental Theorem of Algebra	- Find the number of roots of a polynomial equation. - Find the real and imaginary roots (zeros) of a polynomial equation.
	2.3 Finding Rational Zeros	- Identify possible rational zeros of a polynomial function. - Find the rational zeros of a polynomial function.
	2.4 Logarithmic Functions	- Write logarithmic equations in exponential form. - Write exponential equations in logarithmic form. - Evaluate logarithmic expressions.
	2.5 Graphing Logarithmic Functions	Graph logarithmic functions.
	2.6 Solving Logs	- Solve logarithmic equations. - Solve logarithmic inequalities.
	2.7 Properties of Logarithms	- Simplify and evaluate expressions using logarithmic properties. - Solve logarithmic equations using logarithmic properties.
	2.8 Common Logarithms	- Solve exponential equations and inequalities using common logarithms. - Express logarithmic expressions in terms of common logarithms using the change of base rule.
	2.9 The Natural Log	- Evaluate expressions involving the natural base and logarithm. - Solve exponential equations and inequalities using natural logarithms.
	2.10 Exponential & Log Functions	- Use logarithms to solve problems of exponential growth and decay. - Use logarithms to solve problems of logistic growth.

Module	Lesson Title	Objectives
Module 3 Congruence & Similarity	3.1 Basic Geometric Shapes	- Identify geometric shapes. - Name the properties of basic geometric shapes. - Distinguish between convex and concave polygons.
	3.2 Perimeter and Area	- Calculate the perimeter and area of polygons. - Calculate the circumference and area of circles. - Estimate the perimeter, area, or circumference of an irregular figure.
	3.3 Surface Area	- Define <i>surface area</i>. - Calculate the surface area of common shapes. - Calculate the surface area of real-world objects.
	3.4 Volume	- Define <i>volume</i>. - Calculate the volume of common shapes. - Calculate the volume of real-world objects.
	3.5 Congruence	- Identify congruent shapes. - Show that real-world objects are congruent.
	3.6 Proportional Relationships	- Define proportional relationships. - Determine if a relationship is proportional.
	3.7 Dilation	- Dilate shapes in the coordinate plane. - Show that the figure resulting from dilation is not congruent to the original figure.
	3.8 Similarity	- Distinguish between congruence and similarity. - Use proportional relationships to determine side lengths in similar figures. - Recognize and create similar shapes using dilation.

Module	Lesson Title	Objectives
	3.9 2D Scale Factors	- Calculate the value of a scale factor from 2D shapes. - Determine if two shapes are similar or congruent. - Investigate proportional and nonproportional changes in perimeter and area of 2D scaled figures.
	3.10 3D Scale Factors	- Calculate the value of a scale factor from 3D shapes. - Investigate proportional and nonproportional changes in surface area and volume of 3D scaled figures.
Module 4 Trigonometric Ratios	4.1 Types of Triangles	- Classify triangles based on their angles and side lengths. - Recognize and identify when a triangle does not exist due to side lengths or angle measurements. - Calculate a triangle's missing angle measures.
	4.2 The Pythagorean Theorem	- Calculate the missing side length in a right triangle. - Apply the Pythagorean theorem to solve problems in real-world contexts.
	4.3 The Distance Formula	- Calculate the distance between horizontal and vertical points in the coordinate plane. - Calculate distance in the coordinate plane using the Pythagorean theorem. - Connect the Pythagorean theorem to the distance formula. - Apply the distance formula to solve real-world problems.
	4.4 Special Right Triangles	- State the relationship between the sides of special right triangles. - Calculate missing side lengths in special right triangles. - Calculate the area of a special right triangle.
	4.5 The Sine Ratio	- Calculate the sine ratio. - Calculate angle and side-length values using the sine function. - Solve real-world problems using the sine ratio.
	4.6 The Cosine Ratio	- Calculate the cosine ratio. - Calculate angle and side length values using the cosine function and inverse cosine function. - Solve real-world problems using the cosine ratio.

Module	Lesson Title	Objectives
	4.7 The Tangent Ratio	- Calculate the tangent ratio. - Calculate angle and side-length values using the tangent function and the inverse tangent function. - Solve real-world problems using the tangent ratio.
	4.8 Solving Triangles	- Use the sine, cosine, and tangent ratios to solve right triangles. - Convert degree measurements to radians. - Convert radian measurements to degrees.
Module 5 Rational Functions & Relations	5.1 Direct and Joint Variations	- Solve direct variation problems. - Solve joint variation problems.
	5.2 Inverse and Combined Variations	- Solve inverse variation problems. - Solve combined variation problems.
	5.3 Graphing Reciprocal Functions	- Identify the properties of reciprocal functions. - Graph transformations of reciprocal functions.
	5.4 Graphing Rational Functions	- Graph rational functions with vertical and horizontal asymptotes. - Graph rational functions with oblique asymptotes and point discontinuity.
	5.5 Multiplying Rational Expressions	- Simplify rational expressions. - Multiply rational expressions.
	5.6 Dividing Rational Expressions	- Divide rational expressions. - Simplify complex fractions with rational expressions.
	5.7 Finding LCM of Polynomials	- Find the least common multiple of monomials. - Find the least common multiple of polynomials.
	5.8 Add & Subtract Rationals	Add and subtract rational expressions.

Module	Lesson Title	Objectives
	5.9 Solving Rational Equations	Solve rational equations.
	5.10 Solving Rational Inequalities	Solve rational inequalities.
Module 6 Sequences & Series	6.1 Introduction to Sequences	- Determine whether a sequence is arithmetic. - Determine whether a sequence is geometric. - Graph arithmetic and geometric sequences.
	6.2 Arithmetic Sequences and Series	- Find the nth term of an arithmetic sequence. - Calculate the common difference in an arithmetic sequence. - Find sums of arithmetic series.
	6.3 Geometric Sequences and Series	- Find the nth term of a geometric sequence. - Calculate the common ratio in a geometric sequence. - Find sums of a geometric series.
	6.4 Infinite Geometric Series	- Find the sum of an infinite geometric series. - Solve real world problems.
	6.5 Recursive Rules for Sequences	- Find terms of recursive sequences. - Write recursive formulas.
	6.6 Fibonacci Sequence	- Explain the Fibonacci sequence. - Identify examples of the Fibonacci sequence in nature.
	6.7 Iteration	Iterate a function.

Module	Lesson Title	Objectives
	6.8 Pascal's Triangle	• Explain Pascal's Triangle. • Use Pascal's Triangle to expand powers of binomials.
	6.9 Binomial Theorem	• Use the Binomial Theorem to expand powers of binomials.
	6.10 Mathematical Induction	• Prove statements by mathematical induction. • Disprove statements by finding a counterexample.