Course Description:

Pre-Algebra is designed to give students the opportunity to build the conceptual understanding and skills necessary to be successful in MAT101 Algebra 1A and MAT102 Algebra 1B.

Students begin this course by reviewing operations with rational numbers. They find factors and multiples of numbers, along with common factors and multiples of sets of numbers. They also add, subtract, multiply, and divide integers, fractions, and mixed numbers. Students apply properties, such as the Distributive, Associative, and Commutative Properties, and use the order of operations to simplify numerical expressions and then algebraic expressions. Next, they work with algebraic equations and use them to solve problems. This is followed by identifying, graphing, and comparing linear relationships. The course concludes with an introduction to functions.

Course Objectives:

- Add, subtract, multiply, and divide fractions and mixed numbers.
- Add, subtract, multiply, and divide integers.
- Apply properties, such as the Distributive, Associative, and Commutative Properties, to simplify expressions.
- Determine if a set of ordered pairs is a function.
- Find ordered pairs that are solutions to two-variable equations.
- Find the greatest common factor and least common multiple of a set of numbers.
- Graph a linear equation and write a linear equation from a graph of a line.
- Identify and estimate the value of irrational numbers.
- Model a situation with an expression.
- Rewrite a number by finding its prime factorization.
- Simplify expressions by combining like terms.
- Simplify expressions using the order of operations.
- Simplify expressions using the properties of exponents.
- Solve one-step, two-step, and multi-step equations in one variable.
- Solve word problems.

Required Materials:

- Internet browser

Schedule of Work:

Unit 1: Rational Numbers

Lesson 1: Divisibility Rules and Factors

- Unit 1 Reading Review
- Reading: What Are Factors?
- Interactive: Finding Factors
- Reading: Divisibility Rules
- Example: Using Divisibility Rules to Find Factors
- Checkpoint 1

Lesson 2: Prime Factorization

- Reading: Prime or Composite?

- Reading: Factor Trees
- Example: Making Factor Trees
- Example: Writing the Prime Factorization
- Checkpoint 2

Lesson 3: The Greatest Common Factor

- Reading: The Greatest Common Factor
- Example: The GCF of 28 and 42
- Example: The GCF of 45 and 135
- Checkpoint 3

Lesson 4: The Least Common Multiple

- Reading: The Least Common Multiple
- Example: Finding the LCM by Listing Multiples
- Reading: Another Method for Finding the LCM
- Example: Finding the LCM Using the GCF
- Discussion
- Checkpoint 4

Lesson 5: Understanding Integer

- Reading: Properties of Integers
- Reading: Integers on the Number Line
- Example: Integers on the Number Line
- Reading: Ordering Integers
- Examples: Using the Number Line to Order Integers
- Checkpoint 5

Lesson 6: Adding Integer

- Reading: The Balloons-and-Weights Model
- Video: Balloons and Weights
- Infographic: Adding Integers
- Video: Adding Integers
- Example: Adding Integers in Real-World Situations
- Checkpoint 6

Lesson 7: Subtracting Integers

- Reading: Subtracting Integers on the Number Line
- Examples: Subtracting Integers on the Number Line
- Video: Subtracting Integers on the Number Line
- Examples: Mixed Addition and Subtraction
- Interactive: Balloons and Weights
- Example: Subtracting Integers in Real-World Situations
- Checkpoint 7

Lesson 8: Multiplying and Dividing Integers

- Reading: Rules for Multiplying and Dividing Integers
- Example: Multiplying Integers in Real-World Situations
- Examples: Dividing Integers in Real-World Situations
- Video: Multiplying Integers
- Example: Multiplying Integers Using the Associative Property
- Checkpoint 8

Lesson 9: Adding Rational Numbers

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- Reading: What Are Rational Numbers?
- Examples: Equivalent Rational Numbers
- Reading: Common Denominators
- Examples: Adding Positive Fractions
- Examples: Adding Negative Fractions
- Example: Adding Rational Numbers in Context
- Checkpoint 9

Lesson 10: Subtracting Rational Numbers

- Reading: Subtracting Fractions and Mixed Numbers
- Example: Subtract Fractions Using the Number Line
- Example: Subtracting Rational Numbers in Context
- Checkpoint 10

Lesson 11: Multiplying Rational Numbers

- Reading: Multiplying Fractions and Mixed Numbers
- Examples: Multiplying Fractions
- Example: Multiplying Mixed Numbers
- Example: Multiplying Mixed Numbers in Context
- Example: Multiplying Positive and Negative Numbers
- Example: Multiplying Rational Numbers Using the Associative Property
- Checkpoint 11

Lesson 12: Dividing Rational Numbers

- Reading: Dividing Fractions and Mixed Numbers
- Examples: Dividing Fractions and Mixed Numbers
- Video: Dividing Rational Numbers
- Example: Dividing Signed Fractions in Context
- Discussion
- Checkpoint 12

Lesson 13: Strategies for Solving Word Problems

- Reading: Interpreting Situations
- Example: Interpreting Situations
- Reading: Signal Words
- Example: Signal Words
- Example: Organizing Information and Solving
- Checkpoint 13

