



Foundations of Mathematics

978-1-63545-087-3



To learn more about all our offerings
Visit [Knewton.com](https://www.knewton.com)



Source	Author(s) (Text or Video)	Title(s)	Link (where applicable)
OpenStax	Lynn Marecek, Santa Ana College MaryAnne Anthony-Smith, Formerly of Santa Ana College	Prealgebra	OpenStax Prealgebra
OpenStax	Lynn Marecek, Santa Ana College MaryAnne Anthony-Smith, Formerly of Santa Ana College	Elementary Algebra	OpenStax Elementary Algebra
Openstax	Lyn Marecek, MaryAnne Anthony-Smith	Intermediate Algebra	OpenStax Intermediate Algebra
Mathispower4u	James Sousa	MathIsPower4U	Mathispower4u Videos

Alta Foundations of Mathematics was developed to meet the scope and sequence of a typical one semester foundations course. To develop the course, Knewton used three main sources of content: Openstax, videos created by a Math Professor we have partnered with, and a team of internal and external Subject Matter Experts. The SMEs come from diverse backgrounds and are all academics in the field of Mathematics.

Alta Foundations of Mathematics has two instructional sequences for every learning objective, giving students multiple opportunities to learn new concepts. Between our instructional texts, videos, and a network of SMEs, we were able to solicit ideas from math instructors and students. Alta Foundations of Mathematics combines material from Pre-Algebra, Elementary Algebra, and Intermediate Algebra to allow for flexible combinations of content in varied types of early or developmental math programs. and also provides the necessary depth to ensure the course is manageable and engaging for instructors and students alike.

Foundations of Mathematics | Table of Contents

Chapter 1: Whole Numbers

1.1 Introduction to Whole Numbers

- Place Value and Rounding Whole Numbers
 - Identify counting numbers and whole numbers
 - Model whole numbers and identify the place value of a digit
 - Use place value to name and write whole numbers
 - Round whole numbers

1.2 Add Whole Numbers

- Adding Whole Numbers
 - Use addition notation
 - Model addition of whole numbers
 - Add whole numbers without models
 - Add whole numbers that may require carrying
- Applications of Adding Whole Numbers
 - Translate word phrases involving addition to math notation
 - Add whole numbers in applications

1.3 Subtract Whole Numbers

- Subtracting Whole Numbers
 - Use subtraction notation
 - Model subtraction of whole numbers
 - Subtract whole numbers
 - Subtract whole numbers that may require borrowing
- Applications of Subtracting Whole Numbers
 - Translate word phrases involving subtraction to math notation
 - Subtract whole numbers in applications

1.4 Multiply Whole Numbers

- Multiplying Whole Numbers
 - Use multiplication notation
 - Model multiplication of whole numbers
 - Multiply whole numbers by single digit numbers
 - Multiply whole numbers by multi-digit numbers
 - Applications of Multiplying Whole Numbers
 - Translate word phrases involving multiplication to math notation
 - Multiply whole numbers in applications
-

1.5 Divide Whole Numbers

- Dividing Whole Numbers
 - Use division notation
 - Model division of whole numbers
 - Divide whole numbers by single digit numbers
- Dividing Whole Numbers with Long Division
 - Divide whole numbers using long division
 - Divide whole numbers using long division where there may be a remainder
- Applications of Dividing Whole Numbers
 - Translate word phrases involving division to math notation
 - Divide whole numbers in applications

Chapter 2: The Language of Algebra

2.1 Use the Language of Algebra

- Variables, Expressions, and Equations
 - Use variables and algebraic symbols
 - Use variables and algebraic symbols to describe inequalities
 - Identify expressions and equations
- Exponents and Order of Operations
 - Use exponent notation and evaluate exponential expressions involving whole numbers
 - Simplify expressions using the order of operations

2.2 Evaluate, Simplify, and Translate Expressions

- Evaluating and Simplifying Expressions
 - Evaluate algebraic expressions
 - Identify terms, coefficients, and like terms
 - Simplify expressions by combining like terms
- Translating Phrases to Algebraic Expressions
 - Translate word phrases to algebraic expressions
 - Write word phrases from applications as algebraic expressions

2.3 Solving Equations Using the Subtraction and Addition Properties of Equality

- The Subtraction and Addition Properties of Equality
 - Determine whether a number is a solution of an equation
 - Model the Subtraction Property of Equality
 - Solve equations using the Subtraction Property of Equality
 - Solve equations using the Addition Property of Equality
 - Translating Phrases to Algebraic Equations and Solving
 - Translate word phrases to algebraic equations
 - Translate to an equation and solve
-

2.4 Find Multiples and Factors

- Identify Multiples and Use Divisibility Tests
 - Identify multiples of numbers
 - Use common divisibility tests
- Find Factors and Identify Prime and Composite Numbers
 - Find all the factors of a number
 - Identify prime and composite numbers

2.5 Prime Factorization and the Least Common Multiple

- Prime Factorization and the Least Common Multiple
 - Find the prime factorization of a composite number using a factor tree
 - Find the prime factorization of a composite number using the ladder method
 - Find the least common multiple (LCM) of two numbers

