

# Roanoke County Public Schools

## **College Algebra**

### Curriculum Guide

2007

# Mathematics Curriculum Guide

Revised 2007. Available at [www.rcs.k12.va.us](http://www.rcs.k12.va.us).

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## Preface

This curriculum guide is written for the teachers of College Algebra to assist them in using the adopted textbooks in a most effective way. This guide will assist the mathematics teacher in preparing students for the challenges of the twenty-first century. As established by the National Council of Teachers of Mathematics Principles and Standards for School Mathematics, educational goals for students are changing. Students should have many and varied experiences in their mathematical training to help them learn to value mathematics, become confident in their ability to do mathematics, become problem solvers, and learn to communicate and reason mathematically. This guide, along with the available textbook resources, other professional literature, alternative assessment methods, and various instructional in-service activities will assist the mathematics teacher in continuing to integrate these student goals into the curriculum.

# Table of Contents

|  |    |
|--|----|
| Introduction/General Comments.....                   | i  |
| Textbook Overview .....                              | i  |
| Sequence of Instruction and Pacing Suggestions ..... | ii |
| First Semester .....                                 | ii |
| Second Semester .....                                | ii |
| Mapping for Instruction.....                         | 1  |
| First Nine Weeks .....                               | 1  |
| Second Nine Weeks .....                              | 2  |
| Third Nine Weeks .....                               | 3  |
| Fourth Nine Weeks .....                              | 4  |
| Supplemental Worksheets.....                         | 5  |

## Introduction/General Comments

College Algebra is a college preparatory course that extends topics from Algebra II and introduces additional ones. One quarter of the course deals with trigonometry topics. The remainder of the course concentrates on the study of functions, matrices, and probability. This course is recommended for college-bound seniors who do not have the background or interest to take the more in-depth course of Precalculus. (Roanoke County Public Schools Registration Guide)

The main goal of this course should be to create a sense of mathematical confidence in the student before entering college.

In order to achieve this goal the teacher must exercise extreme compassion for the students.

The teacher needs to treat all mathematical questions with respect, no matter how far back in the student's math career the topic of the question may have been covered.

The teacher needs to constantly keep in mind that they are filling in learning gaps for the student as well as extending their knowledge.

## Textbook Overview

|                             |   |
|-----------------------------|---|
| <b>COURSE TITLE:</b>        | College Algebra   |
| <b>COURSE TEXT:</b>         | <u>College Algebra and Trigonometry</u>   |
| <b>PUBLISHER:</b>           | Pearson Addison Wesley  |
| <b>AUTHOR:</b>              | Mark Dugopolski   |
| <b>TEACHER SUPPLEMENTS:</b> | Annotated Instructor's Addition<br>Instructor's Solutions Manual<br>Instructor's Testing Manual<br>TestGen<br>Insider's Guide to Teaching with College Algebra and Trigonometry<br>Adjunct Support Center |
| <b>STUDENT SUPPLEMENTS:</b> | Student's Solution Manual<br>Graphing Calculator Manual<br>Addison-Wesley Math Tutor Center   |
| <b>EXTRA SUPPLEMENTS:</b>   | InterAct Math Tutorial Website: <a href="http://www.interactmath.com">www.interactmath.com</a>  |

# Sequence of Instruction and Pacing Suggestions

## First Semester

| Chapter/Sections/Topic  | Time Frame     |
|---|----------------|
| Chapter P / Sections P.1 – P.7/ Prerequisites                               | 27 days        |
| Chapter 1 / All Sections (omit 1.5) / Equations, Inequalities, and Modeling | 18 days        |
| Chapter 2 / Sections 2.1 – 2.3 / Functions and Graphs                       | 9 days         |
| Chapter 10 / Sections 10.1 – 10.3 / The Conic Sections                      | 11 days        |
| Chapter 3 / Sections 3.1 – 3.2 / Polynomial and Rational Functions          | 7 days         |
| Chapter 4 / Sections 4.1 – 4.4 / Exponential and Logarithmic Functions      | 12 days        |
| Review and Exam   | 6 days         |
| <b>First Semester Total</b>   | <b>90 days</b> |

## Second Semester

|  |                |
|--|----------------|
| Chapter 5/ All Sections (omit 5.5) / The Trigonometric Functions                     | 28 days        |
| Chapters 7 / Sections 7.1 – 7.2 / Applications of Trigonometry                       | 8 days         |
| Chapter 6/ Sections 6.1 – 6.2 / Basic Identities and Verifying Identities            | 9 days         |
| Chapter 8/ Section 8.1 – 8.2/ Systems of Linear Equations in Two and Three Variables | 9 days         |
| Chapter 9/ All Sections (omit 9.4) / Matrices and Determinants                       | 17 days        |
| Chapter 11 / Section 11.1 - 11.6 / Sequences, Series, and Probability                | 13 days        |
| Review and Exam  | 6 days         |
| <b>Second Semester Total</b>   | <b>90 days</b> |

