

Syllabus

Course Title: College Algebra

Course Number: Math QL1050

Course Credit Hours: 4

Prerequisites: Math 1010 with a grade of C or better or Math ACT score of at least 23, or placement test

Catalog Description: Selected topics in algebra including inequalities, logarithms, theory of equations, matrices, determinants, and progressions.

Objectives: To provide the student with the mathematical skills, concepts and maturity necessary to continue studies in related areas such as mathematics, science, business administration, economics, etc.

To convey, to the extent possible using the content of this course, the quantitative literacy skill set adopted by the Utah State Board of Regents:

1. Interpret mathematical models such as formulas, graphs, tables, and schematics, and draw inferences from them.
2. Represent mathematical information symbolically, visually, numerically, and verbally.
3. Use arithmetical, algebraic, geometric, and statistical methods to solve problems.
4. Estimate and check answers to mathematical problems in order to determine reasonableness, identify alternatives, and select optimal results.
5. Recognize that mathematical and statistical methods have limits.
6. [Optional] Understand basic concepts describing time-varying systems, and how prediction follows from the formulation of basic laws of change, both analytically and numerically.

Course Coverage:

1. Inequalities
 - a. Nonlinear inequalities
 - b. Inequalities involving absolute values
2. Functions
 - a. Definition and examples
 - b. Graphs of functions.
 - c. Composition of functions and the inverse function
3. Polynomials
 - a. Synthetic division
 - b. Graph of polynomial functions
 - c. Factor and remainder theorems
 - d. Finding rational roots

- e. Extracting complex roots of polynomials
 - f. Approximating real roots
4. Rational Functions
 - a. Asymptotic behavior of rational functions
 - b. Graphs of rational functions
 5. Exponential and Logarithmic Functions
 - a. Definitions and examples
 - b. Domain, range and graphs
 - c. Properties of exponential and logarithmic functions
 - d. Solving exponential and logarithmic equations
 - e. Applications
 6. Matrices and system of equations
 - a. Nonlinear systems and the substitution method
 - b. Linear systems and Gaussian Elimination
 - c. Algebra of matrices
 - d. The inverse of a matrix
 - e. Determinants
 7. Discrete Mathematics
 - a. The binomial theorem
 - b. Counting, permutations and combinations
 - c. Sample spaces and probability of events
 8. Sequences
 - a. Summation notation
 - b. Geometric and arithmetic sequences
 - c. Mathematical induction
 - d. Applications to mathematics of finance

Optional: Conics, Mortgages; Present and Future Values, Conditional

Probabilities

Adopted Textbook: *Algebra and Trigonometry*, Eight Edition by Sullivan, ISBN 0-13-15779-X.

Required/Optional Sections:

Chap 1: Sec 1.6

Chap 3: Sec 3.1-3.5, Optional: 3.6

Chap 4: Sec 4.3-4.5

Chap R and 5: Sec 5.1-5.4, R 6, 5.5 (Optional: Bounds on Real Zeros and Descartes Rule of Signs), 5.6

Chap 6: Sec 6.1-6.7, Some or all of 6.8, Optional: 6.9

Chap 12: Sec 12.2-12.4, 12.6, Optional: 12.1

Chap 13: Sec 13.1, 13.2, 13.3 (including Annuities), 13.4, 13.5

Chap 14: Sec 14.1-14.3

Other Optional Sections: Sec 11.1-11.4. This book does not cover Mortgages; Present and Future Values and Conditional Probabilities. Other optional topics are the discretion of the instructor.