MOHAWK VALLEY COMMUNITY COLLEGE

 UTICA and ROME, NEW YORK

COURSE OUTLINE

MA089

ARITHMETIC

Prepared by

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COURSE OUTLINE

Title: Arithmetic

Catalog Number: MA089

Contact Hours: 3

Practicum Hours: 0

Credit Hours: 0

Prerequisite: None

Catalog Description: This course is for students who, according to placement test results need preparation for subsequent mathematics courses. It develops basic skills by focusing on language and concepts. Topics include whole number, integers, rational numbers and decimals.

**Topic 1: Numbers & Properties**

This topic is primarily concerned with recognizing different forms of numbers, rounding and comparing values, and identifying and applying properties of numbers and operations.

The student will:

1. Classify numbers as natural numbers, whole numbers, integers, rational numbers, and real numbers.
2. Demonstrate an understanding of place-value.
3. Round whole numbers and decimals to provided place-values.
4. Convert verbal expressions of numbers into standard form.
5. Convert expressions given in scientific notation into standard form.
6. Determine whether a number is prime or composite.
7. Find the prime factorization of a composite number.
8. Find a common denominator for two or more fractions.
9. Rewrite two or more fractions so that they have a common denominator.
10. Demonstrate an understanding that mixed numbers are the sum of a whole number and a fraction.
11. Identify the associative and commutative properties of addition and multiplication.
12. Identify the distributive property of multiplication over addition.
13. Identify the product property (aman = am + n) and power property ( (am)n = amn ) of exponents.
14. Apply associative, commutative, distributive, product, and power properties to aid in evaluating and simplifying expressions.
15. Determine the additive inverse of a number.
16. Determine the multiplicative inverse of a nonzero number.
17. Use the relations of <, =, and > to compare two natural numbers, two decimals, two integers, and two fractions.
18. Recognize π to the nearest hundredth.

**Topic 2: Operations**

The emphasis on this topic is on a procedural and conceptual understanding of operations.

The student will:

1. Add two or more natural numbers, two or more decimals, two or more integers, and two or more fractions with a common denominator.
2. Express subtraction of integers as addition.
3. Subtract two natural numbers, two decimals, and two fractions with a common denominator.
4. Express multiplication of whole numbers as repeated addition.
5. Find the product of a number and zero.
6. Find the product of two or more single-digit natural numbers, two or more single-digit integers, and two or more fractions.
7. Multiply two natural numbers, each of which is two digits or longer.
8. Find the quotient of two natural numbers, two fractions, and two integers.
9. Use the division algorithm to divide two natural numbers, with and without a remainder.
10. Express the answer to a long-division problem with a remainder as a mixed number.
11. Recognize that division by zero is undefined.
12. Express exponential expressions of whole numbers as repeated multiplication.
13. Simplify exponential expressions where the exponent is 0.
14. Simplify exponential expressions where the exponent is –1.
15. Recognize that 00 and 0–1 are undefined.
16. Simplify exponential expressions of the form –an and (–a)n, where a and n are natural numbers.
17. Find the square root of a perfect square no larger than 100.
18. Simplify expressions of whole numbers according to the order of operations.

**Topic 3: Calculator Proficiency**

Proficiency with a scientific calculator is expected. Professors may recommend a particular model.

The student will:

1. Use a calculator to add, subtract, multiply, and divide whole numbers, integers, fractions, and decimals.
2. Use a calculator to find a quotient and remainder.
3. Use a calculator to evaluate exponential expressions with a real number base and natural number exponents.
4. Use a calculator to evaluate square roots.
5. Use a calculator to change the form of a rational number (decimal, fraction, and mixed number).
6. Use a calculator to simplify a fraction.
7. Use a calculator to evaluate expressions according to the order of operations.

**Topic 4: Algebraic Expressions & Equations**

A basic introduction to algebra is given, with an emphasis on expressions in an applied setting, such as using formulas.

The student will:

1. Solve applied problems, including problems that require implicitly performing inverse operations.
2. Summarize a problem by appropriately assigning variables to numerical values.
3. Write an algebraic expression to model a problem.
4. Simplify algebraic expressions by combining like terms.
5. Simplify exponential expressions by applying the product and power properties.
6. Evaluate an algebraic expression for given values.
7. Solve equations of the type a = bx + c where a, b, and c are integers.
8. Solve a problem by applying a given formula.
9. Find ordered pair solutions to equations of the form y = ax + b where a and b are real numbers.

**Topic 5: Graphing**

Graphing values on a number line are introduced and then applied to creating a bar graph and graphing on a Cartesian Plane.

The student will:

1. Graph whole numbers and integers on a number line.
2. Graph fractions on a number line.
3. Graph decimals on a number line.
4. Create a bar graph for a given table of values.
5. Identify the x-axis and y-axis on a Cartesian Plane.
6. Graph ordered pairs on a Cartesian Plane.
7. Write the ordered pair of a point graphed on a Cartesian Plane.

**Topic 6: Geometry, Rates, & Percent**

A basic introduction to geometry is provided, along with applications of rates and percent.

The student will:

1. Determine the area of a rectangle.
2. Determine the area of a triangle.
3. Determine the perimeter of a geometric figure.
4. Identify the diameter and radius of a circle.
5. Express a rate in fraction form.
6. Solve applied problems involving rates.
7. Convert between decimal and percent form.
8. Find an indicated percentage of an amount.

TEACHING GUIDE

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