



I. GENERAL COURSE INFORMATION

Subject and Number: Mathematics 67
Descriptive Title: General Education Algebra
Course Disciplines: Mathematics
Division: Mathematical Sciences

Catalog Description:

Using data and real-world applications, students in this course reinforce their numeracy skills and learn the algebra, descriptive statistics, and other quantitative reasoning skills needed for statistics and some other transfer-level general education mathematics courses.

Note: Mathematics 67 is a prerequisite course only for Mathematics 110, 115, 120, 140, and 150. Mathematics, computer science, science, engineering, and business students should take Mathematics 80 if they plan to take Math 130, 165, 170, or 180.

Conditions of Enrollment:

Prerequisite: Mathematics 23 with a minimum grade of C or Mathematics 37 with a grade of P with evidence of passing levels and A and B or Mathematics 40 with a minimum grade of C or qualification by appropriate assessment

Course Length:	X Full Term	Other (Specify number of weeks):
Hours Lecture:	5.00 hours per week	TBA
Hours Laboratory:	0.00 hours per week	TBA
Course Units:	5.00	

Grading Method: Letter
Credit Status: Associate Degree Credit

Transfer CSU: No
Transfer UC: No

General Education:
El Camino College:
6 – Mathematics Competency
 Term: Other:

CSU GE:

IGETC:

II. OUTCOMES AND OBJECTIVES

A. COURSE STUDENT LEARNING OUTCOMES (The course student learning outcomes are listed below, along with a representative assessment method for each. Student learning outcomes are not subject to review, revision or approval by the College Curriculum Committee)

1. SLO #1 Application Problems

Students will be able to recognize and apply appropriate mathematical concepts and models involving a variety of functions to contextualized problems involving authentic, real-world data.

2. SLO #2 Solving Equations and Manipulating Expressions

Students will be able to symbolically (algebraically) solve a variety of equations, inequalities and linear systems and manipulate symbolic (algebraic) expressions that arise in contextualized problems using authentic, real-world data.

3. SLO #3 Visual and Graphical Methods

Students will use visual and graphical methods to represent, analyze and solve contextualized problems involving authentic, real-world data.

4. SLO #4 Articulating Mathematical Reasoning

Students will be able to articulate the mathematical reasoning used in solving a variety of contextualized problems using authentic, real-world data, orally or in writing.

The above SLOs were the most recent available SLOs at the time of course review. For the most current SLO statements, visit the El Camino College SLO webpage at <http://www.elcamino.edu/academics/slo/>.

B. Course Student Learning Objectives (The major learning objective for students enrolled in this course are listed below, along with a representative assessment method for each)

1. Recognize proportional relationships from verbal and numeric representations and compare proportional relationships represented in different ways.

Objective Exams

2. Solve problems involving ratios, proportions and percentages.

Homework Problems

3. Analyze simple data sets by using appropriate exploratory data analysis techniques.

Homework Problems

4. Calculate quantities using summation notation.

Homework Problems

5. Construct and analyze various graphs, including bar graphs, pie charts, histograms, stem-and-leaf plots, boxplots and scatterplots.

Laboratory reports

6. Analyze readings that include quantitative or statistical information.

Written homework

7. Calculate measures of center, measures of dispersion, and measures of relative position and distinguish when to apply them appropriately.

Homework Problems

8. Present statistical results orally and in written form after analyzing data or solving applied problems.
Oral exams
9. Translate problems from a variety of contexts into a mathematical representation (symbolic, tabular, and graphic) and vice versa.
Objective Exams
10. Construct and use equations and inequalities to represent relationships involving one or more unknown or variable quantities to solve problems.
Objective Exams
11. Describe the behavior of linear and exponential functions using symbolic expressions, verbal descriptions, tables and graphs.
Presentation
12. Identify when a linear or exponential model or trend is appropriate for data and use a linear or exponential model to answer questions about such data.
Objective Exams
13. Compute and interpret both empirical (experimental) and classical (theoretical) probabilities.
Quizzes

III. OUTLINE OF SUBJECT MATTER (Topics are detailed enough to enable a qualified instructor to determine the major areas that should be covered as well as ensure consistency from instructor to instructor and semester to semester.)