Chapter 3: Integers

3.1 Introduction to Integers

- Integers on the Number Line and Opposites
 - Locate positive and negative numbers on the number line
 - Order positive and negative numbers
 - Find opposites
 - Translate word phrases to expressions with integers
- Introduction to Absolute Value
 - Understand absolute value
 - Simplify expressions using the order of operations with absolute value

3.2 Add Integers

- Adding Integers and Variable Expressions Involving Integers
 - Model addition of integers
 - Simplify expressions involving addition with integers
 - Evaluate variable expressions involving addition with integers
- Adding Integers in Applications
 - Translate word phrases involving addition to algebraic expressions
 - Add integers in applications

3.3 Subtract Integers

- Subtracting Integers and Variable Expressions Involving Integers
 - Model subtraction of integers
 - Simplify expressions involving subtraction with integers
 - Evaluate variable expressions involving subtraction with integers
 - Subtracting Integers in Applications
 - Translate word phrases involving subtraction to algebraic expressions
 - Subtract integers in applications
-

3.4 Multiply and Divide Integers

- Multiplying and Dividing Integers and Variable Expressions with Integers
 - Multiply two integers
 - Divide two integers
 - Simplify expressions involving multiplication or division with integers
 - Evaluate variable expressions involving multiplication or division with integers
- Multiplying and Dividing Integers in Applications
 - Translate word phrases involving multiplication or division to algebraic expressions

3.5 Solve Equations Using Integers and the Division Property of Equality

- The Subtraction and Addition Properties of Equality with Integers
 - Determine whether an integer is a solution of an equation
 - Solve equations with integers using the Addition and Subtraction Properties of Equality
- The Division Property of Equality
 - Model the Division Property of Equality
 - Solve equations using the Division Property of Equality
- Translating Phrases to Algebraic Equations with Integers and Solving
 - Translate to an equation with integers and solve

Chapter 4: Fractions

4.1 Visualize Fractions

- Introduction to Fractions, Improper Fractions, and Mixed Numbers
 - Understand the meaning of fractions
 - Model improper fractions and mixed numbers
 - Convert between improper fractions and mixed numbers
- Finding Equivalent Fractions
 - Model equivalent fractions
 - Find equivalent fractions
- Ordering Fractions and Mixed Numbers
 - Locate fractions and mixed numbers on the number line
 - Order fractions and mixed numbers

4.2 Multiply and Divide Fractions

- Simplifying and Multiplying Fractions
 - Reduce a fraction to lowest terms
 - Multiply two fractions
 - Reciprocals and Dividing Fractions
 - Find reciprocals
 - Divide two fractions
-

4.3 Multiply and Divide Mixed Numbers and Complex Fractions

- Multiplying and Dividing Mixed Numbers
 - Multiply mixed numbers
 - Divide mixed numbers
- Simplifying Complex Fractions and Order of Operations with Fractions
 - Translate phrases to expressions with fractions
 - Simplify a complex fraction
 - Simplify an expression written with a fraction bar

4.4 Add and Subtract Fractions with Common Denominators

- Adding and Subtracting Fractions with Common Denominators
 - Model fraction addition
 - Add fractions with a common denominator
 - Model fraction subtraction
 - Subtract fractions with a common denominator

4.5 Add and Subtract Fractions with Different Denominators

- Adding and Subtracting Fractions with Different Denominators
 - Find the least common denominator (LCD)
 - Convert fractions to equivalent fractions with the LCD
 - Add and subtract fractions with different denominators
- Combining Fraction Operations
 - Identify and use fraction operations
 - Use the order of operations to simplify complex fractions
 - Evaluate a variable expression with fractions

4.6 Add and Subtract Mixed Numbers

- Adding and Subtracting Mixed Numbers with Common Denominators
 - Model addition of mixed numbers with a common denominator
 - Add mixed numbers with a common denominator
 - Model subtraction of mixed numbers
 - Subtract mixed numbers with a common denominator
- Adding and Subtracting Mixed Numbers with Different Denominators
 - Add and subtract mixed numbers with different denominators

4.7 Solve Equations with Fractions

- Solve Equations with Fractions Using the Addition, Subtraction, and Division Properties of Equality
 - Determine whether a fraction is a solution of an equation
 - Solve equations with fractions using the Addition, Subtraction, and Division Properties of Equality
-

- Solve Equations with Fractions Using the Multiplication Properties of Equality
 - Solve equations using the Multiplication Property of Equality
 - Solve equations with a fraction coefficient using the Multiplication Property of Equality
 - Translate sentences involving fractions to equations and solve

Chapter 5: Decimals

5.1 Introduction to Decimals

- Naming Decimals and Converting Decimals to Fractions
 - Name decimals
 - Write decimals
 - Convert decimals to fractions or mixed numbers
- Ordering and Rounding Decimals
 - Locate decimals on the number line
 - Order decimals
 - Round a decimal

5.2 Decimal Operations

- Operations with Decimals
 - Add and subtract two decimals
 - Multiply two decimals
 - Divide decimals by a whole number
 - Divide a decimal by another decimal
- Operations with Decimals in a Money Application
 - Use decimals in money applications

