

**STUDENT LEARNING OUTCOMES FOR THE SANTIAGO CANYON
COLLEGE MATHEMATICS DEPARTMENT
(Last Revised 8/19/10)**

Department SLOs:

Upon completion of any course in Mathematics the student will be able to:

1. Create mathematical models of real world phenomena, apply those models to make predictions about the behavior of the phenomena, apply appropriate problem solving techniques, and critically evaluate the veracity of the obtained results.
2. Clearly communicate mathematical reasoning and problem solving skills using a variety of formats, diverse technologies, and appropriate mathematical vocabulary and notation.
3. Integrate into educational and professional conduct a calm, confident, and ethical approach to mathematical reasoning and problem solving while taking personal responsibility for mathematical successes

Course SLOs:

Math N05

1. Read, define and apply arithmetic vocabulary and symbols
2. Evaluate and perform order of operations on simple arithmetic expressions
3. Recognize basic geometric figures and evaluate simple properties of these figures
4. Apply arithmetic principles to solve simple real world problems

Math N06

1. Read, define and apply arithmetic vocabulary and symbols
2. Evaluate and perform order of operations on simple arithmetic expressions
3. Recognize basic geometric figures and evaluate simple properties of these figures
4. Apply arithmetic principles to solve simple real world problems

Math 030

1. Analyze sources of math anxiety and construct proactive/positive reframes of negative thoughts about math in journals.
2. Appraise current math knowledge and personal learning styles in surveys.
3. Apply study strategies to increase core math skills and decrease anxiety when approaching math homework and exams.

Math N48

1. Recognize, read and apply algebraic vocabulary and symbols.
2. Perform algebraic operations on polynomials and solve basic linear equations.
3. Make connections between solutions to linear equations with two variables and Cartesian graphs.
4. Model real world situations with appropriate mathematical notation and interpret solutions.

Math 060

1. Read, define and apply algebraic vocabulary and symbols
2. Evaluate and perform algebraic operations on polynomial, rational and radical expressions
3. Solve word problems and equations involving linear, quadratic and rational expressions using appropriate algebraic approaches
4. Graph linear equations and find the equation given appropriate information

Math 070

1. Read, define and apply geometric vocabulary and symbols
2. Understand the physical world through geometric concepts and the relationships between geometric figures
3. Expand students deductive and inductive reasoning
4. Incorporate geometric figures into problem solving

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Math 080

1. Read, define and apply algebraic and functional vocabulary and symbols
2. Evaluate and perform algebraic operations on rational, radical, exponential and logarithmic expressions
3. Set up and solve word problems involving quadratic, rational, absolute value, radical, exponential and logarithmic expressions
4. Graph linear, quadratic, absolute value and power functions, apply graphing transformations and find the equation of linear functions given appropriate information

Math 081

1. Read, define and apply algebraic and functional vocabulary and symbols
2. Evaluate and perform algebraic operations on rational, radical, exponential and logarithmic expressions
3. Set up and solve word problems involving quadratic, rational, absolute value, radical, exponential and logarithmic expressions
4. Graph linear, quadratic, absolute value and power functions, apply graphing transformations and find the equation of linear functions given appropriate information

Math 105

1. Students will be able to recognize mathematical applications in everyday life and demonstrate appropriate, relevant problem solving skills.
2. Students will locate and utilize mathematical resources and technology while demonstrating numerical reasoning and literacy.

Math 140

1. Use algebraic, numerical, and graphical processes to manipulate and analyze equations, inequalities, and functional relationships.
2. Formulate and analyze mathematical models for a variety of real-world phenomenon and use mathematical and technological tools to determine the veracity of the model.

Math 145

1. Demonstrate knowledge, comprehension, and appropriate application of linear equations and inequalities, including, but not limited to, linear regression, matrix representation of linear systems of equations, linear programming in two dimensions and the simplex method in three and more dimensions
2. Apply the formulas of the mathematics of finance to real-world situations and interpret the results
3. Demonstrate knowledge, comprehension and application of basic set theory and its application to probability, including conditional probability and Bayes' Theorem
4. Demonstrate knowledge and comprehension of basic statistics including but not limited to distributions of random variables, expected value, variance and standard deviation, and the normal distribution

Math 150

1. Apply appropriate critical thinking, analytical reasoning and problem solving techniques to model real world contexts in the fields of Business, Economics, Social Sciences and Biology.
2. Solve problems using differentiation and integration of single- and multi-variable functions.
3. Interpret and communicate mathematical results in a clear and accurate manner.
4. Analyze the results of modeling real world data and contrast interpolative and extrapolative barriers to their application

Math 160

1. Demonstrate knowledge and the appropriate application of the six trigonometric functions to find arc length, solve triangles, and find linear and angular velocity as related to real-world problems.
2. Analyze and sketch the graphs of the six trigonometric functions and polar equations using such principles as asymptotic, periodic, and reciprocal behavior, as well as plotting points generated by a table or electronic device.
3. Evaluate and solve trigonometric models and equations using inverse functions, Law of Sines, Law of Cosines, technological tools, and algebraic techniques.

