

# Precalculus College Algebra (3)

(Effective Fall 2020)

**Prerequisite:** Two units of high school algebra, and appropriate mathematics placement. Credit may not be received for both MATH 140 and MATH 100–110. Credit may not be received for both MATH 140 and MATH 185.

**Catalog Description:** Functions (e.g., polynomial, exponential, and logarithmic). Zeroes of polynomials. Solutions of systems of equations and inequalities. Selected topics from algebra such as matrices and determinants, partial fractions, and the binomial theorem.

**Notes:**

1. This course requires the use of a graphing calculator. The department recommends a calculator of the TI-83, TI-84 series for this course. Computer algebra systems are prohibited. A TI-Nspire may only be used with a TI-84 faceplate.
2. Some instructors may require MyMathLab, a computer supplement to the course text. Students should check with their instructor before purchasing MyMathLab access.
3. All students in this course will take the Department of Mathematics and Statistics common final exam.

**Goal:** To prepare students for success in college courses, especially the sciences, by introducing algebra and requiring effective written communication. To motivate and illustrate these topics by relevant applications.

**General Education:** The faculty of UT Martin have included this as a general education course with the following course goal and student learning outcomes.

Curriculum Goals: The purpose of the Mathematics requirement is to teach students to organize, evaluate and solve problems using both abstract and quantitative approaches. Courses in this area will enable students to communicate using the language of mathematics.

Student Learning Outcomes:

- a. Students will use appropriate notation and vocabulary to communicate mathematics.
- b. Students will use symbolic and numerical methods to perform calculations.
- c. Students will solve problems with real-world applications.

**Teaching Objectives:** The student will:

1. Determine the domain and codomain of relations and domain and image set of functions.
2. Perform binary operations on functions.
3. Find the composite of two functions and determine its domain and image set.
4. Determine if the inverse of a function exists and relate the graphs of the function and its inverse.
5. Find the formula for the inverse of a one-to-one function.
6. Evaluate and graph functions including piece-wise defined functions.
7. Apply symmetries, reflections, and translations to curve-sketching.
8. Use technology to fit curves to points in the  $xy$ -plane.

9. Solve exponential and logarithmic equations.
10. Apply exponential and logarithmic functions to solve real-world problems.
11. Apply polynomial and synthetic division to finding zeroes of a polynomial.
12. Apply the Remainder, Factor, and Rational Root Theorems to determine zeroes of a polynomial.
13. Sketch the graphs of polynomial functions.
14. Approximate zeroes of polynomials
15. Solve systems of equations and inequalities.
16. Evaluate and graph rational functions.
17. Graph a convex polygon to represent a given set of inequalities.
18. Determine the vertices of a convex polygon and use the vertices to maximize or minimize a function in two variables
19. Calculate the sum and product of two matrices when defined.
20. Perform scalar multiplication.
21. Apply the inverse of a ( $2 \times 2$  or  $3 \times 3$ ) matrix to find the solution of  $\mathbf{Ax} = \mathbf{b}$ .

**Text(s):** Algebra & Trigonometry Enhanced with Graphing Utilities, Eighth Edition, Michael Sullivan and Michael Sullivan III, Pearson, 2021. ISBN: 9780136857969 (This is the ISBN for a book and MyMathLab access. There are several options including rentals and E-books).

MyMathLab computer supplement (ask instructor).

<b>Outline:</b>	<table border="0" style="width: 100%;"> <thead> <tr> <th style="text-align: left;">Chapter</th> <th style="text-align: left;">Title (Sections)</th> <th style="text-align: right;">Days</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">3</td> <td>Functions and Their Graphs (1–5)</td> <td style="text-align: right;">6</td> </tr> <tr> <td style="text-align: center;">4</td> <td>Linear and Quadratic Functions (1–4)</td> <td style="text-align: right;">3</td> </tr> <tr> <td style="text-align: center;">5</td> <td>Polynomial and Rational Functions (1–6)</td> <td style="text-align: right;">7</td> </tr> <tr> <td style="text-align: center;">6</td> <td>Exponential and Logarithmic Functions (1–9)</td> <td style="text-align: right;">9</td> </tr> <tr> <td style="text-align: center;">12</td> <td>Systems of Equations and Inequalities (1–2, 4, &amp; 6–8)</td> <td style="text-align: right;">10</td> </tr> <tr> <td></td> <td>One period tests</td> <td style="text-align: right; border-top: 1px solid black;">5</td> </tr> <tr> <td></td> <td>Total days</td> <td style="text-align: right; border-top: 1px solid black; border-bottom: 1px solid black;">40</td> </tr> </tbody> </table>	Chapter	Title (Sections)	Days	3	Functions and Their Graphs (1–5)	6	4	Linear and Quadratic Functions (1–4)	3	5	Polynomial and Rational Functions (1–6)	7	6	Exponential and Logarithmic Functions (1–9)	9	12	Systems of Equations and Inequalities (1–2, 4, & 6–8)	10		One period tests	5		Total days	40
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**Disability Services:** The University of Tennessee provides reasonable accommodations (academic adjustments and auxiliary aids) to ensure equal access to educational content and university programs for students with disabilities. Any student eligible for and requesting accommodations due to a disability must provide instructors with a letter of accommodation from Disability Services. For additional information, please contact the Disability Services office at 209 Clement Hall, (731) 881-7605.