5.3 Decimals and Fractions

- Converting Fractions to Decimals and Order of Operations with Decimals
 - Convert fractions to decimals
 - Order decimals and fractions
 - Simplify expressions involving decimals using the order of operations
- Circumference and Area of Circles
 - Find the circumference and area of circles with pi as a decimal approximation
 - Find the circumference and area of circles with pi as a fractional approximation

5.4 Solve Equations with Decimals

- Solving Equations Involving Decimals
 - Determine whether a decimal is a solution of an equation
 - Solve equations with decimals
 - Translate sentences involving decimals to an equation and solve
-

5.5 Averages and Probability

- Finding the Mean, Median, and Mode of a Set of Numbers
 - Calculate the mean of a set of numbers
 - Find the median of a set of numbers
 - Find the mode of a set of numbers
- Calculating the Probability of an Event
 - Apply the basic definition of probability

5.6 Ratios and Rate

- Writing Ratios and Using Ratios in Applications
 - Write a ratio as a fraction
 - Use ratios in applications
- Unit Rates and Unit Prices
 - Write a rate as a fraction
 - Find unit rates
 - Find unit price
 - Translate phrases to expressions as rates or ratios

5.7 Simplify and Use Square Roots

- Evaluating, Estimating, and Approximating Square Roots
 - Evaluate square root expressions
 - Estimate square roots
 - Approximate square roots
- Simplifying Square Roots with Variables and Square Roots in Applications
 - Simplify a variable expression with square roots
 - Use a square root in applications

Chapter 6: Percents

6.1 Understand Percent

- Definition of Percent and Converting Percents
 - Use the definition of percent
 - Convert percents to fractions
 - Convert percents to decimals
 - Convert decimals and fractions to percents

6.2 Solve General Applications of Percent

- Percent Equations and Percent Increase and Decrease
 - Translate and solve a basic percent equation
 - Solve applications of percent
 - Find percent increase and percent decrease
-

6.3 Solve Sales Tax, Commission, and Discount Applications

- Using Percents with Sales Tax, Commission, and Discount Applications
 - Solve sales tax applications
 - Solve commission applications
 - Solve discount applications
 - Solve mark-up applications

6.4 Solve Simple Interest Applications

- Solving Simple Interest Applications
 - Use the simple interest formula
 - Solve a simple interest application

6.5 Solve Proportions and Their Applications

- Proportions and Applications Using Proportions
 - Use the definition of proportion
 - Solve proportions
 - Solve applications using proportions
- Writing and Solving Percent Proportions
 - Write percent equations as proportions
 - Translate and solve percent proportions

Chapter 7: The Properties of Real Numbers

7.1 Rational and Irrational Numbers

- Classifying Real Numbers
 - Identify rational numbers and irrational numbers
 - Classify different types of real numbers

7.2 Commutative and Associative Properties

- Simplifying Expressions with the Commutative and Associate Properties
 - Use the commutative and associative properties
 - Evaluate expressions using the commutative and associative properties
 - Simplify expressions using the commutative and associative properties

7.3 Distributive Property

- Simplifying Expressions with the Distributive Property
 - Simplify expressions using the distributive property
 - Simplify expressions involving fractions or decimals with the distributive property
 - Simplify expressions using the distributive property where a variable needs distributed
 - Simplify expressions using the distributive property where a negative number needs distributed
 - Evaluating Expressions with the Distributive Property
 - Use the distributive property as a step in the order of operations
 - Evaluate expressions using the distributive property
-

7.4 Properties of Identity, Inverses, and Zero

- Use the Properties of Identity, Inverses, and Zero to Simplify Expressions
 - Recognize the identity properties of addition and multiplication
 - Use the inverse properties of addition and multiplication
 - Use the properties of zero
 - Simplify expressions using the properties of identities, inverses, and zero

7.5 Systems of Measurement

- Unit Conversions in the US System
 - Make a unit conversion in the US system
 - Use mixed units in the US System
- Unit Conversions in the Metric System
 - Make a unit conversion in the metric system
 - Use mixed units in the metric system
- Unit Conversions Between the US and Metric System
 - Convert between the US and the metric systems of measurement
 - Convert between Celsius and Fahrenheit temperatures

Chapter 8: Solving Linear Equations

8.1 Solve Equations Using the Subtraction and Addition Properties of Equality

- Simplifying and Solving Equations Using the Subtraction and Addition Properties of Equality
 - Solve equations using the Subtraction and Addition Properties of Equality
 - Solve equations that need to be simplified using the Subtraction and Addition Properties of Equality
- Solving Application Problems with the Subtraction and Addition Properties of Equality
 - Translate an equation and solve using the Subtraction and Addition Properties of Equality
 - Translate and solve applications using the Subtraction and Addition Properties of Equality

8.2 Solve Equations Using the Division and Multiplication Properties of Equality

- Simplifying and Solving Equations Using the Division and Multiplication Properties of Equality
 - Solve equations using the Division and Multiplication Properties of Equality
 - Solve equations that need to be simplified using the Division and Multiplication Properties of Equality

