

**Course Outline**

**COURSE:** MATH 8A                      **DIVISION:** 10                      **ALSO LISTED AS:** MATH 8

**TERM EFFECTIVE:** Fall 2018                      **CURRICULUM APPROVAL DATE:** 02/26/2018

**SHORT TITLE:** FIRST HALF PRECALCULUS

**LONG TITLE:** First Half of Precalculus

Units	Number of Weeks	Type	Total Contact Hours
4	18	Lecture:	72
		Lab:	0
		Other:	0
		Total:	72

**COURSE DESCRIPTION:**

Math 8A prepares the student for the study of calculus by providing important skills in algebraic interpretation, and problem solving at the college level. Topics will include basic algebraic concepts, complex numbers, equations and inequalities of the first and second degree, functions, and graphs, linear and quadratic equations, polynomial functions, exponential and logarithmic functions, systems of equations, and matrices.

**PREREQUISITES:**

- Completion of MATH 233, as UG, with a grade of C or better.
- OR
- (Completion of MATH 233A, as UG, with a grade of C or better.
- AND Completion of MATH 233B, as UG, with a grade of C or better.)
- OR
- Completion of MATH 235, as UG, with a grade of C or better.
- OR
- Completion of MATH 240, as UG, with a grade of C or better.
- OR
- Completion of MATH 242, as UG, with a grade of C or better.
- OR
- Completion of MATH 3, as UG, with a grade of C or better.
- OR
- Completion of MATH 5, as UG, with a grade of C or better.
- OR
- Completion of MATH 6, as UG, with a grade of C or better.
- OR

Completion of MATH 7, as UG, with a grade of C or better.  
OR  
Completion of MATH 1A, as UG, with a grade of C or better.  
OR  
Completion of MATH 1B, as UG, with a grade of C or better.  
OR  
Completion of MATH 1C, as UG, with a grade of C or better.  
OR  
Score of 33 on Intermediate Algebra  
OR  
Score of 13 on Pre-Calculus  
OR  
Score of 2800 on Accuplacer Math  
OR  
Score of 2600 on MM CCCApply Math  
OR  
Score of 2600 on MM Placement Tool Math

COREQUISITES:

CREDIT STATUS: D - Credit - Degree Applicable

GRADING MODES

L - Standard Letter Grade

REPEATABILITY: N - Course may not be repeated

SCHEDULE TYPES:

02 - Lecture and/or discussion

**STUDENT LEARNING OUTCOMES:**

- 1.Solve a wide variety of equations and inequalities including absolute value, radical, rational, exponential, logarithmic and polynomial.
- 2.Identify and perform transformations on the graphs of elementary (radical, absolute value, etc.), polynomial (linear, quadratic, cubic), rational, exponential, and logarithmic functions.
- 3.Solve systems of equations and inequalities using graphing, elimination, substitution techniques, matrix algebra, and determinants.
- 4.Explain the concept of a function, perform the arithmetic operations of functions, identify the domain of a function, and analyze graphs of functions.
- 5.Recognize the relationship between inverse functions graphically and through composition.
- 6.Recognize functional patterns in data and apply functions to model real-world applications.
- 7.Graph polynomial functions and characterize the real and complex zeros of polynomials.
- 8.Locate the asymptotes and zeros of rational functions analytically and graph a rational function.

**CONTENT, STUDENT PERFORMANCE OBJECTIVES, OUT-OF-CLASS ASSIGNMENTS**

Curriculum Approval Date: 02/26/2018

HOURS: 14

Equations, Inequalities and Modeling Performance Objectives: Students will review solving and graphing linear equations in one and two variables, quadratic equations, absolute value equations and inequalities, radical equations, and rational equations. Students will perform algebraic manipulations on expressions encountered in a first semester calculus course. Students will use a calculator to construct scatter diagrams and perform linear and quadratic regressions. Out - Of -Class Assignments: Students will complete homework assignments, which require them to explain, apply and explore concepts taught in class. Students will complete a linear regression project using a graphing calculator.

HOURS: 16

Functions and Graphs Performance Objectives: Students will study functions and their graphs. They will investigate function notation, domain and range, transformations and symmetry, operations with functions including composition, inverse functions, even/odd functions, and piecewise functions. Students will perform transformations on the graphs of elementary functions (radical, absolute value, etc.). Students will construct mathematical models. Out- Of-Class Assignments: Students will complete homework assignments, which require them to explain, apply and explore concepts taught in class. Students will complete a computer lab project in which they investigate function transformations and symmetry.

