

COURSE OUTLINE

College Algebra with Review

Course Description

MA 131. College Algebra with Review. 5 hours credit. Prerequisite: Placement score or MA 120 or MA 125 with a C or better. This course will enable the student to interpret mathematical symbols and notation, simplify expressions, factor polynomials, solve equations (including absolute value, quadratic and systems of linear equations), perform operations on radical expressions, write equations of lines, and evaluate functions. The student will begin to conceptualize abstract ideas. The course incorporates some review topics and moves at a slower pace than MA 135.

Course Relevance

The concepts learned in this course will improve the student in math skills, leading to success in subsequent courses. The student's ability to think analytically will improve. Discipline, perseverance and the ability to follow directions are necessary for success, so these skills will also improve. Mathematical literacy will be increased, leading to informed choices when making decisions in life.

Required Materials

MA 131 Textbook:

Bittinger, M., Ellenbogen, D., (2006). *College Algebra* (3rd ed.). Addison Wesley

Graphing calculator: The Texas Instrument Model 83+ or Model 84 is required for enrollment in College Algebra. The student will be responsible for the knowledge necessary to use any other make or model of calculator besides those listed above.

Online materials: Same as above.

Supplemental Materials:

Hornsby, John, Lial, Margaret L., & Rockswold, Gary K. (2003). *A graphical approach to college algebra (Student Solutions Manual)* (3rd ed.). Boston: Addison/Wesley Publishing Company.

Learning Outcomes

The intention is for the student to be able to:

1. Use problem solving to be successful in future learning
2. Gain confidence in personal mathematical ability
3. Use and interpret mathematical symbols and notation
4. Perform mathematical procedures and techniques correctly
5. Conceptualize abstract ideas

Primary PACT Skills that will be DEVELOPED and/or documented in this course

Through the student's involvement in this course, he/she will develop his/her ability in the following primary PACT skill areas:

1. Problem Solving
 - Through the solution of multi-step problems
 - Through the solution of word problems
 - Field-Related Technology
 - Through the use of graphing calculators

Secondary skills (developed but not documented):

Time Management
Reading
Listening

Major Summative Assessment Task:

The learning outcomes and the primary Learning PACT skill will be demonstrated by:

1. Common final exam including three open ended multi-step questions which require use and interpretation of mathematical symbols and notation; the use of a graphic calculator and the conceptualization of abstract ideas
2. Completion of a self assessment inventory which measures confidence in personal math ability

Course Content

- I. Themes – Key recurring concepts that run throughout this course:
 - A. Solving equations
 - B. Graphing
 - C. Following directions
 - D. Analyzing functions
- II. Issues – Key areas of conflict that must be understood in order to achieve the intended outcome:
 - A. Graphing calculator usage
 - B. Recognizing which technique to use
 - C. Remembering prerequisite material
- III. Concepts – Key concepts that must be understood to address the issues:
 - A. Notation and terminology
 - B. Graphing
 - C. Functions
- IV. Skills/Competencies – Actions that are essential to achieve the course outcomes:
 - A. Solving equations and inequalities
 - B. Modeling
 - C. Graphing
 - D. Determining equations of lines, parabolas and circles
 - E. Operations with complex numbers
 - F. Use and apply logarithms and exponential functions

Learning Units

- I. Review of algebra concepts
 - A. Review of exponents and polynomials
 - B. Review of factoring
 - C. Review of rational expressions
 - D. Review of negative and rational exponents
 - E. Review of radicals

- II. Linear functions, equations, and inequalities
 - A. Real numbers and coordinate systems
 - B. Domain and range
 - C. Linear functions
 - D. Slope
 - E. Graphs of linear functions
 - F. Linear inequalities

- III. Analysis of graphs of functions
 - A. Function intervals
 - B. Zeros
 - C. Symmetry
 - D. Function graphs
 - E. Translations and reflections
 - F. Absolute value functions
 - G. Piecewise-defined functions
 - H. Function operations and composition

- IV. Polynomial functions
 - A. Operations with complex numbers
 - B. Quadratic functions and graphs
 - C. Solving quadratic functions
 - D. Solving quadratic inequalities
 - E. Higher degree polynomials
 - F. Long division and synthetic division
 - G. Zeros, complex zeros, and rational zeros

- V. Rational, power, and root functions
 - A. Rational functions
 - B. Vertical and horizontal asymptotes
 - C. Graphing rational functions
 - D. Solving rational functions and inequalities
 - E. Power and root functions
 - F. Graphs and equations of circles and parabolas

- VI. Inverse, exponential, and logarithmic functions
 - A. Inverse functions and their graphs
 - B. Exponential functions and their graphs

- C. Solving exponential functions
- D. Logarithm functions
- E. Properties of logarithms
- F. Graphs of logarithms
- G. Solving exponential and logarithmic equations

VII. Analytic geometry

- A. Equations and graphs of circles
- B. Equations and graphs of parabolas

VIII. Systems of equations

- A. Solving systems of equations
- B. Graphing systems of equations

Learning Activities

Classroom: Independent and collaborative learning activities will be assigned to assist the student to achieve the intended learning outcomes. Activities identified in the syllabus, such as class discussion, lecture, reading, group work or projects will also contribute to learning.

Online: Online teaching/learning activities such as the following will assist the student to achieve course outcomes: posted web pages, threaded discussions, written assignments, assigned reading, and interaction with instructor through e-mail and discussion boards.

Grade Determination

Grade determination will be based on assessment tasks and other activities such as exams, assignment or attendance that the instructor identifies in the syllabus.