

PENN STATE UNIVERSITY
MATH 41: TRIGONOMETRY AND ANALYTIC GEOMETRY

Text: Precalculus Functions and Graphs, A Graphing Approach, 4th Edition, 2005

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Course Outline

CHAPTER 1: FUNCTIONS AND THEIR GRAPHS

- 1.1 Lines in the Plane
- 1.2 Functions
- 1.3 Graphs of Functions
- 1.4 Shifting, Reflecting, and Stretching Graphs
- 1.5 Combinations of Functions
- 1.6 Inverse Functions

CHAPTER 2: POLYNOMIALS AND RATIONAL FUNCTIONS

- 2.1 Quadratic Functions (Also Solving Quadratic Equations, page A61)
- 2.2 Polynomial Functions of Higher Degree
- 2.3 Real Zeros of Polynomial Functions
- 2.6 Rational Functions and Asymptotes
- 2.7 Graphs of Rational Functions

CHAPTER 3: EXPONENTIAL AND LOGARITHMIC FUNCTIONS

- 3.1 Exponential Functions and Their Graphs
- 3.2 Logarithmic Functions and Their Graphs
- 3.3 Properties of Logarithms
- 3.4 Solving Exponential and Logarithmic Equations

CHAPTER 4: TRIGONOMETRIC FUNCTIONS

- 4.1 Radian and Degree Measure
- 4.2 Trigonometric Functions: The Unit Circle
- 4.3 Right Triangle Trigonometry
- 4.4 Trigonometric Functions of Any Angle
- 4.5 Graphs of Sine and Cosine Functions
- 4.6 Graphs of Other Trigonometric Functions
- 4.7 Inverse Trigonometric Functions

CHAPTER 5: ANALYTIC TRIGONOMETRY

5.1 Using Fundamental Identities

5.2 Verifying Trigonometric Identities (cover lightly)

5.3 Solving Trigonometric Equations

5.4 Sum and Difference Formulas

5.5 Multiple-Angle Formulas (double angle, power reduction)

CHAPTER 6: ADDITIONAL TOPICS IN TRIGONOMETRY

6.1 Law of Sines

6.2 Law of Cosines

CHAPTER 9: TOPICS IN ANALYTIC GEOMETRY

9.1 Introduction to Conics: Parabolas

9.2 Ellipses

9.3 Hyperbolas

9.6 Polar Coordinates

NOTES:

1. Calculators that perform symbolic manipulations (TI-89, TI-92, etc.) are not permitted for exams and/or quizzes.
2. Chapter 1 should be a review; so go over quickly.
3. Combine Sections 2.6 and 2.7.
4. Section 5.2 should be covered lightly.
5. Emphasize double angle and power reduction in section 5.5
6. **The Final Exam must consist of questions that cover the following topics.**

Linear Models

Function evaluation (difference quotients)

Finding zeros of a function - polynomial, rational, radical, exponential, logarithmic, and trigonometric

Graphing functions, including finding domain and range (all functions, as above)

Using logarithmic properties

Solving equations, especially exponential and trigonometric

Evaluation of trigonometric functions of any angle

Inverse trigonometric functions

Completing the square

Word problems (quadratic models, exponential and logarithmic models, obtuse triangles, etc.)

Conics

Polar coordinates