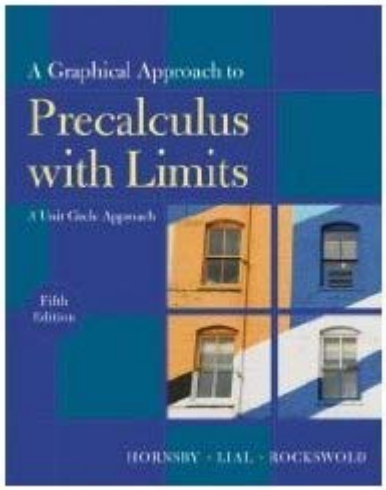
A Correlation of

A Graphical Approach to Precalculus with Limits

5th Edition © 2011



to the

Alabama Course of Study: Mathematics
Analytical Mathematics

Introduction

This document demonstrates how ***A Graphical Approach to Precalculus with Limits: A Unit Circle Approach*, 5th Edition ©2011,** meets the indicators of the Alabama Course of Study: Mathematics Analytical Mathematics. Correlation page references are to the Student Edition and Teacher's Edition and are cited at the page level.

***A Graphical Approach to Precalculus with Limits: A Unit Circle Approach* 5th Edition © 2011** illustrates how the graph of a function can be used to support the solutions of equations and inequalities involving the function. Beginning with linear functions in Chapter 1, the text uses a four-part process to analyze each type of function, starting first with the graph of the function, then the equation, the associated inequality of that equation, and ending with applications. The text covers all of the topics typically caught in a college algebra course, but with an organization that fosters students' understanding of the interrelationships among graphs, equations, and inequalities.

Features:

Chapter Openers These provide a chapter outline and a motivating application topic that is tied to the chapter content.

Enhanced Examples In this edition many examples have been replaced and have carefully polished all solutions and incorporated more side comments.

Dual-Solution Format Selected examples provide side-by-side analytic and graphing calculator solutions, to connect traditional analytic methods for solving problems with graphical methods of solution or support.

Pointers Comments with pointers provide students with on-the-spot reminders and warnings about common pitfalls.

Function Capsules These special boxes offer a comprehensive, visual introduction to each class of function and serve as an excellent resource for reference and review.

What Went Wrong? This feature anticipates typical errors that students make when using graphing technology and provides an avenue for instructors to highlight and discuss such answers.

Cautions and Notes These warn students of common errors and emphasize important ideas throughout the exposition.

Looking ahead to Calculus These margin notes provide glimpses of how the algebraic topics currently being studied are used in calculus.

For Discussion These activities appear within the exposition or in the margins and offer material on important concepts for instructors and students to investigate or discuss in class.

Relating Concepts These groups of exercises appear in the selected exercise sets. They tie together topics and highlight relationships among carious concepts and skills.

Reviewing Basic Concepts These sets of exercises appear every two or three sections and allow students to review and check their understanding of the material in preceding sections.

Chapter Review Material Each end-of-chapter summary features a section-by-section list of Key Terms and Symbols, in addition to Key Concepts.

This document demonstrates the success students will achieve using ***A Graphical Approach to Precalculus with Limits: A Unit Circle Approach.***