## Mapping for Instruction - First Nine Weeks

| Chapter/Sections/Topic                                       | Comments  | Time Frame     |
|--|---|----------------|
| Introduction   | Supplemental Worksheet P.1 Real Numbers Notes   | 1 day          |
| Chapter P/ Section 1/ Real Numbers and Their Properties      | Supplemental Flow Chart and Worksheets  | 3 days         |
| Chapter P/ Section 2/ Integral Exponents                     | Supplement P.3 A, B, and C  | 2 days         |
| Chapter P/ Section 3 / Rational Exponents and Radicals       |   | 3 days         |
| Chapter P/ Section 4 / Complex Numbers                       | Projects are an excellent way to see another side of your students. A sample set of projects for the first nine weeks is included. Throughout the year try to include art, music, sports, writing, and drama choices in the projects. | 2 days         |
| Review and Quiz on P.1-P.4                                   |   | 2 days         |
| Chapter P/ Section 5/ Polynomials                            |   | 2 days         |
| Chapter P/ Section 6/ Factoring Polynomials                  | Supplemental Notes P.6  | 4 days         |
| Chapter P/ Section 7/ Rational Expressions                   | Supplemental Notes P.7 A, B, and C  | 4 days         |
| Review and Quiz on P.5-P.7                                   | See P.7 Review  | 2 days         |
| Review and Test on P.1-P.7                                   | Supplemental Worksheet Test Review  | 2 days         |
| Chapter 1/ Section 1/ Equations in One Variable              |   | 2 days         |
| Chapter 1/ Section 2/ Constructing Models to Solve Problems  | Supplemental Word Problems  | 2 days         |
| Chapter 1/ Section 4/ Linear Equations in Two Variables      |   | 3 days         |
| Review and Quiz 1.1 – 1.4 (omit 1.3)                         |   | 2 days         |
| Chapter 1/ Section 6/ Quadratic Equations                    |   | 3 days         |
| Chapter 1/ Section 7/ Linear and Absolute Value Inequalities |   | 2 days         |
| Review and Quiz 1.6 - 1.7                                    |   | 2 days         |
| Review and Test Chapter 1                                    |   | 2 days         |
|  |   | <b>45 Days</b> |

## Mapping for Instruction - Second Nine Weeks

| Chapter/Sections/Topic   | Comments   | Time Frame     |
|--|--|----------------|
| Chapter 2/ Section 1 / Functions   |  | 2 days         |
| Chapter 2/ Section 2 / Graphs of Relations and Functions                     |  | 2 days         |
| Chapter 2 / Section 3 / Families of Functions, Transformations, and Symmetry |  | 2 days         |
| Review and Test Chapter 2  | A practice test with the same format, directions and length as the actual test is an excellent way of reviewing for tests. | 3 days         |
|  |  |                |
| Chapter 1/ Section 3/ Equations and Graphs in Two Variables                  |  | 2 days         |
| Chapter 10 / Section 1 / The Parabola  |  | 2 days         |
| Chapter 10 / Section 2 / The Ellipse and the Circle                          |  | 2 days         |
| Chapter 10 / Section 3 / The Hyperbola                                       |  | 2 days         |
| Review and Test Chapters 10  | A practice test with the same format, directions and length as the actual test is an excellent way of reviewing for tests. | 3 days         |
| Chapter 3 / Section 1 / Quadratic Functions and Inequalities                 | Supplemental Notes 3.1   | 2 days         |
| Chapter 3 / Section 2 / Zeros of Polynomial Functions                        |  | 2 days         |
| Review and Test Chapter 3  | A practice test with the same format, directions and length as the actual test is an excellent way of reviewing for tests. | 3 days         |
| Chapter 4 / Section 1 / Exponential Functions and their Applications         |  | 2 days         |
| Chapter 4 / Section 2 / Log Functions and their Applications                 |  | 2 days         |
| Chapter 4 / Section 3 / Rules of Logarithms                                  |  | 2 days         |
| Chapter 4 / Section 4 / More Equations and Applications                      |  | 2 days         |
| Review and Test Chapter 4  | A practice test with the same format, directions and length as the actual test is an excellent way of reviewing for tests. | 4 days         |
| Review and Exam  |  | 6 days         |
|  |  | <b>45 days</b> |

