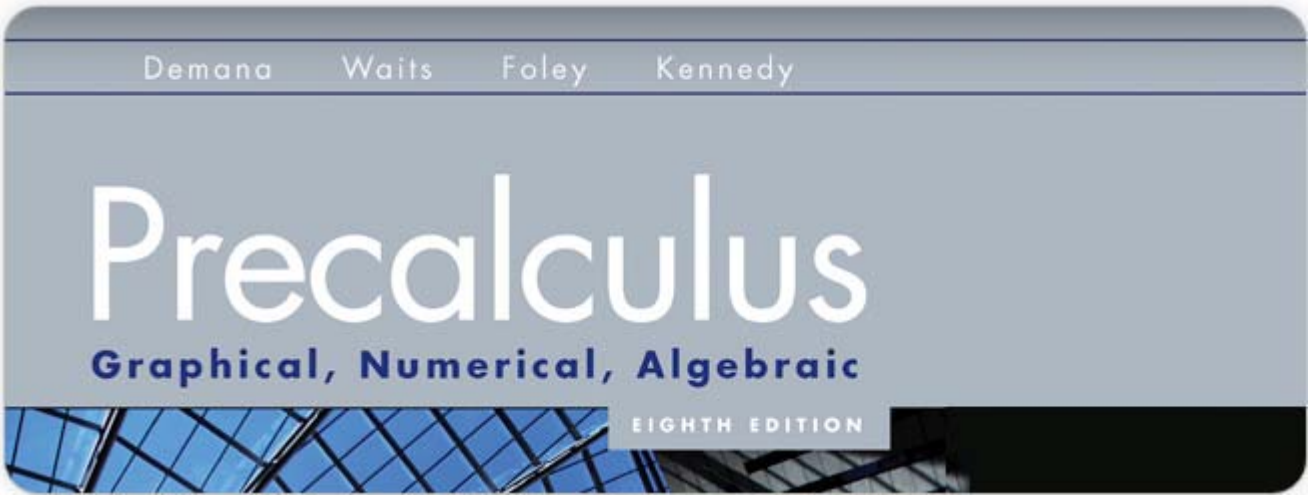
A Correlation of

Precalculus: Graphical, Numerical, Algebraic 8th Edition



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Alabama Course of Study: Mathematics Precalculus

ALWAYS LEARNING PEARSON

INTRODUCTION

This document demonstrates how ***Precalculus: Graphical, Numerical, Algebraic*, 8th Edition © 2011, (**Demana, et al.), meets the indicators of the Alabama Course of Study Mathematics - Precalculus. Correlation page references are to the Student Edition and Instructor's Edition and are cited at the page level.

Precalculus: Graphical, Numerical, Algebraic was created for the needs of today's students with the perfect balance of graphical and algebraic representation. This program was designed by a nationally recognized author team with years of experience and expertise, and prepares students for a course in Calculus.

Features:

- The Twelve Basic Functions are emphasized as a major theme and focus.
- "Now Try" study aids for each exercise encourage students to test their comprehension of concepts.
- Vocabulary and properties are highlighted for quick access and easy reference.

Explorations appear throughout the text and provide the perfect opportunity for students to become active learners and discover mathematics on their own.

- Looking Ahead to Calculus icon points out concepts that students will encounter again in calculus.
- New to this edition, an entire section added on Data Analysis and Statistical Inference, detailed guidance in every chapter on appropriate use of graphing calculators, versus when students should solve problems without them, and Updated data and numerous new problems and exercises.

This document demonstrates the success students will achieve using ***Precalculus: Graphical, Numerical, Algebraic.***

