

# MATHEMATICS (MATH)

## Credit Courses

### MATH 074 Pre-algebra Refresher (1 Unit)

Hours: 18 (18 lecture)

Pre-algebra refresher for students who desire higher placement; students who've completed Math 004 but need review; or those who have attempted Math 95 and need pre-algebra review. Successful completion of this course may serve as a petition to challenge Math 4. Course does not replace a failing grade in Math 4.

### MATH 077 Support for Intermediate Algebra (2 Units)

Prerequisites: Placement by SBCC assessment through multiple measures.

Corequisites: MATH 107.

Hours: 36 (36 lecture)

Concurrent A review of core prerequisite skills, competencies and concepts for intermediate algebra. Intended for students who are concurrently enrolled in Math 107 Intermediate Algebra. Review topics include skills developed in pre-algebra and elementary algebra, operations on integers and fractions, simplifying and manipulating algebraic expressions, solving simple linear equations, applying basic geometric formulas, translation from English to algebra, and using the vocabulary/language of arithmetic and pre-algebra.

Transfer Information: Extnl - Not Degree Applicable

### MATH 087 Intermediate Algebra Refresher (1 Unit)

Hours: 18 (18 lecture)

Intermediate algebra refresher for students who desire higher placement; students who have completed Math 107 but need review; or those who have attempted Math 120 and need review. Successful completion of this course may serve as a petition to challenge Math 107. Course does not replace a failing grade in Math 107.

### MATH 095 Elementary Algebra (5 Units)

Prerequisites: MATH 004 or MATH 041 or equivalent based on SBCC's Assessment Center placement via multiple measures.

Hours: 90 (90 lecture)

Beginning algebra, similar to a standard first-year high school algebra course. Includes a review of signed numbers and their properties, equations and inequalities in one variable, graphing linear equations, systems in two variables, integer exponents, rational and polynomial expressions, quadratic equations, the quadratic formula and graphing parabolas.

### MATH 107 Intermediate Algebra (5 Units)

Prerequisites: MATH 095 or MATH 007C or or equivalent based on SBCC's Assessment Center placement via multiple measures.

Hours: 90 (90 lecture)

Second course in algebra, including algebraic manipulation of polynomials, rational expressions, exponents, radicals, linear equations, ratio and proportion, inequalities, word problems, quadratic equations, systems of linear and quadratic equations. An introduction to functions and nonlinear equations. Exponential and logarithmic functions and their applications.

SBCC General Education: SBCCGE Area D2, SBCCGE Area E1

### MATH 108 Mathematical Concepts for Elementary School Teachers-Number Systems (4 Units)

Prerequisites: MATH 107 or equivalent, based on SBCC's Assessment Center placement via multiple measures.

Hours: 72 (72 lecture)

Recommended for prospective and in-service elementary school teachers. Mathematical investigations and problem solving involving sets, number sense, integers, and rational and real numbers. SBCC General Education: SBCCGE Area D2, SBCCGE Area E1  
Transfer Information: CSUGE Area B4, CSU Transferable, UC Transferable  
C-ID: Math 120.

### MATH 110C Support for Statistics and Liberal Arts Math (2 Units)

Prerequisites: MATH 107 or equivalent based on SBCC's Assessment Center placement via multiple measures.

Corequisites: MATH 117 or MATH 114 or MATH 108.

Hours: 36 (36 lecture)

Concurrent A review of core prerequisite skills, competencies and concepts for elementary statistics and liberal arts mathematics. Intended for students who are concurrently enrolled in Math 117 Elementary Statistics, Math 114 Mathematics for Liberal Arts Majors, or Math 108 Mathematics for Elementary Teachers at Santa Barbara City College. Review topics include skills developed in elementary algebra and intermediate algebra, translation from English to algebra, evaluation of literal expressions, solving and graphing linear equations and calculator skills.

SBCC General Education: SBCCGE Area E1

### MATH 114 Mathematics for Liberal Arts Majors (4 Units)

Prerequisites: MATH 107 or equivalent based on SBCC's Assessment Center placement via multiple measures.

Hours: 72 (72 lecture)

Intended to broaden students' understanding of methods, history and applications of mathematics. Logic, mathematical proofs, numeration systems, modular arithmetic, coordinate geometry and graphing, elementary probability and statistics, linear programming and financial math.

SBCC General Education: SBCCGE Area D2, SBCCGE Area E1

Transfer Information: CSUGE Area B4, IGETC Area 2A, CSU Transferable, UC Transferable

### MATH 117 Elementary Statistics (4 Units)

Prerequisites: MATH 107 or equivalent based on SBCC's Assessment Center placement via multiple measures.