Lecture or Lab	Approximate Hours	Topic Number	Major Topic
Lecture	8	I	Numeracy and Proportional Reasoning <ol style="list-style-type: none"> A. Working with fractions, decimals and percents, including appropriate rounding, in context B. Determining and interpreting ratios and rates in context C. Proportional reasoning and working with scales and magnitude effectively D. Dimensional analysis (units conversion) E. Use scientific notation in calculations
Lecture	8	II	Variables and Expressions <ol style="list-style-type: none"> A. Roles played by symbols in an algebraic expressions B. Simplifying and evaluating algebraic expressions using order of operations and the distributive properties C. Arithmetic operations on simple polynomial expressions and exponential expressions
Lecture	8	III	Equations and Inequalities <ol style="list-style-type: none"> A. Interpreting and setting up equations and inequalities in context, including proportional equations B. Solutions of equations and inequalities, including interpretation of solutions in context C. Symbolic, graphical, and numerical representations of solutions of equations and inequalities D. Using and transforming formulas and literal equations

Lecture	8	IV	<p>Symbolic, Graphical, and Numerical Representations of Functions</p> <ul style="list-style-type: none"> A. Use and interpret function and sigma notation B. Functions as rules (or function machines), as sets of ordered pairs (or tables), as algebraic equations, and as graphs C. Solving equations and evaluating expressions using function notation, both symbolically and graphically, including exponential and linear functions D. In-depth exploration of linear functions and exponential functions and exposure to other functions, such as reciprocals, square roots, sequences and multivariable functions that involve the use of sigma notation E. Graphing techniques, including appropriate scaling
Lecture	10	V	<p>Linear Relations, Equations and Functions</p> <ul style="list-style-type: none"> A. Finding, estimating and interpreting the slope of a linear relation (proportional reasoning) B. Graphs and equations of linear relations given: a) a point and a slope, b) a slope and y-intercept, and c) two points C. Solutions of linear inequalities in one variable and graphs of the solutions on number lines D. Determining when data may be appropriately modeled using a linear function E. Meaningful domains of linear functions modeling authentic data F. Creating and using linear models to make predictions in context
Lecture	10	VI	<p>Exponential Relations, Equations and Functions</p> <ul style="list-style-type: none"> A. Finding, estimating and interpreting the multiplier and percent change of an exponential relation B. Graphs and equations of exponential relations given an initial value and multiplier or given a table of values. C. Determining when data may be appropriately modeled using an exponential function D. Meaningful domains of exponential functions modeling authentic data E. Creating and using exponential models to make predictions in context
Lecture	20	VII	<p>Describing and Displaying Data</p> <ul style="list-style-type: none"> A. Gathering, organizing, analyzing, presenting and interpreting data B. Exploratory Data Analysis: dot plots, stem-and-leaf plots, five-number summaries, and boxplots C. Creating and interpreting visual displays of data or distributions: bar graphs, pie charts, scatter plots, and histograms D. Verbal descriptions of distributions, including measures of central tendency and measures of spread E. Measures of central tendency: mean, median, mode F. Measures of spread: standard deviation, inter-quartile range, range G. Measures of relative position: quartiles and percentiles

			H. Bivariate data, correlation and regression equations
Lecture	10	VIII	Percents and Probability A. Two-way tables and segmented bar graphs B. Subjective (Informal) Probability C. Empirical (Experiential) Probability D. Classical (Theoretical) Probability E. Addition and Multiplication Rule F. Conditional Probability
Lecture	4	IX	Quantitative Reasoning and Critical Thinking in Mathematics A. Critical analysis of readings and charts containing quantitative or statistical information B. Quantitative and mathematical reasoning skills
Lecture	4	X	Mathematical Success Skills A. Problem solving in mathematics B. Strategies for success in mathematics C. Use of technology (graphing calculators and spreadsheet software) in mathematics
Total Lecture Hours		90	
Total Laboratory Hours		0	
Total Hours		90	

IV. PRIMARY METHOD OF EVALUATION AND SAMPLE ASSIGNMENTS

A. PRIMARY METHOD OF EVALUATION:

Problem solving demonstrations (computational or non-computational)

B. TYPICAL ASSIGNMENT USING PRIMARY METHOD OF EVALUATION:

Lars swims 1000m every morning for a month. Examine the scatterplot given below *[omitted from the course outline of record]* comparing Lars' swim time each day to his ending pulse rate. Write a few sentences describing the scatterplot. Identify any points that you would consider outliers and explain why they should be excluded. Sketch a line that you think fits the data fairly well, and find a formula for the line, using swim time as the input variable and pulse rate as the output variable. Use your linear model to predict what Lars' ending pulse rate would be if his swim time were 15 minutes.

C. COLLEGE-LEVEL CRITICAL THINKING ASSIGNMENTS:

1. By statute, the State of California declares that a classroom is properly sized if each student has 15 square feet. In your groups, answer the following question: For what range of class sizes (number of students) is this statute reasonable?

In a five-minute presentation in class, describe the assumptions you made about a typical classroom and what "reasonable" means, the mathematical reasoning you used to answer the question, and the conclusions you drew.

