

## 1 Warning

Community College of Philadelphia is a firm adherent to the principle of academic freedom. In light of this, faculty are not required to follow a particular approach or a particular textbook for the courses they teach. Most faculty, however, have more or less uniform guidelines for specific courses, and indeed, many use a particular textbook or approach in order to conform to area institutions. Therefore, the sample syllabus found here is not binding to faculty, but represents a synthesis of what most faculty do or aspire to do when they teach a particular course. What follows should not be interpreted as a prescription, but rather, as a means to help the placement of our students in transfer institutions.

## 2 Catalogue Description

Course for students with some proficiency in algebraic techniques who need further preparation for higher level courses such as precalculus. Emphasis on problem solving and applications. Properties of real numbers, algebraic expressions such as polynomials, fractions, radicals and exponents. Solution of first and second degree equations and inequalities, including literal equations and absolute value. Solution of linear and nonlinear systems of equations. Graphs of linear and quadratic equations. Relations and functions. Prerequisite: MATH 017.

## 3 Allotted Time

Math 118 is a 3-credit course. Courses at Community College of Philadelphia run for about 42 55-minute periods. Instructors usually give three or four exams (generally lasting at least 55 minutes), and a 2-hour long final exam.

## 4 Topics Outline

- Review of operations with real numbers. Order.
- Linear Equations in one variable. Problems leading to linear equations in one variable. Linear Inequalities. Absolute Value equations solvable through linear equations in one variable.
- Graph of lines. The slope of a line. Graphing Linear Inequalities.
- Linear equations in two and three variables. Solutions by substitution and by elimination.
- Algebra of polynomials: sum, difference, product and quotients of polynomials. Factoring quadratic trinomials and factorizations leading to the factoring of quadratic trinomials. The difference of squares formula. The sum and difference of cubes formula.
- Rational Expressions. Equations involving rational expressions.
- Rational Exponents. Radicals. Complex Numbers.
- Quadratic Equations and Quadratic-like equations.

## 5 Competencies

1. The student will demonstrate knowledge of the absolute value of a number by:
  - (a) solving linear and quadratic equations involving one absolute value.
  - (b) solving linear equations involving multiple absolute values.
2. The student will demonstrate knowledge of the slope of a line by:
  - (a) Determining the slope of a line given two points that lie on the line.
  - (b) Determining the slope and intercept(s) of a line given its equation.
  - (c) Determining the slope of a line from a graph.
  - (d) Finding the slope of a line that is parallel to a given line.
  - (e) Finding the slope of a line that is perpendicular to a given line.
3. The student will demonstrate knowledge of linear equations and inequalities in two variables by:
  - (a) Solving literal equations.
  - (b) Finding an equation of a line given two points.
  - (c) Finding an equation of a line given a point on the line and information about the slope of the line.
  - (d) Writing an equation of a line in standard form.
  - (e) Writing an equation of a line in slope-intercept form.
  - (f) Graphing linear equations in two variables using the slope and  $y$ -intercept of the line.
  - (g) Graphing linear inequalities in two variables.
4. The student will demonstrate knowledge of equations in two variables by:
  - (a) Solving direct variation problems.
  - (b) Solving inverse variation problems.
5. The student will demonstrate knowledge of systems of linear equations by:
  - (a) Solving a system of linear equations in two variables using the addition method.
  - (b) Solving a system of linear equations in two variables using the substitution method.
  - (c) Solving a system of linear equations and inequalities in two variables by graphing.

- (d) Solving applications involving systems of linear equations.
6. The student will demonstrate knowledge of rational expressions and equations by:
- (a) Performing operations of addition, subtraction, multiplication and division on rational expressions.
  - (b) Simplifying complex fractions.
  - (c) Solving equations involving rational expressions including literal equations.
  - (d) Dividing polynomials.
7. The student will demonstrate knowledge of radicals and rational exponents by:
- (a) Adding, subtracting, multiplying, and dividing expressions involving radicals
  - (b) Simplifying expressions containing rational exponents.
  - (c) Applying the properties of exponents to expressions with rational exponents
  - (d) Solving radical equations
8. The student will demonstrate knowledge of complex numbers by:
- (a) Knowing the meaning of  $i$ .
  - (b) Knowing the cyclic nature of powers of  $i$ .
  - (c) Writing the square root of a negative number in terms of  $i$ .
  - (d) Knowing about the complex conjugate of a complex number.
  - (e) Knowing how to add, subtract, multiply and divide complex numbers.
9. The student will demonstrate knowledge of quadratic equations by:
- (a) Solving quadratic equations by factoring.
  - (b) Solving quadratic equations by the square root method.
  - (c) Solving quadratic equations by the quadratic formula.
  - (d) Solving quadratic equations by completing the square