Hours: 72 (72 lecture)

General education mathematics course. Introduction to design of experiments, descriptive statistics and sampling distributions. Central Limit Theorem, statistical inference, confidence interval estimation, tests of hypotheses, correlation and linear regression, categorical variables, Chi-square, one-way ANOVA, and multiple comparisons procedure.

SBCC General Education: SBCCGE Area D2, SBCCGE Area E1

Transfer Information: CSUGE Area B4, IGETC Area 2A, CSU Transferable, UC Transferable

UC Transfer Limit: MATH 117, MATH 117A and MATH 117B, PSY 150 and SOC 125 combined: maximum credit, 1 course or series.

C-ID: MATH 110.

**MATH 117A Elementary Statistics A (2 Units)**

Prerequisites: MATH 107 or equivalent based on SBCC's Assessment Center placement via multiple measures.

Hours: 36 (36 lecture)

MATH 117A is the first part of a two course sequence of a general education mathematics course in statistics. Taken together, MATH 117A and MATH 117B are collectively equivalent to MATH 117, Elementary Statistics. Topics in this course include introduction to design of experiments, descriptive statistics, types of data, introductory probability and sampling distributions. Emphasis is placed on the application of statistical concepts to real world data, development of statistical literacy and reasoning, and the interpretation of results.

SBCC General Education: SBCCGE Area E1

Transfer Information: CSU Transferable, UC Transferable

UC Transfer Limit: MATH 117, MATH 117A and MATH 117B, PSY 150 and SOC 125 combined: maximum credit, 1 course or series.

**MATH 117B Elementary Statistics B (2 Units)**

Prerequisites: MATH 117A.

Hours: 36 (36 lecture)

MATH 117B is the second part of a two course sequence of a general education mathematics course in statistics. Taken together, MATH 117A and MATH 117B are collectively equivalent to MATH 117, Elementary Statistics. Topics include sampling distributions, Central Limit Theorem, statistical inference, confidence interval estimation, tests of hypotheses, correlation and linear regression, Chi-square, one-way ANOVA, and multiple comparisons procedure. Emphasis is placed on the application of statistical concepts to real world data, development of statistical literacy and reasoning, and the interpretation of results.

SBCC General Education: SBCCGE Area E1

Transfer Information: CSUGE Area B4, IGETC Area 2A, CSU Transferable, UC Transferable

**MATH 118 Data Science for All (4 Units)**

Same as: CS 118

Prerequisites: MATH 107 or equivalent based on SBCC's Assessment Center placement via multiple measures.

Hours: 108 (54 lecture, 54 lab)

Introduction to data science using real-world data sets from a variety of disciplines while also presenting inherent uncertainties and issues associated with exploring data. Exposes students to foundational statistical concepts and inferential thinking by learning computation methods in a commonly used programming language such as Python. Transfer Information: CSUGE Area B4, IGETC Area 2A, CSU Transferable, UC Transferable

**MATH 130 Calculus for Biological Sciences, Social Sciences and Business I (5 Units)**

Prerequisites: MATH 137 or equivalent based on SBCC's Assessment Center placement via multiple measures.

Hours: 90 (90 lecture)

Calculus of one variable, limits, continuity, differentiation, Riemann approximations, definite and indefinite integrals; introduction to integration techniques, exponential and logarithmic functions, curve-sketching, maxima/minima problems, and related rates and applications.

SBCC General Education: SBCCGE Area D2, SBCCGE Area E1

Transfer Information: CSUGE Area B4, IGETC Area 2A, CSU Transferable, UC Transferable

UC Transfer Limit: MATH 130 and MATH 150 combined: maximum credit, one course.

C-ID: MATH 140.

**MATH 130C Support for Calculus for Biological Sciences, Social Sciences and Business I (2 Units)**

Prerequisites: Placement by SBCC assessment through multiple measures or.

Corequisites: MATH 130.

Hours: 36 (36 lecture)

Concurrent A review of core prerequisite skills, competencies and advanced algebra concepts for calculus. Intended for students who are concurrently enrolled in Math 130 Calculus for Biological Sciences, Social Sciences and Business I at Santa Barbara City College. Review topics include skills developed in college algebra, with an emphasis on refining skills in algebraic manipulation, functions and geometry.

Transfer Information: CSU Transferable

**MATH 131 Calculus For Biological Sciences, Social Sciences And Business II (3 Units)**

Prerequisites: MATH 130.

Course Advisories: ENG 098 or ENG 103.