Lesson 14: Review and Unit Exam

- Notes Upload
- Unit 1 Practice Exam
- Unit 1 Exam

Unit 2: Properties and Operations

Lesson 15: The Distributive Property

- Unit 2 Reading Review
- Reading: Applying the Distributive Property
- Example: Distributing Positive Numbers
- Examples: Distributing Negative Numbers
- Example: Distributing -1

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- Example: Working Backwards
- Checkpoint 15

Lesson 16: Understanding Exponents

- Reading: What Is an Exponent?
- Example: Rewriting Exponents
- Reading: Evaluating Exponents, Part 1
- Reading: Evaluating Exponents, Part 2
- Examples: Evaluating Exponents Using Technology
- Example: Equivalent Expressions with Exponents
- Discussion
- Checkpoint 16

Lesson 17: Negative Exponents

- Reading: Negative Exponents
- Video: Integer Exponents
- Example: When a Fraction Has a Negative Exponent
- Examples: A Negative Exponent in the Denominator
- Example: Negative Exponents in the Numerator and Denominator
- Checkpoint 17

Lesson 18: Properties of Exponents, Part 1

- Reading: Product of Powers
- Example: Product of Powers
- Reading: Quotient of Powers
- Example: Quotient of Powers
- Reading: Zero Powers
- Checkpoint 18

Lesson 19: Properties of Exponents, Part 2

- Reading: Power of Powers
- Example: Power of Powers
- Video: Power Rules
- Reading: Power of Products
- Example: Power of Products
- Reading: Power of Quotients
- Example: Power of Quotients
- Checkpoint 19

Lesson 20: Square Roots

- Reading: Squares and Square Roots
- Example: Squares and Square Roots
- Example: Squares and Square Roots of Fractions
- Checkpoint 20

Lesson 21: Cube Roots

- Reading: Cubes and Cube Roots
- Interactive: Identifying Perfect Squares and Perfect Cubes
- Example: Evaluating Cube Roots
- Checkpoint 21

Lesson 22: Rational vs. Irrational Numbers

- Reading: What Are Irrational Numbers?

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- Example: Identifying Irrational Numbers
- Reading: Estimating Irrational Numbers
- Video: Estimating Irrational Roots
- Example: Estimating Irrational Roots
- Discussion
- Checkpoint 22

Lesson 23: Order of Operations, Part 1

- Example: Multiplication, Division, Addition, and Subtraction
- Example: The Four Operations with Rational Numbers
- Checkpoint 23

Lesson 24: Order of Operations, Part 2

- Reading: Grouping Symbols
- Example: Grouping Symbols
- Example: Order of Operations with Exponents
- Checkpoint 24

Lesson 25: Review and Unit Exam

- Notes Upload
- Unit 2 Practice Exam
- Unit 2 Exam

Unit 3: Variables and Expressions

Lesson 26: Understanding Variables and Expressions

- Reading: What Is a Variable?
- Example: Identify the Variable
- Reading: Identifying Parts of Expressions
- Example: Identifying Parts of Expressions
- Checkpoint 26

Lesson 27: Translating Words into Math

- Reading: Translating Words into Math
- Examples: Translating Words into Math
- Discussion
- Checkpoint 27

Lesson 28: Modeling with Expressions

- Reading: Modeling with Expressions
- Examples: Words into Expressions
- Examples: Expressions into Words
- Checkpoint 28

Lesson 29: The Distributive Property, Revisited

- Reading: The Distributive Property with Variables
- Example: The Distributive Property with Variables
- Reading: Using the Distributive Property to Factor
- Video: Using the Distributive Property to Factor
- Example: Using the Distributive Property to Factor
- Checkpoint 29

Lesson 30: Combining Like Terms

- Reading: Combining Like Terms

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- Examples: Combining Like Terms
- Discussion
- Checkpoint 30

Lesson 31: Properties of Exponents, Revisited

- Reading: Properties of Exponents with Variable Bases
- Example: Product of Powers with Variables
- Examples: Quotient of Powers with Variables
- Example: Power of Powers with Variables
- Example: Power of Products with Variables
- Example: Power of Quotients with Variables
- Checkpoint 31

Lesson 32: Simplifying Expressions

- Example: Simplifying Expressions with Addition and Subtraction
- Video: Apply Properties to Simplify Expressions
- Example: Simplifying Expressions with the Distributive Property
- Example: Simplifying a More Complex Expression
- Checkpoint 32

Lesson 33: Equivalent Expressions

- Examples: Writing Equivalent Expressions
- Example: Identifying Equivalent Expressions
- Examples: Equivalent Expressions from Modeling Situations
- Discussion
- Checkpoint 33

Lesson 34: Review and Unit Exam

- Notes Upload
- Unit 3 Practice Exam
- Unit 3 Exam

Unit 4: Solving Equations

Lesson 35: Evaluating Expressions

- Unit 4 Reading Review
- Reading: What Is Substitution?
- Example: Substituting for a Variable
- Video: Evaluating One-Variable Expressions
- Examples: Evaluating One-Variable Expressions
- Examples: Evaluating Multi-Variable Expressions
- Checkpoint 35