8.3 Solve Equations with Variables and Constants on Both Sides

- A General Strategy for Solving Equations
 - Solve equations with constants on both sides
 - Solve an equation with variables on each side
 - Solve an equation with variables and constants on both sides
 - General Strategies for Solving Linear Equations
 - Solve an equation using the distributive property with variables on one side
 - Solve an equation using the distributive property with variables on both sides
 - Classify equations as conditional, identity, or a contradiction
-

8.4 Solve Equations with Fraction or Decimal Coefficients

- Use a General Strategy for Solving Equations with Fractions
 - Solve equations with fraction coefficients
 - Solve equations with fraction coefficients and the distributive property
- Use a General Strategy for Solving Equations with Decimals
 - Solve equations with decimal coefficients
 - Solve equations with decimal coefficients and the distributive property

8.5 Solve Linear Inequalities

- Inequalities, the Number Line, and Interval Notation
 - Graph an inequality on the number line
 - Express an inequality using interval notation
- Solving One-Step Linear Inequalities
 - Solve an inequality using the subtraction and addition properties of inequality
 - Solve an inequality using the division and multiplication properties of inequality
- Solving Linear Inequalities
 - Solve an inequality that requires simplification
 - Classify an inequality as conditional, identity, or contradiction
 - Translate an English sentence into an inequality and solve

Chapter 9: Math Models and Geometry

9.1 Use a Problem Solving Strategy

- Introduction to Problem Solving and Number Problems
 - Use a problem solving strategy for word problems
 - Solve number problems
 - Solve number problems involving multiple numbers
 - Solve number problems involving consecutive integers

9.2 Solve Money Applications

- Solve Problems Involving Coins, Tickets, or Stamps
 - Solve a coin word problem
 - Solve a ticket or stamp word problem

9.3 Use Properties of Angles, Triangles, and the Pythagorean Theorem

- Solve Problems with Angle Measures and Similar Triangles
 - Use the definitions of supplementary and complementary angles to solve problems
 - Find the measures of angles of a triangle using properties
 - Use the properties of similar triangles to solve problems
 - Solve Problems with the Pythagorean Theorem
 - Use the Pythagorean Theorem to find the length of a missing side of a right triangle
 - Use the Pythagorean Theorem to solve application problems
-

9.4 Use Properties of Rectangles, Triangles, and Trapezoids

- Find the Area and Perimeter of Rectangles
 - Understand linear, square, and cubic measure and the definition of area and perimeter
 - Solve problems involving the area and perimeter of rectangles
 - Use the area or perimeter of a rectangle to find the length or width of a rectangle when one side is given in terms of another
- Find the Area and Perimeter of Triangles
 - Solve problems involving the area and perimeter of triangles
 - Solve problems involving the area and perimeter of isosceles or equilateral triangles

9.5 Solve Geometry Applications with Circles and Irregular Figures

- Find the Area of Trapezoids
 - Use properties of trapezoids
- Area and Circumference of Circles and Area of Irregular Figures
 - Solve problems involving the area and circumference of circles
 - Find the area of irregular figures made from rectangles and triangles
 - Find the area of irregular figures made from circles and other shapes

9.6 Solve Geometry Applications with Volume and Surface Area

- Volume and Surface Area of Rectangular Solids and Spheres
 - Find volume and surface area of rectangular solids and cubes
 - Find volume and surface area of spheres
- Volume and Surface Area of Cylinders and Cones
 - Find volume and surface area of cylinders
 - Find volume of cones

9.7 Solve a Formula for a Specific Variable

- The Distance, Rate, and Time Formula and Solving for a Specific Variable
 - Use the distance, time, and rate formula
 - Solve a given formula for a specific variable
 - Solve a formula for y

9.8 Solve Applications with Linear Inequalities

- Problem Solving with Linear Inequalities
 - Solve one-step applications with linear inequalities
 - Solve applications with linear inequalities

Chapter 10: Graphs and an Introduction to Functions

10.1 Use the Rectangular Coordinate System

- Reading Graphs and the Rectangular Coordinate System
 - Plot points on a rectangular coordinate system
 - Verify the solution to an equation in two variables
 - Complete a table of solutions to a linear equation in two variables
 - Find solutions to a linear equation
-

10.2 Graph Linear Equations in Two Variables

- Graphing Linear Equations
 - Recognize the relationship between the solutions of an equation and its graph
 - Graph a linear equation by plotting points
 - Graph a linear equation in standard form by plotting points
 - Graph vertical and horizontal lines

10.3 Graph with Intercepts

- Intercepts on the Coordinate Plane
 - Identify the x- and y-intercepts on a graph
 - Find the x- and y-intercepts from an equation of a line
 - Graph a line using the x- and y-intercepts

10.4 Understand Slope of a Line

- Understanding Slope
 - Use a geoboard to model slope
 - Use the relationship between rise and run to find the slope of a line from its graph
 - Find the slope of horizontal and vertical lines
- The Slope Formula
 - Use the slope formula to find the slope of a line between two points
 - Graph a line given a point and the slope
 - Determine the slope in applications

