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# A Planned Course of Study

# for

# Prerequisites for College Mathematics

**Abington School District**

**Abington, Pennsylvania**

**September, 2016**

# Prerequisites for College Mathematics

## I. Objectives

Students will demonstrate the appropriate level of proficiency in each of the following areas of mathematics:

A. Real Number System

1. Sets of Numbers
2. Operations on Real Numbers
3. Properties of Real Numbers

B. Linear Equations and Inequalities

1. Linear Equations
2. Inequalities
3. Systems of Linear Equations and Inequalities
4. Functions
5. Applications and Graphs

C. Polynomials

1. Exponents
2. Polynomial Functions
3. Factoring
4. Quadratic Equations and Inequalities

D. Further Topics in Algebra

1. Rational Expressions and Functions
2. Roots, Radicals and Root Functions
3. Inverse, Exponential and Logarithmic Functions
4. Complex Numbers

## II. Major Concepts

Students will demonstrate the appropriate level of proficiency in each of the following areas of mathematics:

A. Real Number Systems

1. Sets of Numbers
   a. Apply and extend set notation to the real number system.
   b. Express real numbers in set builder notation.
2. Operations on Real Numbers
   a. Apply and extend the four operations on real numbers.
   b. Utilize order of operations.
3. Properties of Real Numbers
   a. Identify the six properties of real numbers.
   b. Utilize the properties to justify a mathematical statement.

B. Linear Equations and Inequalities

1. Linear Equations
   a. Solving one variable linear equations.
   b. Solving two variable linear equations.
2. Inequalities
   a. Solving one variable inequalities.
   b. Solving two variable inequalities.
3. Systems of Linear Equations and Inequalities
   a. Solve by graphing.
   b. Solve by the substitution method.
   c. Solve by the elimination method.
4. Functions
   a. Identify relations and functions.
   b. Apply and extend function notation.
5. Applications and Graphs
   a. Utilize algebraic concepts and skills to solve real-world problems.
   b. Utilize graphing calculators to solve systems of equations with two or more variables and/or two or more equations.
   c. Utilize graphs to solve real-world.

C. Polynomials

1. Exponents
   a. Identify components of powers.
   b. Apply and extend properties of exponents.
   c. Express numbers in scientific and standard notation.
2. Polynomial Functions
   a. Identify types and degrees of polynomial functions.
   b. Apply and extend operations on polynomial functions.
3. Factoring
   a. Identify greatest common factors.
   b. Identify and utilize various methods of factoring.
4. Quadratic Equations and Inequalities
   a. Utilize the square root property to solve quadratic equations and/or inequalities.
   b. Apply and extend the quadratic formula to solve quadratic equations and/or inequalities.

D. Further Topics in Algebra

1. Rational Expressions and Functions
   a. Apply the four operations to rational expressions and functions.
   b. Identify domain and range for relations that are functions.
2. Roots, Radicals and Root Functions
   a. Identify graphs of squared and cubed root functions.
   b. Identify domain, range and asymptotes of squared and cubed root functions.
3. Inverse, Exponential and Logarithmic Functions
   a. Identify inverse of functions.
   b. Convert exponential functions to logarithmic functions, and vice versa.
   c. Solve basic exponential functions and logarithmic functions.
4. Complex Numbers
   a. Express complex numbers in standard form.
   b. Apply and extend properties of complex numbers to simplify mathematical statements.

## III. Instruction

A. Course Schedule

1. 5 days a week
2. 47 minute classes

B. Pacing

1. Marking Period 1

    a. Sets of Numbers
    b. Operations on Real Numbers
    c. Properties of Real Numbers
    d. Linear Equations
    e. Inequalities

2. Marking Period 2

    a. Systems of Linear Equations and Inequalities
    b. Functions
    c. Applications and Graphs
    d. Exponents
    e. Polynomial Functions

3. Marking Period 3

    a. Factoring
    b. Quadratic Equations and Inequalities
    c. Rational Expressions and Functions
    d. Roots, Radicals, and Root Functions

4. Marking Period 4

    a. Inverse, Exponential, and Logarithmic Functions
    b. Complex Numbers

C. Methods

1. Lecture
2. Cooperative learning
3. Mathematics software and internet resources such as applets and math websites will be incorporated into the course using computers and Chromebooks.
4. Exploration and discovery lessons with and without technology
5. Homework
6. Pre-class assignments
7. Graphing calculator activities
8. Formative assessments and differentiation
9. Summative assessments
10. Data analysis of student results

D. Resources

1. Lial, M.L., Hornsby, J., McGinnis, T. *Algebra for College Students*. Addison-Wesley: Boston, Massachusetts, 2012.
2. Ancillary materials from the text, such as Test Generator software.
3. Teacher made presentations, handouts, activities, practice, quizzes
4. Departmental chapter tests, midterm and final exam
5. Reference materials available in the mathematics office and the school library
6. Computer labs
7. Chromebooks
8. Websites such as Khan Academy, Wolfram Alpha, Desmos, Quizizz, Kahoot, etc.
9. Google Classroom and Skyward
10. Graphing calculator class sets
11. Scientific calculators
12. Apperson scan sheets and software for test analysis
13. Tutoring Center

## IV. Assessment

A. Procedures for Evaluation

1. Summative assessments
   a. A departmental common assessment will be administered at the end of each unit.
   b. A departmental common assessment will be administered at the end of each semester.
2. Formative assessments will be administered in a variety of formats.
3. Accommodations aligned with those permitted for the PSSA/Keystone Exams and included in IEP's will be provided for Special Education students who are enrolled in this course.

B. Expected Levels of Achievement

Students are expected to achieve at least a minimum level of proficiency. Proficiency and related grades are defined as follows:

| | |
|---|---|
| A…… | 90 - 100% |
| B…… | 80 - 89% |
| C…… | 70 - 79% |
| D…… | 60 - 69% |
| E-Failing – eligible for Summer School ..... | 40 - 59% |
| F-Failing – ineligible for Summer School…..... | 0 - 39% |

The final grade will be calculated as follows:

| | |
|---|---|
| Marking Period I…….. ..... | 20% |
| Marking Period II…… ..... | 20% |
| Midterm Exam…… ..... | 10% |
| Marking Period III…….. ..... | 20% |
| Marking Period IV…….. ..... | 20% |
| Final Exam…….. ..... | 10% |