



## **STUDENT LEARNING OUTCOMES:**

Students will be able to:

- Perform operations on and simplify numerical and algebraic expressions
  - Substitution and evaluation
  - Basic exponential notation
- Solve linear and literal equations
  - Translate word problems into algebraic equations and solve them
  - Solve literal equations for a given variable
- Perform basic operations on and simplify radicals and roots
- Perform basic operations involving inequalities
- Write and graph linear equations in the Cartesian coordinate plane using various techniques and properties of linear equations

## MATH 019: DAY-BY-DAY COURSE OUTLINE:

### I. THE REAL NUMBER SYSTEM AND INTRODUCTION TO ALGEBRA

#### Day 1:

Introduction: sets of integers, rational, irrational and real numbers  
The real number line  
Absolute value  
Comparing, ordering ( $<$ ,  $=$ ,  $>$ ), and trichotomy (e.g.,  $-1 < 0 < 5$ )  
Order of operations involving real numbers

#### Day 2:

The concept of variable and constant; defining like and unlike terms  
Definition of algebraic expressions and like terms:  
Term:  
    Numerical coefficient (including implied 1 and -1)  
    Literal part  
    Monomial, binomial, polynomial  
    Like and unlike terms  
The substitution principle for evaluating formulas and algebraic expressions

#### Day 3:

Basic exponent rules, including negative exponents for scientific notation  
Finding roots and simplifying radicals

### II. LINEAR EQUATIONS IN ONE VARIABLE, TOGETHER WITH APPLICATIONS

#### Day 4:

Definition and solution of a linear equation in one variable  
Solving linear equations using:  
    Addition/Subtraction and Multiplication/Division Principles of Equality  
Language translation problems (e.g., “three less than twice a number is what?”)

#### Day 5:

Solving word problems (application problems) using linear equations:  
    a. Solving literal equations for a given variable, including statistics formulas  
    b. Translating from English to algebra, (e.g., “15 is 12 less than 2 times a number”  
        “30 subtracted from 7 times a number is 4”)

#### Day 6:

**PARTIAL TEST I (non-departmental):** General review, which should include at least the following: order of operations, substitution, signed numbers, translation problems, solving linear equations, and basic radicals and exponents.

### III. CARTESIAN GEOMETRY

#### Day 7:

- The Cartesian coordinate system;
- Ordered pairs of real numbers and finding points in a plane, given a table
- Definition and solution of a linear equation in two variables ( $ax + by = c$ )
- Graphing a linear equation:
  - a. By finding two points
  - b. By the x- and y-intercepts method

#### Day 8:

- Concept of the slope of a straight line:
  - Slope formula
  - Finding the slope of a line on a graph given its equation
  - Finding the slope of a line using  $y = mx + b$
  - Given possible graphs of a line, use slope and y-intercept to select correct graph

#### Day 9:

- Finding equations of lines:
  - Using the slope-intercept formula ( $y = mx + b$ )
  - Using the point-slope formula
  - Given two points on the line

#### Day 10:

- PARTIAL TEST II (non-departmental):** Cartesian geometry, including finding equations of lines and finding the correct graph given equation

### IV. WORD PROBLEMS

#### Day 11:

- Solving and graphing linear inequalities

#### Day 12:

- More algebra word problems, including area problems, and linear inequality problems

*Please be advised that while the instructor may change the order and the pacing, the instructor is still responsible for covering in time all topics represented before the need of such knowledge in the corequisite statistics course. A.J.S. Last edited: 9/7/17*