MOHAWK VALLEY COMMUNITY COLLEGE

 UTICA and ROME, NEW YORK

 COURSE OUTLINE

 MA091

 INTRODUCTORY ALGEBRA

Prepared December 2013

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COURSE OUTLINE

Title: Introductory Algebra

Catalog Number: MA091

Contact Hours: 3

Practicum Hours: 0

Credit Hours: 0

Prerequisite: An appropriate placement test score or MA089 Arithmetic.

Catalog

Description: This course is for students enrolled in STEM programs or for students who need to take either MA115 or MA171 who, according to placement test results, need preparation for subsequent mathematics courses. It develops basic skills and the understanding of elementary algebra. Topics include arithmetic computations, measurement and geometry, percentages, ratio and proportion, linear equations, polynomials, and an introduction to graphing lines. Prerequisite: An appropriate placement test score or MA089 Arithmetic.

**Major Topics:**

For each of the following topics the student will:

**Topic 1. Whole Numbers**

1. Perform basic operations with whole numbers and identify their properties.
2. Approximate quantities using estimation.
3. Simplify and/or evaluate arithmetic and variable expressions, including exponential form, involving whole numbers using order of operations.
4. Translate a given verbal expression to symbolic form.

**Topic 2. Integers**

2.1 Locate integer values on a real number line and use order relations to compare given integers.

2.2 Add, subtract, multiply and divide integers.

2.3 Simplify and/or evaluate variable expressions involving verbal and/or symbolic expressions for the operations on integers.

2.4 Simplify and/or evaluate expressions, including exponential form, additive inverse and absolute value involving integers using order of operations.

**Topic 3. Rational Numbers**

3.1 Simplify fractions.

3.2 Use order relations to compare given fractions.

3.3 Determine the prime factorization of given composite numbers.

3.4 Determine a common denominator for given fractions.

3.5 Add, subtract, multiply and divide given fractions.

3.6 Evaluate variable expressions involving verbal and/or symbolic expressions for the operations on fractions.

3.7 Simplify and/or evaluate expressions involving fractions using the order of operation agreements.

**Topic 4. Decimals:**

4.1 Perform basic operations on decimals.

4.2 Convert given fractional expressions to decimals including fractions that are equal to repeating decimals, and convert given decimals to fractional expressions.

4.3 Use order relations to compare given decimals.

4.4 Approximate the (principal) square root of a given number with the aid of a calculator.

4.5 Evaluate variable expressions involving verbal and/or symbolic expressions for the operations on decimals.

4.6 Convert numbers between standard notation and scientific notation.

**Topic 5. Measurements**

5.1 Convert, using conversion factors (rates), measurements of length and time in the U.S. System.

5.2 Convert, using conversion factors (rates), measurements of length, capacity and mass in the Metric System of measurement.

5.3 Convert between U.S. Units and metric units of length using provided conversion factors.

**Topic 6. Geometry**

6.1 Calculate the perimeter of plane geometric figures.

6.2 Know and use the formulas to calculate the area and circumference of a circle.

6.3 Calculate the area of triangles, rectangles, and squares.

6.4 Recognize the symbol π and use its approximation (from the π key on a scientific calculator or by using 3.14) to evaluate formulas.

**Topic 7. Ratio, Proportion, and Percents**

7.1 Write ratios as fractions and simplify.

7.2 Write rates as fractions and find unit rates.

7.3 Write and solve proportions.

7.4 Solve application problems which use proportions.

7.5 Perform conversions between percents and fractions and between decimals and percents.

7.6 Use either the basic percent equation (percent X base = amount) or the percent proportion to solve application problems including percent increase and decrease.

**Topic 8. Algebraic Expressions and Linear Equations**

1. Simplify algebraic expressions using the operations of addition and subtraction and distribution of a constant over an expression.
2. Evaluate algebraic expressions.
3. Evaluate formulas, including when the desired variable is not isolated.
4. Determine solutions to first degree equations by applying the addition and multiplication properties of equations.
5. Translate given verbal sentences into equations and solve the resulting equations.

**Topic 9. Lines**

9.1 Graph ordered pairs on a rectangular coordinate system.

9.2 Determine solutions of given linear equations in two variables.

9.3 Graph solutions of given linear equations in two variables on a rectangular coordinate system.

9.4 Recognize and graph horizontal and vertical lines from given equations.

9.5 Determine the x and y-intercepts of given linear equations in two variables.

9.6 Determine and interpret the slopes of lines given two points on the line and/or given the equation of the line.

9.7 Determine an equation of a line given a point and the slope and/or given the graph of a linear equation.

**Topic 10. Polynomials**

10.1 Use the Rules of Exponents to simplify an expression.

10.2 Add and subtract polynomials

10.3 Multiply a monomial by a polynomial, a binomial by a binomial, and divide a polynomial by a monomial.

10.4 Factor the Greatest Common Factor from a polynomial.