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PRECALCULUS	
Precalculus is a course designed for students who have successfully completed the Algebra II With Trigonometry course. This course is considered to be a prerequisite for success in calculus and college mathematics. Algebraic, graphical, numerical, and verbal analyses are incorporated during investigations of the Precalculus content standards. Parametric equations, polar relations, vector operations, conic sections, and limits are introduced. Content for this course also includes an expanded study of polynomial and rational functions, trigonometric functions, and logarithmic and exponential functions.	
NUMBER AND QUANTITY	
The Complex Number System	
Perform arithmetic operations with complex numbers.	
Alabama Course of Study: Mathematics Precalculus	***Precalculus: Graphical, Numerical, Algebraic*, 8/e**
1. (+) Find the conjugate of a complex number; use conjugates to find moduli and quotients of complex numbers. [N-CN3]	**SE/TE:** 51, 53, 504-513
Represent complex numbers and their operations on the complex plane.	
2. (+) Represent complex numbers on the complex plane in rectangular and polar form (including real and imaginary numbers), and explain why the rectangular and polar forms of a given complex number represent the same number. [N-CN4]	**SE/TE:** 503-505, 511-513
3. (+) Represent addition, subtraction, multiplication, and conjugation of complex numbers geometrically on the complex plane; use properties of this representation for computation. [N-CN5]	**SE/TE:** 503, 505-506, 511-513
4. (+) Calculate the distance between numbers in the complex plane as the modulus of the difference, and the midpoint of a segment as the average of the numbers at its endpoints. [N-CN6]	**SE/TE:** 15, 17, 19, 503
Limits	
Understand limits of functions.	
5. Determine numerically, algebraically, and graphically the limits of functions at specific values and at infinity.	**SE/TE:** 738-746, 748-754, 755-765
a. Apply limits in problems involving convergence and divergence.	**SE/TE:** 744-746, 758-760, 762-765
Vector and Matrix Quantities	
Represent and model with vector quantities.	
6. (+) 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**, |**v**|, ||**v**||, v). [N-VM1]	**SE/TE:** 456-458, 460-461, 464-466, 633-637
7. (+) Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point. [N-VM2]	**SE/TE:** 457-458, 464
8. (+) Solve problems involving velocity and other quantities that can be represented by vectors. [N-VM3]	**SE/TE:** 461-466, 471-474, 634-637
Perform operations on vectors.	
9. (+) Add and subtract vectors. [N-VM4]	**SE/TE:** 458-459, 462, 464-466, 633-637
a. (+) 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. [N-VM4a]	**SE/TE:** 458-459, 464-466
b. (+) Given two vectors in magnitude and direction form, determine the magnitude and direction of their sum. [N-VM4b]	**SE/TE:** 462, 465-466

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c. (+) 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. [N-VM4c]	This standard can be addressed when performing vector addition: **SE/TE:** 458-459, 464-466
10. (+) Multiply a vector by a scalar. [N-VM5]	**SE/TE:** 458-459, 464-466
a. (+) Represent scalar multiplication graphically by scaling vectors and possibly reversing their direction; perform scalar multiplication component-wise, e.g., as c(v_x, v_y) = (cv_x, cv_y). [N-VM5a]	**SE/TE:** 458-459, 464-466
b. (+) Compute the magnitude of a scalar multiple c**v** using ‖c**v**‖ = |c|v. Compute the direction of c**v** knowing that when |c|v ≠ 0, the direction of c**v** is either along **v** (for c > 0) or against **v** (for c < 0). [N-VM5b]	**SE/TE:** 458-459, 464-466
Perform operations on matrices and use matrices in applications.	
11. (+) Use matrices to represent and manipulate data, e.g., to represent payoffs or incidence relationships in a network. [N-VM6]	**SE/TE:** 530-531, 532-534, 541-543, 554-555
12. (+) Multiply matrices by scalars to produce new matrices, e.g., as when all of the payoffs in a game are doubled. [N-VM7]	**SE/TE:** 531, 540, 548, 552-556
13. (+) Add, subtract, and multiply matrices of appropriate dimensions. [N-VM8]	**SE/TE:** 530-534, 540-543, 550-556
14. (+) Understand that, unlike multiplication of numbers, matrix multiplication for square matrices is not a commutative operation, but still satisfies the associative and distributive properties. [N-VM9]	**SE/TE:** 537, 540
15. (+) 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. [N-VM10]	**SE/TE:** 534-537, 540-543
16. (+) 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. [N-VM11]	This standard can be addressed when multiplying matrices: **SE/TE:** 530-538, 550-556
17. Work with 2 × 2 matrices as transformations of the plane, and interpret the absolute value of the determinant in terms of area. [N-VM12]	**SE/TE:** 537-543
ALGEBRA	
Reasoning With Equations and Inequalities	
Solve systems of equations.	
18. (+) Represent a system of linear equations as a single matrix equation in a vector variable. [A-REI8]	**SE/TE:** 546-549, 552-556
19. (+) Find the inverse of a matrix if it exists and use it to solve systems of linear equations (using technology for matrices of dimension 3 × 3 or greater). [A-REI9]	**SE/TE:** 550-556

