

356-H/356-CP ALGEBRA 2B

GRADE: 10-12

LEVEL: Honors and College Prep

CREDITS: 5

RECOMMENDED PREREQUISITE: 352-H/352-CP Algebra 2A

BASIC TEXT: Algebra II, Prentice Hall, 2004

REQUIRED MATERIALS: writing utensil, notebook, and scientific calculator

COURSE DESCRIPTION:

This course is intended to prepare students for the study of calculus at the college level. It is a study of algebraic techniques with an emphasis on coordinate geometry, trigonometry and quadratic systems. It is expected that students will have a sound knowledge of Algebra 2A.

MISSION RELATED GOALS:

This class will provide the student with a variety of opportunities to demonstrate academic excellence and intellectual curiosity by communicating effectively, solving complex problems, and working with others toward a common goal.

STUDENT EXPECTATIONS FOR LEARNING ADDRESSED:

Students will be afforded opportunities to apply mathematical concepts to real-world applications. A variety of teaching methods will be used to foster an environment that promotes self-confidence and respect for others throughout the school and global community.

GENERAL PERFORMANCE OBJECTIVES:

The student will be able to:

1. Graph polynomial and rational algebraic functions
2. Find the real zeros of a polynomial function.
3. Identify and write the equation of a conic from its graph.
4. Find the solutions of quadratic systems.
5. Perform operations and graph expressions involving real and rational exponents.
6. Identify and apply the logarithm properties to simplify expressions and solve equations.
7. Solve standard probability problems using a variety of counting techniques.
8. Solve basic statistical formulas to experimental data.
9. Identify and graph the trigonometric and inverse trigonometric functions.
10. Solve trigonometric equations and apply these to real-life situations.

MASSACHUSETTS CURRICULUM FRAMEWORK CONTENT STANDARDS:

<http://goo.gl/tv2ya>

UNITS AND THEMES:

I. Radical Functions & Rational Exponents

A.SSE.2, A.APR.3, A.CED.1, A.CED.2, A.CED.3, A.REI.2, F.IF.4, F.IF.5, F.IF.6, F.IF.7

II. Exponential and Logarithmic Functions

A.SSE.2, A.APR.1, A.APR.3, A.CED.1, A.CED.2, A.CED.3, A.REI.11, F.IF.4, F.IF.5, F.IF.6, F.IF.7, F.LE

III. Sequences and Series

A-SSE-4

IV. Periodic Functions and Trigonometry

A.CED.2, F.IF.4, F.IF.5, F.IF.7,

A.APR.3, F.TF.1, F.TF.2, F.TF.5

A.CED.3, F.IF.8, F.TF.8

V. Trigonometric Identities and Equations

VI. Matrices

N-VM

VI. Preparation for Pre-Calculus

A.CED.4, F.BF.4

VII. Review, Midterm, Final Exam

COURSE OUTLINE: (number of days are an approximation and may be adjusted by course demands)
Topics with (+) are included in 356-H.

I. Radical Functions & Rational Exponents (14 days)

- A. Roots and Radical Expressions
- B. Multiplying and Dividing Radical Expressions
- C. Binomial Radical Expressions
- D. Rational Exponents
- E. Solving Radical Equations
- F. Graphing Radical Functions

II. Exponential and Logarithmic Functions (14 days)

- A. Exploring Exponential Models
- B. Properties of Exponential Functions
- C. Logarithmic Functions as Inverses
- D. Properties of Logarithms
- E. Exponential & Logarithmic Equations
- F. Natural Logarithm

III. Sequences and Series (6 days)

- A. Mathematical Patterns
- B. Arithmetic Sequences
- C. Geometric Sequences
- D. Arithmetic Series
- E. Geometric Series

IV. Periodic Functions and Trigonometry (11 days)

- A. Exploring Periodic Data
- B. Angles and the Unit Circle
- C. Radian Measure

- D. The Sine Function
- E. The Cosine Function
- F. The Tangent Function

V. Trigonometric Identities and Equations (15 days)

- A. Trigonometric Identities
- B. Right Triangle Trigonometry
- C. Area and the Law of Sines
- D. The Law of Cosines

VI. Matrices (8 days)

- A. (+) Organizing Data into Matrices
- B. (+) Operations with Matrices
- C. (+) Using Matrices for Geometric Transformations
- D. (+) 2×2 Matrices and determinants and inverses
- E. (+) Vectors

VII. Preparation for Pre-Calculus (15 days)

- A. Operations on Functions
- B. Inverse Relations and Functions
- C. Literal Equations
- D. Rational Exponents
- E. Trigonometry Tables

VIII. Review, Midterm, Final Exam (6 days)

SUGGESTED INSTRUCTIONAL STRATEGIES

1. Lecture
2. Written Exercises
3. Group Work
4. Projects
5. Use of Manipulatives
6. Use of a Variety of Questioning Techniques
7. Board work
8. Calculator Activities
9. Games (Math Jeopardy, etc.)
10. Student Presentations
11. A variety of assessment tools (partner quizzes, etc.)

SUGGESTED INTEGRATED ACTIVITIES:

1. Students will research the astronomer Hipparchus. They will use his techniques to calculate the heights of three buildings without measuring them directly. Students will prepare a report of their findings.

2. Students will construct a scale model of the catenary between the towers of the Golden Gate bridge and suspend weights to approximate the parabola formed. They will present a report comparing their model to the original.

USE OF TOOLS/TECHNOLOGY:

1. Use a classroom computer and an integrated software package (Graph Wiz, 3D Images, Algebra (4.0), Math CAD).
2. Use the TI-83 Graphics Calculator.
3. Use a Smartboard
4. View video selections
5. Use computer laboratory

ASSESSMENT TECHNIQUES:

1. Students will take free-response performance tests.
2. Students will participate in classroom discussions and will demonstrate problems solving on the Smartboard or whiteboard.
3. Students will work in cooperative situations and report out their results.
4. Students will prepare integration projects.