Course Description

The learning opportunities and instruction in Algebra 2 are designed to help students grow into more confident and competent practitioners of 21st century mathematics. Course content is aligned with the Colorado Academic Standards. These standards describe what all high school graduates should know and be able to do to ensure success in postsecondary and workforce settings. The Algebra 2 program (text: Prentice Hall’s Advanced Algebra: Tools for a Changing World, ©2001) aims to apply and extend what students have learned in previous courses by focusing on finding connections between multiple representations of functions, transformations of different function families, finding zeros of polynomials and connecting them to graphs and equations of polynomials, modeling periodic phenomena with trigonometry, and understanding the role of randomness and the normal distribution in making statistical conclusions.

On a daily basis, students in Algebra 2 use problem solving strategies, questioning, investigating, analyzing critically, gathering and constructing evidence, and communicating rigorous arguments justifying their thinking. Students learn in collaboration with others, sharing information, expertise, and ideas.

Course Objectives

Upon completing this course, students should be able to:

- Visualize, express, interpret, describe, and graph functions (and their inverses, in many cases). Given the graph, students will be able to represent the function with an equation, and vice-versa, and transform the graph, including those that can be classified in the following families:
  - linear
  - exponential
  - sine, cosine, tangent
  - quadratic
  - absolute value
  - square root
  - polynomial
  - logarithmic
  - piecewise-defined

- Use variables and functions to represent relationships given in tables, graphs, verbally stated problems, and geometric diagrams and recognize the interconnection between these multiple representations.

- Apply the use of multiple algebraic representations to model and solve problems presented as real world situations or simulations from such subject areas as economics, biology, chemistry and physics.

- Solve linear or quadratic equations in one variable, mixed systems in two variables, and linear systems of equations in three or more variables, including solving with graphical methods.

- Use order and equivalence properties of algebra to rewrite complicated algebraic expressions and equations in more useful forms.

- Rewrite rational expressions.

- Perform arithmetic operations on polynomials.

- Understand the relationship between zeros and factors of polynomials.
• Perform operations with complex numbers, and solve quadratics with complex solutions.
• Model periodic phenomena with trigonometric functions.
• Solve trigonometric equations and prove trigonometric identities.
• Find the sums of arithmetic and geometric series, including some infinite geometric series.
• Use concepts of randomness and bias to design surveys and interpret their results.
• Use the normal distribution to model samples and to make inferences as appropriate.
• Use computers to simulate and determine complex probabilities.
• Use margin of error and sample-to-sample variability to evaluate statistical decisions.

Classroom Behavior Requirements
❖ Students must be in their seats when both the starting and exit bells ring to avoid tardiness and late dismissal from class.
❖ Electronic devices must be used only with teacher permission for calculation, math research, and/or note-taking purposes. No social networking. Only graphing calculators can be used on tests.
❖ No eating or flavored drinks allowed in the classroom. Water only.
❖ Sit quietly; wait for instructions. Check board for and listen carefully to instructions.
❖ Take turns talking during whole group discussions. Raise your hand for attention.
❖ Work cooperatively in teams according to your team role to accomplish the team task.
❖ Respect others’ property, space, and opportunity to learn. No disruptions.
❖ Students must bring their textbook, pencil, designated math notebook, graph paper, and calculator (TI-83 graphing calculator recommended for all classes).

Grading
In Algebra 2, we value:
• **Mathematical Understanding:** Understanding is a prerequisite to remembering, connecting, and using mathematics.
• **Skill Proficiency:** Skills are necessary to succeed at the mathematical tasks that students will encounter in these courses and beyond.
• **Problem Solving:** Our students need to learn to use what they know and think logically about problems to devise effective strategies to find solutions.
• **Communication:** Our students need to be able to use mathematical language and talk and write about their ideas effectively.
• **Justification:** Our students should be able to give logical arguments to defend their reasoning both orally and in writing.
• **Mastery Over Time:** We expect our students to continue to build broader and deeper understanding of the ideas in each course as the year progresses.
• **Multiple Ways of Seeing:** We value breadth of thinking. Our students should seek, find, hear, and understand multiple ways to think about a given mathematical task.
• **Effective Team Work:** In order to achieve many of the above-mentioned goals, our students need to work together. They need practice talking about mathematics and building deeper understanding by listening to the reasoning of other students. Therefore, it is essential that we place high value on students learning to work cooperatively.
A broad range of values necessitates a broad range of assessment tools with the indicated weights:

**Individual Tests/Quizzes – 40% of semester grade** (Semester tests are 10% of the semester grade)

**Team Tests/Quizzes – 30%** (Individual test score replaces team score if the individual score is higher)

**Homework and Individual Projects** (including Learning Log and Math Notes) – 30%

Homework is due the day after it is assigned. Work turned in after one week from assignment date will receive 80% of the homework score. Grade summaries are available online at [www.goedustar.com](http://www.goedustar.com). The counselor will help students set up their goedustar account. Extra credit is available to all students at the teacher’s discretion.

In addition to help at a prearranged time before or after school, students are encouraged to explore the homework and extra practice resources available online at such sites as Purple Math, Math Warehouse, Khan Academy, and the West Custer County Library.

Below is the 5-point rubric with which homework sets and test problems will be scored:

<table>
<thead>
<tr>
<th>Score</th>
<th>Criteria</th>
<th>Minimum % Score</th>
<th>Letter Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>• Fully Accomplishes the Purpose of the Task</td>
<td>89.60</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>• Student work shows full grasp and use of the central mathematics idea(s)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Recorded work communicates thinking clearly using some combination of written, symbolic, or visual means.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>• Substantially Accomplishes the Purpose of the Task</td>
<td>79.60</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>• Student works shows essential grasp of the central mathematics idea(s)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Recorded work in large part communicates the thinking.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>• Partially Accomplishes the Purpose of the Task</td>
<td>69.60</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>• Student work shows partial but limited grasp of the central mathematics idea(s)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Recorded work may be incomplete, somewhat misdirected, or not clearly presented.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>• Makes Little Progress Toward Accomplishing the Task</td>
<td>59.60</td>
<td>D</td>
</tr>
<tr>
<td></td>
<td>• Shows little or no grasp of the central mathematics idea(s)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Recorded work is barely comprehensible, frequently incomplete, or occasionally missing.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>• Makes No Progress Toward Accomplishing the Task</td>
<td>0</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td>• Shows no grasp of the central mathematics idea(s)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Recorded work is incomprehensible, consistently incomplete, or frequently missing.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>