

MATH-0915: BASIC ARITHMETIC AND PRE-ALGEBRA

Cuyahoga Community College

Viewing: MATH-0915 : Basic Arithmetic and Pre-Algebra

Board of Trustees:

December 2023

Academic Term:

Fall 2024

Subject Code

MATH - Mathematics

Course Number:

0915

Title:

Basic Arithmetic and Pre-Algebra

Catalog Description:

Includes real numbers (whole numbers, integers, fractions, signed fractions, and signed decimals) and operations (addition, subtraction, multiplication, and division) along with the use of order of operations, ratio rates, proportion, percent, English and Metric systems of measurement, introduction to basic algebra and solving basic algebraic equations, and perimeter and area of basic geometric shapes. Includes applications and activities to build skills in estimation and problem solving. Grading for Math 0915 is P for Pass or NP for No Pass.

Credit Hour(s):

4

Lecture Hour(s):

4

Lab Hour(s):

0

Other Hour(s):

0

Requisites

Prerequisite and Corequisite

Sufficient score on assessment test, or departmental approval.

Outcomes

Course Outcome(s):

Perform operations with whole numbers and simplify expressions using whole numbers.

Objective(s):

1. Evaluate expressions using whole numbers.
2. Solve application problems using whole numbers.
3. Estimate reasonable answers to application problems involving whole numbers.
4. Graph whole numbers on a number line.
5. Use inequality symbols to compare whole numbers.
6. Add, subtract, multiply, and divide whole numbers.
7. Simplify expressions with exponents that have whole number bases.
8. Use Order of Operations to simplify expressions involving whole numbers.

Course Outcome(s):

Perform operations with integers and simplify expressions using integers.

Objective(s):

1. Identify integers based on the definition of integers.
2. Evaluate expressions using integers.
3. Solve application problems using integers.
4. Estimate reasonable answers to application problems involving integers.
5. Graph integers on a number line.
6. Determine the absolute value of an integer.
7. Determine the additive inverse of an integer.
8. Use inequality symbols to compare integers.
9. Add, subtract, multiply, and divide integers.
10. Simplify expressions with exponents that have integer bases.
11. Use order of operations and Properties of Real Numbers to simplify expressions involving integers.

Course Outcome(s):

Perform operations with fractions and mixed numbers and simplify expressions using fractions and mixed numbers.

Objective(s):

1. Identify proper and improper fractions, mixed numbers, reciprocals, numerators and denominators.
2. Identify prime and composite numbers.
3. Write the prime factorization of a natural number.
4. Determine the Least Common Multiple (LCM) and Greatest Common Factor (GCF) of a set of numbers using prime factorization.
5. Graph positive and negative (signed) fractions and mixed numbers on a number line.
6. Use inequality symbols to compare fractions, including signed fractions
7. Write fractions in simplest form.
8. Write equivalent fractions.
9. Add and subtract fractions that initially have common denominators.
10. Add and subtract fractions that initially do not have a common denominator by determining the Least Common Denominator (LCD).
11. Write mixed numbers as improper fractions and write improper fractions as mixed numbers.
12. Add and subtract mixed fractions.
13. Multiply and divide fractions and mixed numbers.
14. Perform all operations with signed fractions and mixed fractions.
15. Use order of operations and Properties of Real Numbers to simplify expressions.
16. Define and simplify complex fractions with operations involving signed fractions in the numerator and/or the denominator.
17. Solve application problems using fractions and mixed numbers.

Course Outcome(s):

Perform operations with signed decimals and simplify expressions using signed decimals.

Objective(s):

1. Graph signed decimals on a number line.
2. Identify the base 10 relationship of place values.
3. Read a decimal number using appropriate place values.
4. Write a decimal number in English using appropriate place values.
5. Use inequality symbols to compare signed decimals.
6. Convert signed decimals to fractions.
7. Convert signed fractions to decimals.
8. Use inequality symbols to compare signed fractions and decimals.
9. Add, subtract, multiply, and divide signed decimals.
10. Simplify expressions with exponents that have signed decimal bases.
11. Use order of operations and Properties of Real Numbers to simplify expressions involving signed decimals.
12. Solve application problems using signed decimals.
13. Estimate reasonable answers to application problems involving signed decimals.

14. Round decimals.
15. Distinguish between the appropriateness of an answer as a fraction or decimal.

Course Outcome(s):

Identify ratio, rates, proportions and solve applications.

Objective(s):

1. Using the definition of a ratio, write a ratio as a fraction in simplest form.
2. Write a rate as a fraction in simplest form.
3. Distinguish between a ratio and a rate.
4. Write a rate as a unit rate.
5. Using the definition of a proportion, translate an English sentence to a mathematical proportion.
6. Determine if a proportion is mathematically true.
7. Solve application problems involving ratios and rates.

Course Outcome(s):

Define the basic properties and vocabulary of algebra, simplify basic algebraic expressions, and solve basic algebraic equations.

Objective(s):

1. Using the definition of a term, identify terms.
2. Using the definition of a variable, identify variables.
3. Using the definition of a coefficient, identify coefficients.
4. Based on the definition of a variable, identify and distinguish between constants and variables.
5. Identify, add, and subtract like terms.
6. Use the Distributive Property of Multiplication over Addition to simplify an expression.
7. Evaluate algebraic expressions.
8. Translate word phrases to algebraic expressions.
9. Identify the Addition Property for Equations (for Real Numbers).
10. Identify the Multiplication Property for Equations (for Real Numbers).
11. Simplify one-step and multiple-step equations using the Addition Property for Equations and the Multiplication Property for Equations.
12. Solve basic literal equations.
13. Solve application problems involving a combination of integers, decimal and/or fractions.