2. Your local bar and grill (where cash is all that is accepted) is having a quarter wing night, during which chicken wings cost \$0.25 each. A pitcher of beer for you and your friends costs \$9; ranch dressing costs \$1.50 (and is enough for ten wings), tax is 8.5%; and the expected tip is 15%. If you are treating your friends to a pitcher of beer, chicken wings and enough ranch dressing for the wings, what is the maximum number of wings can you order and still keep the total bill (including tax and tip) within \$80. Set up an equation first with all of the details and then solve the equation. (You decide whether or not to pay tip on the tax, but indicate your choice clearly in your

equation.) You may speak with your fellow students as your work on this problem, but each of you will need to turn in a written solution.

D. OTHER TYPICAL ASSESSMENT AND EVALUATION METHODS:

- Objective Exams
- Oral exams
- Embedded questions
- Quizzes
- Reading reports
- Written homework
- Homework Problems
- Completion
- Presentation

V. INSTRUCTIONAL METHODS

- Discussion
- Group Activities
- Internet Presentation/Resources
- Laboratory
- Lecture
- Multimedia presentations

Note: In compliance with Board Policies 1600 and 3410, Title 5 California Code of Regulations, the Rehabilitation Act of 1973, and Sections 504 and 508 of the Americans with Disabilities Act, instruction delivery shall provide access, full inclusion, and effective communication for students with disabilities.

VI. WORK OUTSIDE OF CLASS

- Study
- Skill practice
- Required reading
- Problem solving activities

Estimated Independent Study Hours per Week: 10

VII. TEXTS AND MATERIALS

A. UP-TO-DATE REPRESENTATIVE TEXTBOOKS

Jay Lehmann. [A Pathway to Introductory Statistics \(Pathways Solutions\)](#). 1st ed. Pearson, 2015.

B. ALTERNATIVE TEXTBOOKS

C. REQUIRED SUPPLEMENTARY READINGS

Instructor's choice of readings that contain quantitative or statistical information.

D. OTHER REQUIRED MATERIALS

TI-84 graphing calculator.

VIII. CONDITIONS OF ENROLLMENT

A. Requisites (Course and Non-Course Prerequisites and Corequisites)

Requisites	Category and Justification
Course Prerequisite Mathematics-23 or	Sequential
Course Prerequisite Mathematics-37 or	Sequential
Non-Course Prerequisite	Qualification by appropriate assessment

B. Requisite Skills

Requisite Skills
<p>Find perimeters, areas, and volumes of various geometrical shapes and use in applications. MATH 23 - Find perimeters, areas, and volumes of various geometrical shapes and use in applications. MATH 37 - Find perimeters, areas, and volumes of various geometrical shapes and use in applications.</p> <p>Formulate mathematical representations of real-world applications including the recognition of proportional relationships. MATH 23 -Formulate mathematical representations of real-world applications including the recognition of proportional relationships. MATH 37 - Formulate mathematical representations of real-world applications including the recognition of proportional relationships.</p> <p>Solve linear equations using a variety of techniques. MATH 23 -Solve linear equations. MATH 37 -Set up, graph, and solve linear equations, systems of linear equations, and linear inequalities using a variety of techniques.</p> <p>Recognize and apply the concepts of variable, expression, and equation. MATH 23 - Recognize and apply the concepts of variable, expression, and equation. MATH 37 - Recognize and apply the concepts of variable, expression, equation and function.</p> <p>Find perimeters, areas, and volumes of various geometrical shapes and use in applications. Math 40- Set up and solve application problems using linear equations and inequalities, systems of two linear equations with two variables, and quadratic equations.</p> <p>Formulate mathematical representations of real-world applications including the recognition of proportional relationships. Math 40 - Starting with a linear model in tabular, graphical or symbolic form, translate the model into the other two forms.</p> <p>Solve linear equations using a variety of techniques. Math 40 - Solve linear equations and inequalities, systems of two linear equations with two variables, and quadratic equations. Math 40 - Graph linear equations and systems of linear equations by plotting points or by using intercepts and the slope.</p> <p>Recognize and apply the concepts of variable, expression, and equation. Math 40- Use the properties of the real numbers to evaluate, simplify, and factor algebraic expressions, including expressions with fractions and radicals.</p>

C. Recommended Preparations (Course and Non-Course)

Recommended Preparation	Category and Justification
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D. Recommended Skills

Recommended Skills

E. Enrollment Limitations

Enrollment Limitations and Category	Enrollment Limitations Impact
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Course created by Lars Kjeseth on 10/02/2012.

BOARD APPROVAL DATE: 01/22/2013

LAST BOARD APPROVAL DATE: 04/15/2019

Last Reviewed and/or Revised by: Susan Taylor and Ronald Martinez

Date: 10/13/2018

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