

M: Course Objectives / Learning Outcomes:

This course aims to develop students' mathematics study skills and confidence in their quantitative abilities, as they come to appreciate the role mathematics plays in both everyday situations and in mastering other disciplines. Along with reviewing the mathematics topics included under Course Content (below), students will learn how to read and analyze mathematics problems, how to solve them, and how to present their solutions.

At the end of this course, the successful student will be able to:

- apply a variety of problem-solving strategies to solve mathematical problems
 - where algebraic approaches are used:
 - translate a problem given in English (story form) into an associated algebraic form, defining variables appropriately
 - communicate clearly the relationship between the model and the original problem
 - articulate any restrictions on solutions
 - solve the associated algebraic equations
 - verify and clearly present solutions
 - distinguish between conjecture and proof
 - distinguish between different subsets of real numbers
 - read and use a variety of notations signifying sets / subsets of real numbers, including set builder, number line, inequality and interval notation
 - understand the concept of a solution set
 - work with two-dimensional Cartesian co-ordinate system
 - work with function notation
 - determine if an equation in two variables represents an function or a relation
 - determine the domain and range of a function
 - correctly apply properties of commutativity, associativity, distribution, inequality, equality and absolute value, and use the laws of exponents in the course of simplifying expressions and solving inequalities and equations
 - simplify linear, polynomial, absolute value, rational, and radical expressions
 - interconvert radical and fractional exponent expressions
 - solve linear, quadratic, factorable polynomial, absolute value, rational, and radical equations, check solution(s) and express solution sets using a variety of notations
 - solve linear and simple absolute value inequalities and express solutions sets using a variety of notations
 - solve quadratic and quadratic form equations by factoring, completing the square or (deriving and) using the quadratic formula
 - factor polynomials using grouping, common factors, difference of squares, sum and difference of cubes
 - add, subtract, multiply and divide polynomials, including synthetic division
 - find volumes, areas and perimeters of selected geometric figures and employ the results in the context of story/applied problems
 - use the Pythagorean theorem to solve problems, to calculate distances, and to find midpoints
 - solve linear systems of equations (both two-by-two and three-by-three systems) algebraically and graphically
 - graph linear equations in general, slope-intercept and slope-point forms, and find linear equations for given graphs
 - distinguish parallel and perpendicular lines
 - graph simple absolute value and radical functions
 - graph quadratic functions (parabolas) by completing the square
- Optional additional subjects, as time allows:
- basic concepts of conic sections: circles, parabolas, ellipses, and hyperbolas
 - algebraic and graphical solutions of systems of inequalities in two dimensions
 - elements of linear programming
 - polynomial and rational function inequalities and their solutions
 - supplementary topics in geometry

N: Course Content:

1. Sets of numbers: integers, rationals, reals
2. Basic algebraic techniques - absolute values, exponents, factoring methods, rational expressions
3. Quadratic, polynomial, rational, and absolute value equations
4. Inequalities
5. Functions and relations; domains and ranges
6. Graphing of linear, quadratic, and absolute value functions
7. Mathematical modeling (story problems)
8. Basic geometric formulas
9. Systems of equations in 2- and 3-variables
10. Radicals, radical forms, and fractional exponents; radical equations

O: Methods of Instruction:

The course uses a problem solving approach to teach mathematical thinking and math study skills, and to introduce and review mathematical concepts. Students work in small groups under the guidance of the instructor. Much of the content/skill review will take place through student use of on-line materials in conjunction with the textbook. These skills will be applied and reinforced during the in-class problem-solving sessions.

P: Textbooks and Materials to be Purchased by Students:

Hall, James W., & Mercer, Brian A. (current edition). *Foundations of Analytical and Quantitative Reasoning*, McGraw-Hill Custom Publications for SFU.

Q: Means of Assessment:

Evaluation will be carried out in accordance with Douglas College policy. The instructor will present a written course outline with specific evaluation criteria at the beginning of the semester. The assessment breakdown will be:

Homework	10 – 15%
Quizzes/In-class work	15 – 25%
Midterms	30 – 40%
Final Exam	30 – 40%

R: Prior Learning Assessment and Recognition: specify whether course is open for PLAR

NA

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