Hours: 54 (54 lecture)

Techniques of integration for single and multivariable calculus, functions of several variables, partial differentiation, maxima/minima problems, differential equations, and probability. Optional topics: infinite series, Taylor's Theorem and the calculus of trigonometric functions.

SBCC General Education: SBCCGE Area D2, SBCCGE Area E1

Transfer Information: CSUGE Area B4, IGETC Area 2A, CSU Transferable, UC Transferable

UC Transfer Limit: MATH 131 and 160 combined: maximum credit, one course.

**MATH 137 College Algebra (5 Units)**

Prerequisites: MATH 107 or equivalent based on SBCC's Assessment Center placement via multiple measures.

Hours: 90 (90 lecture)

Extensive treatment of functions and graphing techniques, including translations, symmetries, reflections, and graphs of inverse functions. Analysis and applications of polynomial, rational, absolute value, exponential and logarithmic functions. Systems of equations and inequalities, conics, and sequences and series.

SBCC General Education: SBCCGE Area D2, SBCCGE Area E1

Transfer Information: CSUGE Area B4, IGETC Area 2A, CSU Transferable, UC Transferable

UC Transfer Limit: MATH 137 and MATH 138 combined: maximum credit, 5 semester/7.5 quarter units. No credit for MATH 137 or H 138 if taken after MATH 130 or MATH 150.

**MATH 137C Support for College Algebra (2 Units)**

Prerequisites: MATH 107 or equivalent based on SBCC's Assessment Center placement via multiple measures.

Corequisites: MATH 137.

Hours: 36 (36 lecture)

Concurrent A review of core prerequisite skills, competencies, and concepts for college algebra. Intended for students who are concurrently enrolled in Math 137 College Algebra at Santa Barbara City College. Review topics include skills developed in elementary algebra and intermediate algebra, with an emphasis on refining skills in algebraic manipulation and simplification of linear, quadratic, polynomial, radical, and rational expressions, functions and graphing.

SBCC General Education: SBCCGE Area E1

**MATH 138 Precalculus - College Algebra and Trigonometry (4 Units)**

Prerequisites: MATH 137 or equivalent based on SBCC's Assessment Center placement via multiple measures.

Hours: 72 (72 lecture)

Advanced algebra course emphasizing analysis, graphing and applications of trigonometric functions. Such functions are developed from circular functions. Trigonometric identities and conditional equations, applications to triangles, vectors, complex numbers, parametric equations and polar coordinates are covered. Additional topics include matrix algebra, logic and structure of proof, and the Binomial Theorem.

SBCC General Education: SBCCGE Area D2, SBCCGE Area E1

Transfer Information: CSUGE Area B4, IGETC Area 2A, CSU Transferable, UC Transferable

UC Transfer Limit: MATH 137 and MATH 138 combined: maximum credit, 5 semester/7.5 quarter units; No credit for MATH 137 or MATH 138 if taken after MATH 130 or MATH 150.

**MATH 138C Support for Precalculus (2 Units)**

Prerequisites: Placement by SBCC assessment through multiple measures or MATH 120.

Corequisites: MATH 138.

Hours: 36 (36 lecture)

Concurrent A review of core prerequisite skills, competencies and advanced concepts for precalculus. Intended for students who are concurrently enrolled in Math 138 Precalculus II at Santa Barbara City College. Review topics include skills developed in college algebra, with an emphasis on refining skills in algebraic manipulation, functions and geometry.

Transfer Information: CSU Transferable

**MATH 149 Precalculus for STEM Majors (6 Units)**

Prerequisites: MATH 107 or equivalent based on SBCC's Assessment Center placement via multiple measures.

Hours: 108 (108 lecture)

Preparation for SBCC's STEM Calculus sequence Math 150, followed by Math 160. Topics include the study of polynomial, absolute value, radical, rational, exponential, and logarithmic functions, analytic geometry, and polar coordinates. The study of trigonometric functions, their inverses and their graphs, identities, and proofs related to trigonometric expressions, solving trigonometric equations, solving right triangles, and solving triangles using the Law of Cosines and the Law of Sines will also be covered, as well as an introduction to conics.

SBCC General Education: SBCCGE Area D2, SBCCGE Area E1

Transfer Information: CSU Transferable

**MATH 150 Calculus with Analytic Geometry I (5 Units)**

Prerequisites: MATH 138 or equivalent based on SBCC's Assessment Center placement via multiple measures.

Hours: 90 (90 lecture)

Limits, derivatives and integrals of algebraic, trigonometric, exponential and logarithmic functions. Differentials and applications of the derivative.