## Mapping for Instruction – Third Nine Weeks

| Chapter/Sections/Topic   | Comments  | Time Frame     |
|--|---|----------------|
| Chapter 5/ Sections 1A / Angles and Their Measurements                   |   | 2.5 days       |
| Chapter 5/ Section 1B/ Radian Measures of Angles                         |   | 2.5 days       |
| Review and Quiz 5.1  |   | 3 days         |
| Chapter 5/ Section 2/ The Sine and Cosine Functions                      |   | 4 days         |
| Chapter 5/ Section 3/ Graphs of Sine and Cosine Functions                | <p>Supplemental Worksheet Sine and Cosine Graphs (Have students do the graphs in two different colors.)</p> <p>A lab worksheet that requires the student to investigate the changes that occur to the graph when certain changes are made to the equation is very effective.</p> <p style="text-align: center;">Supplemental Worksheet After 5.3 Graphing Lab</p> | 4 days         |
| Chapter 5/ Section 4/ The Other Trigonometric Functions and Their Graphs |   | 3 days         |
| Review and Quiz 5.2-5.4  |   | 2 days         |
| Review and Test 5.1-5.4  |   | 3 days         |
| Chapter 5/ Section 6/ Right Triangle Trigonometry                        | Supplemental Worksheet 5.6-Right Triangles  | 4 days         |
| Chapter 7/ Section 1/ The Law of Sines/Area of a Triangle                |   | 2.5 days       |
| Chapter 7/ Section 2/ The Law of Cosines/Heron's Formula                 |   | 2.5 days       |
| Review and Test 5.6, 7.1, 7.2  |   | 3 days         |
| Chapter 6/ Section 1/ Basic Identities                                   | Cover Through Example 3. Supplemental Worksheet Trig Memory Sheet-Have students memorize the basic trig. Identities.  | 2 days         |
| Chapter 6/ Section 2/ Verifying Identities                               | Supplemental Proving Trig Identities (work in groups)   | 6 days         |
| Test 6.1-6.2   |   | 1 day          |
|  |   | <b>45 days</b> |

## Mapping for Instruction – Fourth Nine Weeks

| Chapter/Sections/Topic   | Comments   | Time Frame |
|--|--|------------|
| Chapter 8/ Sections 1 / Systems of Linear Equations in Two Variables                   |  | 3 days     |
| Chapter 8/ Section 2/ Systems of Linear Equations in Three Variables                   |  | 3 days     |
| Review and Test 8.1-8.2  |  | 3 days     |
| Chapter 9/ Section 1/ Solving Linear Systems Using Matrices                            |  | 3 days     |
| Chapter 9/ Section 2/ Operations with Matrices   |  | 1 day      |
| Chapter 9/Section 3/ Multiplication of Matrices  |  | 2 days     |
| Review and Quiz 9.1-9.3  |  | 2 days     |
| Chapter 9/ Section 5/ Solution of Linear Systems in Two Variables Using Determinants   | Recommended that this be done without the aid of a calculator.<br>Spend a day on word problems.                    | 2 days     |
| Chapter 9/ Section 6/ Solution of Linear Systems in Three Variables Using Determinants | Recommended that this be done with the aid of a calculator.<br>Use Cramer's Rule.<br>Spend a day on word problems. | 2 days     |
| Review and Quiz 9.5-9.6  |  | 2 days     |
| Review and Test Chapter 9 (omit 9.4)   |  | 3 days     |
| Chapter 11/ Section 1/ Sequences   |  | 2 days     |
| Chapter 11/ Section 2/Series   |  | 2 days     |
| Chapter 11/ Section 3/ Geometric Sequences and Series                                  |  | 2 days     |
| Review and Quiz 11.1-11.3  |  | 3 days     |
| Chapter 11/ Section 4/ Counting and Permutations                                       |  | 1 day      |
| Chapter 11/ Section 5/ Combinations  | Omit Binomial Theorem  | 1 day      |

|                                    |  |                |
|------------------------------------|--|----------------|
| Chapter 11/ Section 6/ Probability |  | 1 day          |
| Review and Quiz 11.4-11.6          |  | 1 day          |
| Review and Exam                    |  | 6 days         |
|                                    |  | <b>45 days</b> |

## Supplemental Materials

Sample Syllabus

Worksheets for Chapter P and Chapter 1.2

Sample of College Algebra Projects

Worksheet 3.1 Completing the Square and Analyze

Worksheet 5.3 Graphing Sine and Cos

Worksheet After 5.3 Graphing Lab Analyze Sine and Cos Graphs

Worksheet 5.6 Right Triangles

Worksheet 6.1 Trig Memory Sheet

Worksheet 6.2 Proving Trig Identities