10.5 Use the Slope-Intercept Form of an Equation of a Line

- Slope-Intercept Form
 - Identify the slope and y-intercept from an equation of a line and relate a graph to the equation
 - Graph a line given its equation using its slope and y-intercept
 - Graph lines using a variety of methods
 - Graph and interpret applications of slope-intercept
- Parallel and Perpendicular Lines
 - Use slopes to identify parallel lines
 - Use slopes to identify perpendicular lines

10.6 Find the Equation of a Line

- Equations of Lines
 - Find an equation of the line given the slope and y-intercept
 - Find an equation of the line given the slope and a point
 - Find an equation of the line given two points
- Equations of Parallel and Perpendicular Lines
 - Find an equation of a line parallel to a given line
 - Find an equation of a line perpendicular to a given line

10.7 Graphs of Linear Inequalities

- Graphing Linear Inequalities
 - Verify solutions to an inequality in two variables
 - Recognize the relationship between the solutions of an inequality and its graph
 - Graph a linear inequality
-

10.8 Relations and Functions

- Introduction to Functions
 - Find the domain and range of a relation
 - Determine if a relation is a function given a set of ordered pairs or a mapping
 - Determine if a relation is a function given an equation
- Function Notation
 - Use function notation to find the value of a function given a number
 - Use function notation to find the value of a function given a variable expression

10.9 Graphs of Functions

- The Vertical Line Test and Graphs of Functions
 - Use the vertical line test to determine if a graph represents a function
 - Identify graphs of basic functions
 - Read information from the graph of a function

Chapter 11: Systems of Linear Equations

11.1 Solve Systems of Equations by Graphing

- Solving Systems of Linear Equations by Graphing
 - Determine whether an ordered pair is a solution of a system of linear equations
 - Solve a system of linear equations by graphing
 - Determine the number of solutions of a linear system
 - Solve applications of systems of linear equations by graphing

11.2 Solve Systems of Equations by Substitution

- Solving Systems of Linear Equations by Substitution
 - Solve a system of linear equations by substitution
 - Solve applications of systems of linear equations by substitution

11.3 Solve Systems of Equations by Elimination

- Solving Systems of Linear Equations by Elimination
 - Solve a system of linear equations by elimination
 - Solve applications of systems of equations by elimination
 - Solve a system of linear equations using a variety of methods

11.4 Solve Applications with Systems of Equations

- Systems of Linear Equations and Problem Solving
 - Translate a word problem to a system of equations
 - Solve a word problem using a system of equations
 - Solve an application in geometry using a system of equations
 - Solve uniform motion applications using a system of equations

11.5 Solve Mixture Applications with Systems of Equations

- Mixture Problems and Systems of Equations
 - Solve mixture applications involving tickets or money with a system of equations
 - Solve mixture applications involving concentrations using a system of equations
 - Solve interest applications using a system of equations
-

11.6 Solve Systems of Equations with Three Variables

- Solving Systems of Linear Equations in Three Variables
 - Determine whether an ordered triple is a solution of a system of three linear equations with three variables
 - Solve a system of linear equations with three variables
 - Identify inconsistent and dependent systems of equations with three variables
 - Solve applications using systems of linear equations in three variables

11.7 Solve Systems of Equations Using Matrices

- Solving Systems of Linear Equations with Matrix Row Operations
 - Write the augmented matrix for a system of equations
 - Use row operations on a matrix
 - Solve a system of equations using matrices

11.8 Solve Systems of Equations Using Determinants

- Determinants of Matrices
 - Evaluate the determinant of a 2x2 matrix
 - Evaluate the minor of an element in a 3x3 matrix
 - Evaluate the determinant of a 3x3 matrix
- Solving Systems of Linear Equations with Cramer's Rule and Determinants
 - Use Cramer's Rule to solve systems of equations in two variables
 - Use Cramer's Rule to solve systems of equations in three variables
 - Use determinants to determine if three given points are collinear

Chapter 12: Compound and Absolute Value Inequalities and Systems of Linear Inequalities

12.1 Solve Compound Inequalities

- Solving Compound Inequalities
 - Solve a compound inequality involving intersections
 - Solve a compound inequality involving unions
 - Solve applications with compound inequalities

12.2 Solve Absolute Value Equations and Inequalities

- Solving Absolute Value Equations and Inequalities
 - Solve an absolute value equation
 - Solve an absolute value inequality involving "less than"
 - Solve an absolute value inequality involving "greater than"
 - Solve applications with absolute value

12.3 Graphing Systems of Linear Inequalities

- Solving Systems of Linear Inequalities
 - Determine whether an ordered pair is a solution of a system of linear inequalities
 - Solve a system of linear inequalities by graphing
 - Solve applications of systems of linear inequalities
-

Chapter 13: Polynomials

13.1 Add and Subtract Polynomials

- Adding and Subtracting Polynomials
 - Identify the types and degrees of polynomials
 - Add and subtract monomials
 - Add and subtract polynomials
 - Evaluate a polynomial for a given value

13.2 Use Multiplication Properties of Exponents

- Product Properties of Exponents
 - Simplify numerical expressions containing exponents
 - Simplify expressions using the product property for exponents
 - Simplify expressions using the power property for exponents or the product to a power property for exponents
 - Simplify expressions by applying several properties