ANALYTICAL MATHEMATICS	
Analytical Mathematics is a course designed for students who have successfully completed the Algebra II With Trigonometry course. It is considered to be parallel in rigor to Precalculus. This course provides a structured introduction to important areas of emphasis in most postsecondary studies that pursue a concentration in mathematics. Linear algebra, logic, vectors, and matrices are topics that are given more in-depth coverage than in previous courses. Application-based problem solving is an integral part of this course. To assist students with numerical and graphical analysis, the use of advanced technological tools is highly recommended.	
NUMBER AND QUANTITY	
Vector and Matrix Quantities	
Represent and model with vector quantities.	
Alabama Course of Study: Mathematics Analytical Mathematics	A Graphical Approach to Precalculus with Limits 5/e
1. (+) Recognize vector quantities as having both magnitude and direction. Represent vector quantities by directed line segments, and use appropriate symbols for vectors and their magnitudes (e.g., **v**, $\|\mathbf{v}\|$, $\|\|\mathbf{v}\|\|$), including the use of eigen-values and eigen-vectors. [N-VM1]	**SE/TE:** 714, 715, 716, 721-723 Further opportunity to introduce this objective is available. See the following: **SE/TE:** 485
2. (+) Solve problems involving velocity and other quantities that can be represented by vectors, including navigation (e.g., airplane, aerospace, oceanic). [N-VM3]	**SE/TE:** 720-721, 723-725
3. (+) Add vectors end-to-end, component-wise, and by the parallelogram rule. Understand that the magnitude of a sum of two vectors is typically not the sum of the magnitudes. Find the dot product and the Cross product of vectors. [N-VM4a]	**SE/TE:** 714, 717, 721-723 Further opportunity to introduce this objective is available. See the following: **SE/TE:** 717, 718-719, 723-724
4. (+) Given two vectors in magnitude and direction form, determine the magnitude and direction of their sum, including vectors in complex vector spaces. [N-VM4b]	**SE/TE:** 715-716, 723 83-87, 726-728, 733, 733
5. (+) Understand vector subtraction **v** – **w** as **v** + (–**w**), where (–**w**) is the additive inverse of **w**, with the same magnitude as **w** and pointing in the opposite direction. Represent vector subtraction graphically by connecting the tips in the appropriate order, and perform vector subtraction component-wise, including vectors in complex vector spaces. [N-VM4c]	**SE/TE:** 715, 717, 721-722 Further opportunity to introduce this objective is available. See the following: **SE/TE:** 726
Perform operations on matrices and use matrices in applications.	
6. (+) Use matrices to represent and manipulate data, e.g., to represent payoffs or incidence relationships in a network, including linear programming. [N-VM6]	**SE/TE:** 463-464, 466-467 Further opportunity to introduce this objective is available. See the following: **SE/TE:** 466, 506-508, 511
7. (+) Multiply matrices by scalars to produce new matrices, e.g., as when all of the payoffs in a game are doubled, including rotation matrices. [N-VM7]	**SE/TE:** 473, 478 Further opportunity to introduce this objective is available. See the following: **SE/TE:** 589
8. (+) Understand that the zero and identity matrices play a role in matrix addition and multiplication similar to the role of 0 and 1 in the real numbers. The determinant of a square matrix is nonzero if and only if the matrix has a multiplicative inverse. Solve matrix equations using augmented matrices. [N-VM10]	**SE/TE:** 471-472, 491-493, 493-497, 498-500 Further opportunity to introduce this objective is available. See the following: **SE/TE:** 489-491, 499

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9. (+) Multiply a vector (regarded as a matrix with one column) by a matrix of suitable dimensions to produce another vector. Work with matrices as transformations of vectors, including matrices larger than 2 × 2. [N-VM11]	**SE/TE:** 474-477, 479, 480 Further opportunity to introduce this objective is available. See the following: **SE/TE:** 477
10. (+) Work with 2 × 2 matrices as transformations of the plane, and interpret the absolute value of the determinant in terms of area. Solve matrix application problems using reduced row echelon form. [N-VM12]	**SE/TE:** 459-463, 461-464, 466-468 Further opportunity to introduce this objective is available. See the following: **SE/TE:** 590, 719
Complex Numbers	
Use complex numbers in polynomial identities and equations.	
11. (+) Know the Fundamental Theorem of Algebra; show that it is true for quadratic polynomials. Understand the importance of using complex numbers in graphing functions on the Cartesian or complex plane. [N-CN9]	**SE/TE:** 180, 182, 183, 185, 189-190; 1-74, 226
Limits	
Understand limits of functions.	
12. Calculate the limit of a sequence, of a function, and of an infinite series.	**SE/TE:** 766, 785, 786, 789: 43-52, 831-835, 838-842, 835-836, 842
ALGEBRA	
Seeing Structure in Expressions	
13. Use the laws of Boolean Algebra to describe true/false circuits. Simplify Boolean expressions using the relationships between conjunction, disjunction, and negation operations.	The opportunity to introduce this objective is available. See the following: **SE/TE:** 813
14. Use logic symbols to write truth tables.	The opportunity to introduce this objective is available. See the following: **SE/TE:** 813
Arithmetic With Polynomials and Rational Functions	
15. Reduce the degree of either the numerator or denominator of a rational function by using partial fraction decomposition or partial fraction expansion.	**SE/TE:** 512-517, 517-518: 1-30 Further opportunity to introduce this objective is available. See the following: **SE/TE:** 517
FUNCTIONS	
Trigonometric Functions	
Extend the domain of trigonometric functions using the unit circle.	
16. (+) Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions. [F-TF4].	**SE/TE:** 544-550, 552: 47-61, 554-556, 558-559, 565-567: 1-8, 29-40, 59-64
Apply trigonometry to general triangles.	
17. (+) Prove the Law of Sines and the Law of Cosines and use them to solve problems. Understand Law of Sines = 2*r*, where *r* is the radius of the circumscribed circle of the triangle. Apply the Law of Tangents. [G-SRT10]	**SE/TE:** 692, 699-702: 1-79, 705, 710-713: 1-72 Further opportunity to introduce this objective is available. See the following: **SE/TE:** 699, 709
18. Apply Euler's formula and deMoivre's formulas as links between complex numbers and trigonometry	**SE/TE:** 735-738, 739-740, 1-58 Further opportunity to introduce this objective is available. See the following: **SE/TE:** 727