4. State, verify, and apply trigonometric identities, including but not limited to reciprocal, co-functional and Pythagorean identities, sum and difference identities, and double-angle and half-angle identities.

Math 165

1. Identify the needs of the student, including any difficulties due to cultural differences and learning styles
2. Communicate patiently and effectively, using various problem solving techniques

Math 170

1. State and Apply basic definitions, properties and theorems of Pre-Calculus
2. Solve higher order polynomial equations, rational inequalities and equations, systems of inequalities and equations and more complex trigonometric, exponential and logarithmic equations
3. Analyze and graph functions, systems of inequalities and conics, using technology where appropriate
4. Model and solve problems using properties of exponentials, logarithms, sequences and series, systems of equations, and the binomial theorem.

Math 180

1. State and apply basic definitions, properties and theorems of first semester Calculus
2. Evaluate limits, derivatives, definite integrals and indefinite integrals graphically and algebraically
3. Analyze and sketch graphs of functions using the principles of Calculus
4. Model and solve problems using derivatives of algebraic and transcendental functions

Math 180H

1. State and apply basic definitions, properties and theorems of first semester Calculus and use them to formulate elementary proofs
2. Evaluate limits, derivatives, definite integrals and indefinite integrals graphically, algebraically and using the formal definitions
3. Analyze and sketch graphs of functions using the principles of Calculus
4. Model and solve problems using derivatives of algebraic and transcendental functions

Math 185

1. Choose and apply appropriate integration techniques
2. Apply Calculus techniques using polar and parametric equations
3. Find and apply power series representations of functions and determine possible errors
4. Model and solve problems including areas, volume, work and elementary differential equations.

Math 203

1. Clearly and coherently pose applications and a variety of models for mathematical concepts including operations on number systems from whole numbers to rational numbers on exams.
2. Identify and calmly analyze mathematical problems using higher-order critical thinking skills and then apply appropriate techniques/strategies to problem solving on exams.
3. Present topics in elementary mathematics in a clear and accurate manner, demonstrated through oral presentations and in written form.
4. Demonstrate that they will be responsible for giving their own students a positive attitude toward mathematics through written journals

Math 219

1. To read and critically analyze the validity of a statistical statement by considering how the data was obtained and the appropriateness of the statistical methods used.
2. Know how to collect data from a population and represent it in an organized and visual manner
3. To read and interpret data represented in a chart or graph

Math 219H

1. To read and critically analyze the validity of a statistical statement by considering how the data was obtained and the appropriateness of the statistical methods used.
2. Know how to collect data from a population and represent it in an organized and visual manner
3. To read and interpret data represented in a chart or graph

Math 280

1. State and apply basic definitions, properties and theorems of multivariable Calculus
2. Apply vector operations in two and three dimensions and use vector methods to analyze plane and space curves, and curvilinear motion.
3. Apply standard techniques of multivariable calculus, both differential and integral to solve selected applied problems

Math 287

1. State and apply basic definitions, properties and theorems of linear algebra and differential equations.
2. Use matrices to solve systems of linear equations and analyze linear transformations and vector spaces.
3. Correctly choose and apply techniques to solve various types of differential equations.
4. Model and solve applications involving differential equations and linear algebra.

Math 290

1. State and apply basic definitions, properties and theorems of Linear Algebra
2. Perform operations on matrices in order to solve systems of linear equations and analyze linear transformations and apply matrix theory to model real-life situations
3. Utilize the concept of a generalized vector space to extend what was known about the real number spaces
4. Compose clear and accurate proofs using the concepts of this course.

Math 295

1. Demonstrate the ability to communicate basis definitions, properties, and theorems of differential equations
2. Apply various methods to solve the vast array of differential equations encountered in beginning differential equations
3. Demonstrate logical reasoning processes in identifying, modeling, and solving problems
4. Use the principles of beginning differential equations to apply problem-solving strategies to “real world” situations