FUNCTIONS	
Conic Sections	
Understand the graphs and equations of conic sections.	
Alabama Course of Study: Mathematics Precalculus	***Precalculus: Graphical, Numerical, Algebraic*, 8/e**
20. Create graphs of conic sections, including parabolas, hyperbolas, ellipses, circles, and degenerate conics, from second-degree equations.	**SE/TE:** 580-590, 593, 595, 599-601, 603-606, 609-611, 612-616, 618-619
a. Formulate equations of conic sections from their determining characteristics.	**SE/TE:** 584-585, 587-590, 593-594, 599-601, 603-605, 609-611
Interpreting Functions	
Analyze functions using different representations. *(Logarithmic and trigonometric functions.)*	
21. (+) Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior. [F-IF7d]	**SE/TE:** 218-227
Building Functions	
Build a function that models a relationship between two quantities.	
22. (+) Compose functions. [F-BF1c]	**SE/TE:** 111-114, 116-118
Build new functions from existing functions.	
23. Determine the inverse of a function and a relation.	**SE/TE:** 121-128
24. (+) Verify by composition that one function is the inverse of another. [F-BF4b]	**SE/TE:** 124-128
25. (+) Read values of an inverse function from a graph or a table, given that the function has an inverse. [F-BF4c]	**SE/TE:** 123-128
26. (+) Produce an invertible function from a non-invertible function by restricting the domain. [F-BF4d]	**SE/TE:** 125-128
27. (+) Understand the inverse relationship between exponents and logarithms, and use this relationship to solve problems involving logarithms and exponents. [F-BF5]	**SE/TE:** 292, 296-297
28. Compare effects of parameter changes on graphs of transcendental functions.	**SE/TE:** 256-264
Trigonometric Functions	
Recognize attributes of trigonometric functions and solve problems involving trigonometry.	
29. Determine the amplitude, period, phase shift, domain, and range of trigonometric functions and their inverses.	**SE/TE:** 351-360, 361-368
30. Use the sum, difference, and half-angle identities to find the exact value of a trigonometric function.	**SE/TE:** 330-331, 333-337, 341-349
31. Utilize parametric equations by graphing and by converting to rectangular form.	**SE/TE:** 119-120, 126, 475-484
a. Solve application-based problems involving parametric equations.	**SE/TE:** 478-486
b. Solve applied problems that include sequences with recurrence relations.	This standard can be addressed when examining recursively defined sequences: **SE/TE:** 670-677
Extend the domain of trigonometric functions using the unit circle.	
32. (+) Use special triangles to determine geometrically the values of sine, cosine, tangent for $\pi/3$, $\pi/4$ and $\pi/6$, and use the unit circle to express the values of sine, cosine, and tangent for $\pi - x$, $\pi + x$, and $2\pi - x$ in terms of their values for x, where x is any real number. [F-TF3] 346	**SE/TE:** 330-331, 335-337, 344-349

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33. (+) Use the unit circle to explain symmetry (odd and even) and periodicity of trigonometric functions. [F-TF4]	**SE/TE:** 345
Model periodic phenomena with trigonometric functions.	
34. (+) Understand that restricting a trigonometric function to a domain on which it is always increasing or always decreasing allows its inverse to be constructed. [F-TF6]	**SE/TE:** 378-387
35. (+) Use inverse functions to solve trigonometric equations that arise in modeling contexts; evaluate the solutions using technology, and interpret them in terms of the context.* [F-TF7]	**SE/TE:** 384-387
Prove and apply trigonometric identities.	
36. (+) Prove the addition and subtraction formulas for sine, cosine, and tangent, and use them to solve problems. [F-TF9]	**SE/TE:** 422-427
GEOMETRY	
Expressing Geometric Properties With Equations	
Translate between the geometric description and the equation for a conic section.	
37. (+) Derive the equations of a parabola given a focus and directrix. [G-GPE2]	**SE/TE:** 584-585, 587-590
38. (+) Derive the equations of ellipses and hyperbolas given the foci, using the fact that the sum or difference of distances from the foci is constant. [G-GPE3]	**SE/TE:** 593-594, 599-601, 604-605, 609-611
Explain volume formulas and use them to solve problems.	
39. (+) Give an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures. [G-GMD2]	This standard can be addressed when examining figures in the three-dimensional Cartesian coordinate: **SE/TE:** 629-638
STATISITCS AND PROBABILITY	
Using Probability to Make Decisions	
Calculate expected values and use them to solve problems.	
40. (+) Define a random variable for a quantity of interest by assigning a numerical value to each event in a sample space; graph the corresponding probability distribution using the same graphical displays as for data distributions. [S-MD1]	**SE/TE:** 659, 666-669
41. (+) Calculate the expected value of a random variable; interpret it as the mean of the probability distribution. [S-MD2]	**SE/TE:** 668-669 (#61-62)
42. (+) Develop a probability distribution for a random variable defined for a sample space in which theoretical probabilities can be calculated; find the expected value. [S-MD3]	**SE/TE:** 659, 666-669
43. (+) Develop a probability distribution for a random variable defined for a sample space in which probabilities are assigned empirically; find the expected value. [S-MD4]	**SE/TE:** 659, 666-669
Use probability to evaluate outcomes of decisions.	
44. (+) Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values. [S-MD5]	**SE/TE:** 668-669 (#61-62)
a. Find the expected payoff for a game of chance. [S-MD5a]	**SE/TE:** 668-669 (#61-62)
b. Evaluate and compare strategies on the basis of expected values. [S-MD5b]	**SE/TE:** 668-669 (#61-62)