SBCC General Education: SBCCGE Area D2, SBCCGE Area E1

Transfer Information: CSUGE Area B4, IGETC Area 2A, CSU Transferable, UC Transferable

UC Transfer Limit: MATH 130 and 150 combined: maximum credit, one course.

C-ID: MATH 210.

**MATH 150C Support Course for Calculus with Analytic Geometry I (2 Units)**

Prerequisites: placement by SBCC assessment through multiple measures or MATH 138.

Corequisites: MATH 150.

Hours: 36 (36 lecture)

Concurrent A review of core prerequisite skills, competencies and advanced algebra concepts for calculus. Intended for students who are concurrently enrolled in Math 150 Calculus with Analytic Geometry I at Santa Barbara City College. Review topics include skills developed in college algebra and precalculus, with an emphasis on refining skills in algebraic manipulation, functions, trigonometry and geometry.

Transfer Information: CSU Transferable

**MATH 160 Calculus with Analytic Geometry II (5 Units)**

Prerequisites: MATH 150.

Hours: 90 (90 lecture)

Techniques of integration; applications of definite integrals; polar and parametric equations; sequences and infinite series; introduction to differential equations and to vectors.

SBCC General Education: SBCCGE Area D2, SBCCGE Area E1

Transfer Information: CSUGE Area B4, IGETC Area 2A, CSU Transferable, UC Transferable

UC Transfer Limit: MATH 131 and 160 combined: maximum credit, one course.

C-ID: MATH 220.

**MATH 160C Support Course for Calculus with Analytic Geometry II (2 Units)**

Corequisites: MATH 160.

Hours: 36 (36 lecture)

Concurrent A review of core prerequisite skills, competencies, advanced algebra and beginning calculus concepts for second semester calculus. Intended for students who are concurrently enrolled in Math 160 Calculus with Analytic Geometry II at Santa Barbara City College. Review topics include skills developed in college algebra, precalculus, and first-semester calculus, with an emphasis on refining skills in algebraic manipulation, functions, trigonometry, proofs, limits and differentiation.

Transfer Information: CSU Transferable

**MATH 180 Transition to Advanced Mathematics (4 Units)**

Prerequisites: MATH 160.

Hours: 72 (72 lecture)

Designed to introduce students to the rigors of advanced mathematics courses, with an emphasis on reading and writing proofs. Topics include set theory and logic, relations, functions, induction, countable and uncountable sets, the Heine-Borel Theorem and the Bolzano-Weierstrass Theorem. Some elementary group theory and/or topology is covered.

Transfer Information: CSUGE Area B4, IGETC Area 2A, CSU Transferable, UC Transferable

**MATH 188 Trigonometry Refresher (1 Unit)**

Hours: 18 (18 lecture)

This short course is intended for students who wish to review trigonometry topics before or while taking Calculus or higher courses. A computer program is used to refresh concepts identified as needed for each student, plus weekly contact with the instructor. This course is not intended to replace Math 138.

**MATH 200 Multivariable Calculus (4 Units)**

Prerequisites: MATH 160.

Hours: 72 (72 lecture)

Functions of several variables, multiple integrals and applications, partial differentiation and applications, calculus of vector functions, Green's Theorem, Stokes' Theorem, and Divergence Theorem.

SBCC General Education: SBCCGE Area D2, SBCCGE Area E1

Transfer Information: CSUGE Area B4, IGETC Area 2A, CSU Transferable, UC Transferable

C-ID: MATH 230.

**MATH 210 Linear Algebra (4 Units)**

Prerequisites: Math 160.

Hours: 72 (72 lecture)

Finite dimensional vector spaces, linear independence, basis, systems of linear equations, linear transformations, matrices, LU factorization, change of basis, similarity of matrices, eigenvalues and eigenvectors, applications, quadratic forms, symmetric and orthogonal matrices, canonical forms, and introduction to infinite dimensional vector spaces.

SBCC General Education: SBCCGE Area D2, SBCCGE Area E1

Transfer Information: CSUGE Area B4, IGETC Area 2A, CSU Transferable, UC Transferable

C-ID: MATH 250.

**MATH 220 Differential Equations (4 Units)**

Prerequisites: Math 200 and Math 210.

Hours: 72 (72 lecture)

Theory and applications of ordinary and partial differential equations.

Topics include constant coefficient equations, series techniques, introduction to Laplace Transforms, qualitative and quantitative solutions to linear and nonlinear systems of differential equations, and separable partial differential equations.

SBCC General Education: SBCCGE Area D2, SBCCGE Area E1

Transfer Information: CSUGE Area B4, IGETC Area 2A, CSU Transferable, UC Transferable

C-ID: MATH 240.