Course Outcome(s):

Convert between percent, fraction and decimal and solve problems involving percent.

Objective(s):

1. Use the definition of a percent to write percent.
2. Given a percent, fraction or decimal, write it in the other two formats.
3. Write and solve equations for the three basic types of percent problems.
4. Solve applications involving percent.

Course Outcome(s):

Apply basic geometric formulas.

Objective(s):

1. Identify a circle, rectangle, square, triangle, trapezoid, and parallelogram.
2. Determine the perimeter of a rectangle, square, triangle, trapezoid, and parallelogram, and circumference of a circle.
3. Determine the area of a circle, rectangle, square, triangle, trapezoid, and parallelogram.

Course Outcome(s):

Use appropriate techniques to be successful in math courses.

Objective(s):

1. Use a calculator to complete calculations that are time consuming or to check computational answers.
2. Apply math-specific study skills when preparing for quizzes and exams.
3. Check answers to problems for appropriateness.

Course Outcome(s):

Perform basic conversions in the English and Metric systems.

Objective(s):

1. Convert measurements of length, weight and mass, and volume and capacity within the English system.
2. Convert measurements of length, weight and mass, and volume and capacity within the Metric system.
3. Convert between Celsius and Fahrenheit measures of temperature.
4. Convert units of time.

Methods of Evaluation:

1. Periodic exams during the course.
2. Homework.
3. Quizzes.
4. In class collaborative work.
5. Final Exam.

Course Content Outline:

- A. Whole numbers
 1. Add, subtract, multiply, and divide
 2. Graph
 3. Inequalities
 4. Expressions with exponents
 5. Order of operations
 6. Evaluate expressions
 7. Application problems
 8. Estimation
- B. Integers
 1. Definition of integers
 2. Graph integers
 3. Absolute value
 4. Additive integers
 5. Inequalities
 6. Add, subtract, multiply, and divide
 7. Expressions with exponents
 8. Order of operations and properties of real numbers
 9. Evaluate expressions
 10. Application problems
 11. Estimation
- C. Fractions and mixed numbers
 1. Fractions, mixed numbers, reciprocals, numerators and denominators
 2. Prime and composite numbers
 3. Prime factorization of a natural number
 4. Least Common Multiple (LCM) and Greatest Common Factor (GCF)

5. Graph
 6. Inequalities
 7. Simplify
 8. Equivalent fractions
 9. Add and subtract with common denominators
 10. Add and subtract by determining LCD
 11. Convert between mixed numbers and improper fractions
 12. Add and subtract mixed fractions
 13. Multiply and divide mixed fractions
 14. Operations with signed fractions and mixed fractions
 15. Order of operations with signed fractions and mixed fractions
 16. Numeric complex fractions
 17. Applications
- D. Signed decimals and expressions
1. Graph
 2. Place values
 3. Decimal numbers orally
 4. Decimal numbers written in English
 5. Decimal inequalities
 6. Decimal to fractions
 7. Fractions to decimals
 8. Fraction and decimal inequalities
 9. Add, subtract, multiply, and divide
 10. Expressions with exponents
 11. Decimals, order of operations and expressions
 12. Applications
 13. Estimation
 14. Rounding
 15. Fraction or decimal appropriateness
- E. Ratios, rates, and proportions
1. Ratios
 2. Rates
 3. Ratio versus rate
 4. Unit rate
 5. Translate to proportion
 6. True proportions
 7. Applications
- F. Algebra
1. Terms
 2. Variables
 3. Coefficients
 4. Constants
 5. Add and subtract like terms
 6. Distributive property of multiplication over addition
 7. Evaluate expressions
 8. Translate to algebraic expressions
 9. Addition property for equations
 10. Multiplication property for equations
 11. One-step equations
 12. Multiple-step equations
 13. Literal equations
 14. Applications

G. Percent

- 1. Definition
- 2. Conversion between percent, fraction, and decimal
- 3. Three basic types of percent problems and equations

H. Basic geometric formulas

- 1. Circle
 - a. Circumference
 - b. Area
- 2. Rectangle
 - a. Perimeter
 - b. Area
- 3. Square
 - a. Perimeter
 - b. Area
- 4. Triangle
 - a. Perimeter
 - b. Area
- 5. Parallelogram
 - a. Perimeter
 - b. Area
- 6. Trapezoid
 - a. Perimeter
 - b. Area

I. Measurement

- 1. Length
 - a. English
 - b. Metric
- 2. Weight/Mass
 - a. English
 - b. Metric
- 3. Volume/Capacity
 - a. English
 - b. Metric
- 4. Temperature
 - a. Celsius
 - b. Fahrenheit
- 5. Time

J. Math Success Skills

- 1. Calculator use
- 2. Study skills
- 3. Answer appropriateness

Resources

Lial, Margaret L. and Diana L. Hestwood. (2018) *Prealgebra*, Pearson.

Resources Other

1. Activity sourcebook
2. Software provided by textbook publisher.

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