College of San Mateo
Official Course Outline

1. **COURSE ID:** MATH 122   **TITLE:** Intermediate Algebra I
   Units: 3.0 units **Hours/Semester:** 48.0-54.0 Lecture hours
   Method of Grading: Letter Grade Only
   Prerequisite: MATH 110, or MATH 112 or higher or appropriate score on the College Placement Test.
   Recommended Preparation:
       MATH 115 and READ 830

2. **COURSE DESIGNATION:**
   Degree Credit
   Transfer credit: none

3. **COURSE DESCRIPTIONS:**
   Catalog Description:
       First half of MATH 120, a comprehensive review of elementary algebra with certain topics studied in
       greater depth. Extension of fundamental algebraic concepts and operations, problem solving and
       applications, linear, quadratic, rational and radical equations, equations in two variables, graphs, systems
       of equations, complex numbers, exponential and logarithmic functions, sequences and series. MATH 122
       and 123 together are equal to MATH 120.

4. **STUDENT LEARNING OUTCOME(S) (SLO'S):**
   Upon successful completion of this course, a student will meet the following outcomes:
       1. Identify and apply basic algebraic concepts including functions and their properties (domain, range,
          intercepts, inverse functions); slope and its meaning (rate of change); absolute value; equations and
          equivalency of equations; inequalities, exponents, laws of exponents and logarithms; Pythagorean Theorem.
       2. Perform basic operations on algebraic expressions, simplify algebraic expressions, including exponential
          and logarithmic expressions.
       3. Solve equations and inequalities, including equations in one or two variables, inequalities in one variable,
          systems of linear equations in two or three variables using elimination, substitution, and graphing, and
          exponential and logarithmic equations.
       4. Sketch the graphs of functions and relations, including linear equalities and inequalities, exponential and
          logarithmic functions.
       5. Solve application problems involving linear, exponential, and logarithmic functions.
       6. Find and sketch inverse functions.

5. **SPECIFIC INSTRUCTIONAL OBJECTIVES:**
   Upon successful completion of this course, a student will be able to:
       1. Identify and apply basic algebraic concepts including functions and their properties (domain, range,
          intercepts, inverse functions); slope and its meaning (rate of change); absolute value; equations and
          equivalency of equations; inequalities, exponents, laws of exponents and logarithms; Pythagorean
          Theorem.
       2. Perform basic operations on algebraic expressions; simplify algebraic expressions, including exponential
          and logarithmic expressions.
       3. Solve equations and inequalities, including equations in one or two variables, inequalities in one variable,
          systems of linear equations in two or three variables using elimination, substitution, and graphing, and
          exponential and logarithmic equations.
       4. Sketch the graphs of functions and relations, including linear equalities and inequalities, exponential and
          logarithmic functions.
       5. Solve application problems involving linear, exponential, and logarithmic functions.
       6. Find and sketch inverse functions.

6. **COURSE CONTENT:**
   Lecture Content:
       1. Linear Equations and Linear Functions
               A. Using Qualitative Graphs to Describe Situations
               B. Graphing Linear Equations
               C. Slope of a Line

       D. Meaning of Slope for Equations, Graphs, and Tables
       E. Finding Linear Equations
       F. Functions
  2. Modeling with Linear Functions
       A. Using Lines to Model Data
       B. Finding Equations of Linear Models
       C. Function Notation and Making Predictions
       D. Slope Is a Rate of Change
  3. Systems of Linear Equations
       A. Using Graphs and Tables to Solve Systems
       B. Using Substitution and Elimination to Solve Systems
       C. Using Systems to Model Data
       D. Value, Interest, and Mixture Problems
       E. Using Linear Inequalities in One Variable to Make Predictions
  4. Exponential Functions
       A. Properties of Exponents
       B. Rational Exponents
       C. Graphing Exponential Functions
       D. Finding Equations of Exponential Functions
       E. Using Exponential Functions to Model Data
  5. Logarithmic Functions
       A. Inverse Functions
       B. Logarithmic Functions
       C. Properties of Logarithms
       D. Using the Power Property with Exponential Models to Make Predictions
       E. More Properties of Logarithms
       F. Natural Logarithms (optional)
  6. Optional topics
       A. Absolute Value: Equations and Inequalities
       B. Linear Inequalities in Two Variables; Systems of Linear Inequalities

7. **REPRESENTATIVE METHODS OF INSTRUCTION:**
  Typical methods of instruction may include:
  A. Lecture
  B. Other (Specify): B. Other (Specify): Instructor carefully chooses or creates relevant out-of-class exercises to be completed either on-line or in written form. Instructor creates or uses already created in-class assignments for students to do with the help of other students and the instructor. Instructor may create longer written assignments for students to complete in essay form; these assignments are meant to incorporate mathematical modeling or exposition of applications of mathematics. To encourage critical thinking: (1) Lecture/discussion and demonstrations to model the problem-solving process, (2) Small group problem solving where proposed solutions are evaluated in light of constraints to the problem. Instructor directs students to resources available on CD and the Internet may be used to supplement the text.

8. **REPRESENTATIVE ASSIGNMENTS**
  Representative assignments in this course may include, but are not limited to the following:
  Writing Assignments:
  Students will submit written homework assignments. Students may be assigned papers including mathematical modeling.
  Reading Assignments:
  Instructor will assign text readings prior to discussion of a topic in class.
  Other Outside Assignments:
    Students will need to complete assigned problems and projects.

9. **REPRESENTATIVE METHODS OF EVALUATION**
  Representative methods of evaluation may include:
  A. Class Participation
  B. Exams/Tests
  C. Group Projects
  D. Homework
  E. Quizzes

F. a. written individual assignments and/or journal- to demonstrate individual student progress toward objectives b. small group presentations- to demonstrate student participation in problem solving process c. written exams/quizzes - to reflect student knowledge of vocabulary, concepts, and application of concepts to problem solving as presented in lectures and discussion, small group sessions, and text readings. d. Final Examination - to reflect student knowledge of vocabulary, concepts, and applications of concepts to problem solving as presented in lectures and discussions, small group sessions, and text readings. e. participation - to reflect student involvement in class discussions, small group sessions and presentations, etc.

10. **REPRESENTATIVE TEXT(S):**
    Possible textbooks include:
    A. Lehmann, Jay. *Intermediate Algebra*, 4th ed. Prentice-Hall, 2010

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Course Originator: Cheryl Gregory

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