HOURS: 16

Polynomial and Rational Functions Performance Objectives: Students will analyze and learn to graph linear, quadratic, polynomial and rational functions. Students will identify end behavior, asymptotic behavior, intercepts, and vertices. They will characterize real and complex zeros of polynomials and apply the Fundamental Theorem of Algebra. Students will perform transformations on the graphs of polynomial and rational functions. They will solve polynomial and rational inequalities using sign charts and graphs. Students will construct mathematical models. Out-Of-Class Assignments: Students will complete homework assignments which require them to explain, apply and explore concepts taught in class.

HOURS: 16

Exponential and Logarithmic Functions Performance Objectives: Students will study and analyze exponential functions. Emphasis will be placed on the number  $e$ , and on using exponential functions in the modeling of growth and decay. Students will study logarithms learning their uses and applications. Students will learn to recognize the distinguishing characteristics of exponential functions and will employ regression analysis to generate exponential functions from appropriate raw data. Students will perform transformations on the graphs of exponential and logarithmic functions. They will solve exponential and logarithmic equations. Out-Of-Class Assignments: Students will complete homework assignments which require them to explain, apply and explore concepts taught in class. Students will complete a project involving Newton's Law of Cooling.

HOURS: 8

Systems of Equations and Inequalities Performance Objectives: Students will investigate methods for solving linear systems of equations in two and three variables, and nonlinear systems. Students will investigate methods for solving linear systems using matrices. They will also learn partial fraction decomposition, systems of inequalities in two variables, and linear programming. Out-Of-Class Assignments: Students will complete homework assignments which require them to explain, apply and explore concepts taught in class.

HOURS: 2 Final Exam

Out of Class Assignments

Required Outside Hours: 192

#### Assignment Description:

1. Analyze and study pertinent text material, solved examples and lecture notes.
2. Apply principles and skills covered in class by solving regularly-assigned homework problems.
3. Regularly synthesize course materials in preparation for exams.
4. Projects to apply concepts learned in class

#### Methods Of Evaluation

Writing assignments

Percent of total grade: 10.00 %

Out-of-class projects.

Problem-solving assignments

Percent of total grade: 10.00 %

Homework, quizzes.

Objective examinations

Percent of total grade: 80.00 %

In-class written exams.

#### METHODS OF INSTRUCTION:

Instruction will follow a standard lecture/discussion format. Extensive homework will be assigned in order to assure mastery of the concepts covered in class. Students will also be required to utilize technology, both calculators and computer software, to enhance their understanding of the material. Students will be given opportunities to work together on problems given in class and group projects.

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Required Outside Hours: 192

Assignment Description:

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Writing assignments

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Out-of-class projects.

Problem-solving assignments

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Homework, quizzes.

Objective examinations

Percent of total grade: 80.00 %

REPRESENTATIVE TEXTBOOKS:

Sullivan & Sullivan. Precalculus: Concepts Through Functions, A Unit Circle Approach to Trigonometry. Pearson,2014.

ISBN: ISBN-10: 0321931041 ISBN-13: 978-0321931047

Reading Level of Text, Grade: 12 Verified by: Jennifer Nari

**ARTICULATION and CERTIFICATE INFORMATION**

Associate Degree:

GAV B4, effective 200430

CSU GE:

CSU B4, effective 200430

IGETC:

IGETC 2A, effective 200430

CSU TRANSFER:

Transferable CSU, effective 200430

UC TRANSFER:

Transferable UC, effective 200430

SUPPLEMENTAL DATA:

Basic Skills: N

Classification: Y

Noncredit Category: Y

Cooperative Education:

Program Status: 1 Program Applicable

Special Class Status: N

CAN:

CAN Sequence:

CSU Crosswalk Course Department: MATH

CSU Crosswalk Course Number: 8A

Prior to College Level: Y

Non Credit Enhanced Funding: N

Funding Agency Code: Y

In-Service: N

Occupational Course: E

Maximum Hours:

Minimum Hours:

Course Control Number: CCC000166253

Sports/Physical Education Course: N

Taxonomy of Program: 170100