Lesson 36: Equations and Their Solutions

- Reading: The Meaning of a Solution to an Equation
- Examples: Checking for Solutions
- Reading: No Solutions or Many Solutions
- Checkpoint 36

Lesson 37: One-Step Equations

- Reading: Inverse Operations
- Video: Inverse Operations
- Reading: One-Step Equations

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- Examples: Solving One-Step Equations
- Examples: Solving Real-World One-Step Equations
- Checkpoint 37

Lesson 38: Two-Step Equations

- Reading: Two-Step Equations
- Example: Solving the First Type of Two-Step Equations
- Video: Solving Two-Step Equations
- Example: Solving the Second Type of Two-Step Equations
- Example: Solving Real-World Two-Step Equations
- Discussion
- Checkpoint 38

Lesson 39: Multi-Step Equations

- Reading: Combining Like Terms
- Example: Combining Like Terms
- Reading: Collecting Like Terms
- Example: Collecting Like Terms
- Example: The Distributive Property and Like Terms
- Video: The Distributive Property and Like Terms
- Examples: Clearing the Denominator
- Checkpoint 39

Lesson 40: Using Roots to Solve Equations

- Reading: Simplifying Square Roots
- Example: Simplifying a Square Root
- Reading: Solving Equations Using Square Roots
- Video: Solving an Equation with a Square Root
- Video: Solving with Cube Roots
- Examples: Solving Equations with Cube Roots
- Discussion
- Checkpoint 40

Lesson 41: Solutions to Word Problems

- Example: Solutions to One-Step Equations
- Video: Solutions to Two-Step Equations
- Example: Solutions to Equations with Cubes
- Video: Is the Solution Reasonable?
- Checkpoint 41

Lesson 42: Review and Unit Exam

- Notes Upload
- Unit 4 Practice Exam
- Unit 4 Exam

Unit 5: Linear Relationships

Lesson 43: Creating Tables of Ordered Pairs

- Unit 5 Reading Review
- Reading: Ordered Pairs as Solutions
- Example: Ordered Pairs as Solutions
- Interactive: Ordered Pairs as Solutions

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- Reading: Input-Output Tables
- Examples: Completing Input-Output Tables
- Example: Input-Output Tables in Context
- Discussion
- Checkpoint 43

Lesson 44: Recognizing Patterns in Tables

- Reading: Sequences, Ordered Pairs, and Input-Output Tables
- Reading: Finding Patterns
- Example: Finding Patterns
- Reading: Equal Distances over Equal Intervals
- Examples: Linear or Nonlinear?
- Checkpoint 44

Lesson 45: Plotting Points in the Coordinate Plane

- Reading: Points and Coordinates
- Example: Reading Coordinates from a Graph
- Examples: Plotting Points
- Reading: Graphing Relationships
- Examples: Graphing Relationships
- Video: Using Appropriate Scales When Graphing Relationships
- Discussion
- Checkpoint 45

Lesson 46: Graphing Lines from Points

- Reading: Graphing Lines from Tables of Ordered Pairs
- Example: Graphing Lines from Tables of Ordered Pairs
- Reading: Graphing from Tables in Context
- Example: Graphing from Tables in Context
- Checkpoint 46

Lesson 47: Key Features of Graphs

- Reading: Increasing vs. Decreasing
- Example: Increasing vs. Decreasing
- Reading: Linear vs. Nonlinear
- Example: Linear vs. Nonlinear
- Video: Analyzing Graphs
- Checkpoint 47

Lesson 48: Review and Unit Exam

- Notes Upload
- Unit 5 Practice Exam
- Unit 5 Exam

Unit 6: Using the Slope-Intercept Form of a Line

Lesson 49: Rates of Change and Slopes

- Unit 6 Reading Review
- Reading: Finding Slope from a Graph
- Example: Finding Slope from a Graph
- Reading: Calculating Slope with the Slope Formula
- Example: Calculating Slope from a Graph

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- Example: Finding Slope from Ordered Pairs
- Examples: Rate of Change from Context
- Checkpoint 49

Lesson 50: Initial Values and y-intercepts

- Reading: Initial Value
- Video: Properties of Linear Relationships
- Example: Determining Initial Values
- Discussion
- Checkpoint 50

Lesson 51: Slope-Intercept Form of a Line

- Reading: Slope-Intercept Form of a Linear Equation
- Example: Slope-Intercept Form of a Linear Equation
- Reading: Graphing an Equation from Slope-Intercept Form
- Interactive: Graphing a Linear Relationship
- Example: Writing an Equation from a Situation
- Checkpoint 51

Lesson 52: Comparing Rates of Change

- Video: Comparing Slopes
- Example: Comparing Slopes from Graphs
- Example: Comparing Equations and Graphs
- Example: Comparing Tables and Equations
- Discussion
- Checkpoint 52

Lesson 53: Introduction to Functions

- Reading: What Is a Function?
- Example: Are the Ordered Pairs a Function?
- Reading: The Vertical Line Test
- Example: Does the Graph Represent a Function?
- Checkpoint 53

Lesson 54: Review and Unit Exam

- Notes Upload
- Unit 6 Practice Exam
- Unit 6 Exam

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