

**CANON CITY HIGH SCHOOL
COURSE GUIDE**

Department: Mathematics

Course Title: Algebra II

Date: 9/23/03

Grade Level: 9-12

Prerequisite/Requirements: “C” grade or better in Geometry

Costs to Students: 3 ring binder, scientific calculator, graph paper, paper, and pencils

Course Description: This course reviews and extends the student’s understanding of the sets of numbers, open sentences, equations and inequalities in one or two variables, systems of linear open sentences, expressions, relations and functions, rational numbers and functions, quadratic equations, irrational and complex numbers, variations, conic sections, basic matrix algebra, and probability/statistics.

General Course Outcomes:

Upon completion of this course the proficient student will know and be able to: (core concepts/essential skills).

1. Know and understand real numbers and their operations.
2. Use the problem solving steps to model problems mathematically.
3. Solve linear equalities and inequalities using substitution, linear combinations, and graphical techniques.
4. Solve absolute value equations and inequalities.
5. Develop and utilize functions and their graphs.
6. Use and understand linear correlation and best fit lines.
7. Understand and apply linear inequalities in two variables.
8. Graph, understand, and use piecewise functions.
9. Apply graphical techniques in the solution of linear programming problems.
10. Algebraically solve linear equations in three variables and present a graphical solution of the same.
11. Understand the fundamental operations of matrix algebra.
12. Model problems and solve linear equations in matrix form using Cramer’s Rule and identity/inverse matrices.

13. Solve quadratic equations using factoring, completing the square, and the quadratic formula. Understand the role of the discriminant.
14. Model (and then solve) problems using quadratic equations.
15. Know the properties of exponents.
16. Understand and utilize the remainder and factor theorems.
17. Find the rational roots of polynomials.
18. Know the basics of complex numbers and their manipulation.
19. Understand the Fundamental Theorem of Algebra.
20. Know the properties of rational exponents and radicals.
21. Understand power functions and perform function operations.
22. Solve radical equations.
23. Understand exponential growth and decay.
24. Know the properties of logarithms and solve logarithmic equations (to include base e).
25. Model exponential problems with exponential functions and solve the same.
26. Understand inverse and joint variation. Model problems using these variations and solve the same.
27. Graph rational functions. Identify vertical and horizontal asymptotes. Solve rational equations.
28. Add and subtract complex fractions.
29. Know and use the distance and midpoint formulas. Write and graph the equations of circles, parabolas, ellipses, and hyperbolas.
30. Solve quadric systems of equations.

Additional or optional skills:

Identify and use finite and infinite arithmetic and geometric sequences and series.
Develop and use explicit and recursive rules for the n th term of a sequence.
Understand and utilize statistical parameters such as measures of the central tendency and dispersion. Create and use frequency distributions.
Use the fundamental counting principle and permutation rules.
Know the basics of the binomial theorem and combination rules.
Create a probability density function (pdf) from a histogram, understand and utilize the function.
Create and use binomial and normal distributions.
Model the probability of simple compound, independent, and independent events.

Standards:

State Standards addressed in this course. (Identify the course outcomes that support those standards.)

STANDARD 1 (course outcomes: 1, 2, 12, 14, 22, 24, 25, and 37)

Students develop number sense and use numbers and number relationships in problem-solving situations and communicate the reasoning used in solving these problems.

STANDARD 2 (course outcomes: 3, 4, 5, 6, 7, 8, 9, 10, 11, 13, 15, 16, 17, 18, 19, 20, 23, 25, 26, 27, 29, 30, 31, 32)

Students use algebraic methods to explore, model, and describe patterns and functions involving numbers, shapes, data, and graphs in problem-solving situations and communicate the reasoning used in solving these problems.

STANDARD 3 (course outcomes: 33, 34, 34, 36, 37, and 38)

Students use data collection and analysis, statistics, and probability in problem-solving situations and communicate the reasoning used in solving these problems.

STANDARD 4 (course outcome: 29)

Students use geometric concepts, properties, and relationships in problem-solving situations and communicate the reasoning used in solving these problems.

STANDARD 5(course outcomes: 2, 3, 25, and 38)

Students use a variety of tools and techniques to measure, apply the results in problem-solving situations, and communicate the reasoning used in solving these problems.

STANDARD 6 (course outcomes: 3, 8, 9, and 27)

Students link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic, paper-and-pencil, calculators, and computers, in problem-solving situations and communicate the reasoning used in solving these problems.

Required Unit of Study:

Themes within the course/Specific concepts being targeted

- Mastery of polynomial manipulation.
- Mastery of graphing
- Ability to model/solve polynomial equations and inequalities analytically and graphically.
- Ability to manipulate and solve exponential and logarithmic equations.
- Solve systems of linear equations using matrix algebra.
- Working knowledge of probability and statistics.

Unit Modifications/Enrichments:

- **Assistance to students having difficulty and/or special needs**
 - Multiple English to Spanish guides including audio CD
 - Basic Skills Workbook: Diagnosis and Remediation
 - Reteaching worksheets in each chapter resource book
 - Student Tour CD-Rom
 - Students references at website: <http://www.mcdougallittell.com/>

- **Additional experiences for students capable of advanced work (cooperative learning, adaptive materials, re-teaching, second chance, etc.**
 - Exploration and projects workbook
 - Challenge problems embedded in text
 - Website <http://www.mcdougallittell.com/> offers more challenge problems

Materials/Resources:

- **Textbook (CORE and Supplemental) (Publisher, Edition, Year Adopted)**

Algebra 2, McDougal Littell, 1st ed, 2003
- **Media materials used**

CD-Rom, internet, VHS video
- **Technology needs**

Overhead, computers, and/or TV/VCR
- **Other resources (guest speakers, field trips)**

Assessment Program

Publisher Developed (list test)
Test and Practice Generator CD-Rom
Unit Resource Books
Warm-up / Daily Quiz Transparencies

Teacher Developed

Individualized per teacher

- **Tests and Quizzes, Homework**
- **Type: Essay, constructed response, criterion referred, oral presentation**

See publisher resources (CD-Rom) available for tests and quizzes

Homework from text

Unit resources have worksheets at three different levels for each section

Within the unit resources books, there are Challenge and Skill Problems/Worksheets, interdisciplinary worksheets, and project ideas for higher-level learning or alternative assessment.

- **Notebook**

Students are required to keep an organized notebook with daily notes, assignments, and any assigned projects.

- **Authentic production**

- **Proficiency Test Requirement** none

Instructional time:

List units or interdisciplinary themes and approximate length of time (actual or percent, etc.)

- Mastery of polynomial manipulation 1-3 weeks
- Mastery of graphing 1-3 weeks
- Ability to model/solve polynomial equations and inequalities analytically and graphically 1-3 weeks
- Ability to manipulate and solve exponential and logarithmic equations 1-3 weeks
- Solve systems of linear equations using matrix algebra 1-3 weeks
- Basic knowledge of sequences and series 1-3 weeks
- Working knowledge of probability and statistics 1-3 weeks