13.3 Multiply Polynomials

- Multiplying Polynomials
 - Multiply monomials
 - Multiply a polynomial by a monomial
 - Multiply a binomial by a binomial
 - Multiply a trinomial by a binomial

13.4 Special Products

- Special Products of Binomials
 - Square a binomial using the binomial squares pattern
 - Multiply conjugates using the product of conjugates pattern
 - Recognize and use the appropriate special product pattern

13.5 Divide Monomials

- Quotient Properties of Exponents and Dividing Monomials
 - Simplify expressions using the quotient property for exponents and the exponent of zero
 - Simplify expressions using the quotient to a power property
 - Simplify expressions by applying several quotient properties of exponents
 - Divide monomials

13.6 Divide Polynomials

- Dividing Polynomials
 - Divide a polynomial by a monomial
 - Divide a polynomial by a binomial using polynomial long division
- Synthetic Division and the Remainder and Factor Theorems
 - Use synthetic division to divide polynomials
 - Use the remainder and factor theorems

13.7 Integer Exponents and Scientific Notation

- Negative Exponents
 - Use the definition of a negative exponent
 - Simplify expressions with integer exponents
-

- Scientific Notation
 - Convert from decimal notation to scientific notation
 - Convert from scientific notation to decimal notation
 - Multiply and divide using scientific notation

Chapter 14: Factoring

14.1 Greatest Common Factor and Factor by Grouping

- The Greatest Common Factor and Factoring by Grouping
 - Find the greatest common factor of two or more expressions
 - Factor the greatest common factor from a polynomial
 - Factor a polynomial by grouping

14.2 Factor Quadratic Trinomials with Leading Coefficient 1

- Factoring Trinomials with a Leading Coefficient of 1
 - Factor a trinomial of the form x^2+bx+c where c is positive
 - Factor a trinomial of the form x^2+bx+c where c is negative
 - Factor a trinomial of the form $x^2+bxy+cy^2$

14.3 Factor Quadratic Trinomials with Leading Coefficient Other than 1

- Factoring Trinomials with a Leading Coefficient Other than 1
 - Factor a trinomial of the form ax^2+bx+c with a GCF
 - Factor a trinomial using trial and error
 - Factor a trinomial using the 'ac' method

14.4 Factor Special Products

- Factoring Special Products
 - Factor a perfect square trinomial
 - Factor a difference of squares
 - Factor polynomials by combining the difference of squares and perfect square trinomial patterns
 - Factor sums and differences of cubes

14.5 General Strategy for Factoring Polynomials

- Choosing a Factoring Strategy
 - Recognize and use the appropriate method to factor a polynomial completely

14.6 Quadratic Equations

- Solving Quadratic Equations by Factoring
 - Solve a factored quadratic equation using the zero product property
 - Solve a quadratic equation by factoring
 - Solve applications modeled by quadratic equations

14.7 Polynomial Equations

- Solving Polynomial Equations by Factoring
 - Use the zero product property to solve a factored polynomial equation
 - Solve polynomial equations by factoring
 - Find zeros and intercepts of a polynomial function by factoring
 - Use factoring to solve application problems involving polynomial equations
-

Chapter 15: Rational Expressions and Equations

15.1 Simplify Rational Expressions

- Domain of Rational Expressions and Simplifying Rational Expressions
 - Determine the values for which a rational expression is undefined
 - Evaluate a rational expression
 - Simplify a rational expression
 - Simplify a rational expression with opposite factors

15.2 Multiply and Divide Rational Expressions

- Multiplying and Dividing Rational Expressions
 - Multiply rational expressions
 - Divide rational expressions
 - Multiply and divide more than two rational expressions

15.3 Add and Subtract Rational Expressions with a Common Denominator

- Adding and Subtracting Rational Expressions with a Common Denominator
 - Add rational expressions with a common denominator
 - Subtract rational expressions with a common denominator
 - Add and subtract rational expressions whose denominators are opposites

15.4 Add and Subtract Rational Expressions with Unlike Denominators

- Adding and Subtracting Rational Expressions with Unlike Denominators
 - Find the least common denominator of rational expressions
 - Find equivalent rational expressions
 - Add rational expressions with different denominators
 - Subtract rational expressions with different denominators

15.5 Simplify Complex Rational Expressions

- Simplifying Complex Fractions
 - Simplify a complex rational expression by writing it as division
 - Simplify a complex rational expression by using the LCD

15.6 Solve Rational Equations

- Solving Rational Equations
 - Solve a rational equation that results in a linear equation
 - Solve a rational equation that results in a quadratic equation
 - Solve a rational equation for a specific variable

15.7 Solve Proportion and Similar Figure Applications

- Proportions and Problem Solving with Rational Equations
 - Solve proportions
 - Solve applications with proportions
 - Solve similar figure applications

15.8 Solve Uniform Motion and Work Applications

- Uniform Motion, Work, and Problem Solving
 - Solve uniform motion applications involving rational equations
 - Solve problems involving rates of work using rational equations
-

15.9 Use Direct and Inverse Variation

- Variation and Problem Solving
 - Solve direct variation problems
 - Solve inverse variation problems

15.10 Solve Rational Inequalities

- Solving Rational Inequalities
 - Find the solution set of a rational inequality
 - Solve an inequality with rational functions

Chapter 16: Roots and Radicals

16.1 Simplify and Use Square Roots

- Understanding Square Roots
 - Simplify expressions with square roots
 - Estimate square roots and approximate square roots
 - Simplify variable expressions with square roots

16.2 Simplify Square Roots

- Simplifying Square Root Expressions
 - Use the product property to simplify square roots
 - Use the quotient property to simplify a perfect square fraction
 - Use the quotient property to simplify square roots

16.3 Add and Subtract Square Roots

- Adding and Subtracting Square Root Expressions
 - Add and subtract like square roots
 - Add and subtract square roots that need simplification

16.4 Multiply Square Roots

- Multiplying Square Root Expressions
 - Multiply square roots
 - Use polynomial multiplication to multiply square roots
 - Use special product formulas to multiply square roots

16.5 Divide Square Roots

- Dividing Square Root Expressions and Rationalizing Denominators
 - Divide square roots
 - Rationalize a one-term denominator
 - Rationalize a two-term denominator

16.6 Solve Equations with Square Roots

- Solving Radical Equations
 - Solve a square root equation with a single radical
 - Solve a square root equation with two radicals
 - Use square roots in applications

16.7 Higher Roots

- Understanding Higher Roots
 - Simplify numerical expressions with higher roots
-

- Simplify expressions with higher roots
- Simplifying Higher Roots and Operations on Higher Roots
 - Use the product property to simplify expressions with higher roots
 - Use the quotient property to simplify expressions with higher roots
 - Add and subtract higher roots

16.8 Rational Exponents

- Simplifying Expressions with Rational Exponents
 - Simplify expressions with rational exponents and a numerator of 1
 - Simplify expressions with rational exponents and a numerator greater than 1
 - Use the laws of exponents to simplify expressions with rational exponents

16.9 Use Radicals in Functions

- Radical Functions
 - Evaluate a radical function
 - Find the domain of a radical function
 - Graph a radical function by plotting points and determine its range

16.10 Use the Complex Number System

- Introduction to Complex Numbers
 - Evaluate the square root of a negative number and understand the complex number system
 - Add or subtract complex numbers
- Multiplying and Dividing Complex Numbers and Powers of i
 - Multiply complex numbers
 - Multiply two complex conjugates
 - Divide complex numbers
 - Simplify powers of i

Chapter 17: Quadratic Equations

17.1 Solve Quadratic Equations Using the Square Root Property

- Solving Quadratic Equations Using the Square Root Property
 - Solve a quadratic equation using the square root property
 - Solve a quadratic equation with a binomial as the quadratic term using the square root property
 - Solve a quadratic equation where factoring results in a perfect square binomial

17.2 Solve Quadratic Equations by Completing the Square

- Solving Quadratic Equations by Completing the Square
 - Complete the square of a binomial expression
 - Solve a quadratic equation with a leading coefficient of 1 by completing the square
 - Solve a quadratic equation with a leading coefficient greater than 1 by completing the square

17.3 Solve Quadratic Equations Using the Quadratic Formula

- Solving Quadratic Equations with the Quadratic Formula
 - Solve a quadratic equation using the quadratic formula with 2 real solutions
 - Solve a quadratic equation using the quadratic formula with 1 or 0 real solutions
-

- Use the discriminant to predict the number of solutions of a quadratic equation

17.4 Solve Quadratic Equations in Quadratic Form

- Solving Equations by Using Quadratic Methods
 - Solve an equation in quadratic form by using substitution
 - Solve an equation in quadratic form with rational or negative exponents by using substitution

17.5 Solve Applications Modeled by Quadratic Equations

- Problem Solving with Quadratic Equations
 - Solve applications modeled by quadratic equations that may require the quadratic formula
 - Solve geometric applications that may require the quadratic formula

17.6 Graph Quadratic Functions Using Properties

- Parabolas and Their Properties
 - Graph a quadratic function by plotting points and determine the direction a parabola opens
 - Determine the axis of symmetry and vertex of a parabola given a function
 - Determine the intercepts of a parabola given a function
- Graphing Quadratic Functions
 - Graph a quadratic function by finding key points
 - Determine the minimum or maximum of a quadratic function and use it in applications

17.7 Graph Quadratic Functions Using Transformations

- Transformations of Parabolas
 - Graph a quadratic function using a vertical translation
 - Graph a quadratic function using a horizontal translation
 - Graph a quadratic function by compression, stretching, or reflecting
- Graphing Quadratic Functions Using Transformations
 - Rewrite a quadratic in vertex form and graph it using transformations
 - Find a quadratic function given its graph

17.8 Solve Quadratic Inequalities

- Solving Quadratic Inequalities
 - Solve a quadratic inequality graphically
 - Solve a quadratic inequality algebraically

Chapter 18: Exponential and Logarithmic Functions

18.1 Finding Composite and Inverse Functions

- Composite Functions
 - Perform a composition of functions
 - Evaluate a composition of functions for a specific value
 - One-to-One Functions
 - Determine whether a function is one-to-one given a set of ordered pairs
 - Use the horizontal line test to determine whether a graph represents a one-to-one function
-

- Inverse Functions
 - Find the inverse of a function given a set of ordered pairs or a graph
 - Verify that two functions are inverses of each other
 - Find the inverse of a function algebraically

18.2 Evaluate and Graph Exponential Functions

- Graphing Exponential Functions
 - Graph an exponential function and understand its properties
 - Graph an exponential function using transformations
 - Evaluate an exponential function with base e and understand the natural base
- Applications with Exponential Functions
 - Use the one-to-one property of exponential equations to solve an exponential equation
 - Use the compound interest formula to find the new value of an account
 - Use the continuously compounding interest formula to find the new value of an account
 - Calculate resultant values using exponential growth and decay models

18.3 Evaluate and Graph Logarithmic Functions

- Introduction to Logarithms
 - Convert between exponential and logarithmic form
 - Evaluate a logarithmic function
- Logarithmic Functions and Applications
 - Graph a logarithmic function and understand its properties
 - Solve a logarithmic equation by rewriting the equation in exponential form
 - Use logarithmic models in applications

18.4 Use the Properties of Logarithms

- Understanding the Properties of Logarithms
 - Use basic properties of logarithms and the inverse properties of logarithms
 - Use the product, quotient, and power properties of logarithms
- Using the Properties of Logarithms
 - Use the properties of logarithms to expand a logarithmic expression
 - Use the properties of logarithms to condense a logarithmic expression
 - Use the change-of-base formula for logarithms

18.5 Solve Exponential and Logarithmic Equations

- Solving Logarithmic Equations
 - Use the one-to-one property of logarithmic equations to solve logarithmic equations
 - Use the properties of logarithms to solve logarithmic equations
 - Solving Exponential Equations and Applications
 - Solve exponential equations using logarithms
 - Solve for amounts other than a new balance with the compound or continuously compounding interest formula
 - Use the exponential growth and decay models to find values other than the resultant value
-

Chapter 19: Conics

19.1 Distance and Midpoint Formulas and Circles

- The Distance and Midpoint Formulas
 - Use the distance formula to find the distance between two points
 - Use the midpoint formula to find the midpoint between two points
- The Equation of Circles
 - Write the standard form of the equation of a circle given its center and radius
 - Write the standard form of the equation of a circle given its center and a point on the circle
 - Graph a circle given its equation in standard form
 - Rewrite the equation of a circle given in general form by completing the square

19.2 Parabolas

- Parabolas as Conic Sections and Applications
 - Graph a vertical parabola given the equation in general or standard form
 - Graph a horizontal parabola given the equation in general form
 - Graph a horizontal parabola given the equation in standard form
 - Solve applications with parabolas

19.3 Ellipses

- Ellipses with Centers at the Origin
 - Graph an ellipse with its center at the origin
 - Find the equation of an ellipse with its center at the origin
- Ellipses with Centers Not at the Origin and Applications
 - Graph an ellipse with its center not at the origin
 - Rewrite the equation of an ellipse given in general form by completing the square
 - Solve applications with ellipses

19.4 Hyperbolas

- Hyperbolas as Conic Sections
 - Graph a hyperbola with its center at the origin
 - Graph a hyperbola with its center not at the origin
 - Rewrite the equation of a hyperbola given in general form by completing the square
- Identifying Conic Sections by Their Equations
 - Identify conic sections by their equations

19.5 Solve Systems of Nonlinear Equations

- Solving Systems of Nonlinear Equations
 - Solve a system of nonlinear equations by graphing
 - Solve a system of nonlinear equations using substitution
 - Solve a system of nonlinear equations using elimination
 - Problem Solving with Systems of Nonlinear Equations
 - Use a system of nonlinear equations to solve applications
-

Chapter 20: Sequences, Series, and the Binomial Theorem

20.1 Sequences

- Introduction to Sequences
 - Write the first few terms of a sequence
 - Find a formula for the general term of a sequence
- Factorial Notation and Sigma Notation
 - Use factorial notation
 - Find the partial sum
 - Use summation notation to write a sum

20.2 Arithmetic Sequences and Series

- Arithmetic Sequences and Series
 - Determine if a sequence is arithmetic and write the first few terms of an arithmetic sequence
 - Find the general term of an arithmetic sequence
 - Find the sum of the first n terms of an arithmetic sequence

20.3 Geometric Sequences and Series

- Geometric Sequences
 - Determine if a sequence is geometric and write the first few terms of a geometric sequence
 - Find the general term of a geometric sequence
- Finite and Infinite Geometric Series and Applications
 - Find the sum of the first n terms of a geometric sequence
 - Find the sum of an infinite geometric series and use infinite geometric series to write a repeating decimal as a fraction
 - Use geometric sequences and series to solve monetary applications including annuities

20.4 Binomial Theorem

- The Binomial Theorem
 - Use Pascal's Triangle to expand a binomial
 - Evaluate a binomial coefficient
 - Use the binomial theorem to expand a binomial
-