

Welcome to Algebra 2

(handout courtesy Mr. Barriger)

Instructor

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Free Periods: 2, 6, 7 in Room 15

Brief Course Description

This course builds on many of the topics covered last year in Geometry. We will do extensive work with circles, circular motion, and the modeling of periodic functions. This will lead to a much deeper understanding of trigonometric functions. The course will also explore exponential, logarithmic and power functions and look at how those functions can be used to model compound growth and decay among other applications. We will explore the relationship between exponential functions and geometric sequences and series. In addition, we will work with matrices, parametric equations, inverse functions, transformations and probability.

Topics will be explored graphically, algebraically, and numerically. Students will do algebraic manipulations manually to maintain skill, accuracy, improve estimation and to prove general results. Students will improve their skills with the graphing calculator as a tool for mathematical analysis.

Problem Solving Approach

Problem solving is central to the process of learning mathematics. Hence, the primary activity in class will be discussing the methods used to solve assigned problems, underlying concepts, and exploring extensions. Our intent is that students can answer most (but not necessarily all) of the questions in the assignments with persistence and effort, but without the aid of tutors or parents.

The problems we will solve are best thought of as “exercises.” Like physical exercises, these exercises require effort and are often not mastered on the first try. Homework will not merely ask you to repeat a process demonstrated in class. Instead, it will require careful reading and focused thought about applying what you know. The introduction to *Math 3* states:

Problem solving requires persistence as much as it requires ingenuity. When you get stuck, or solve a problem incorrectly, back up and start over. Keep in mind that you are probably not the only one who is stuck.... If you have taken the time to think about a problem, you should bring to class a written record of your efforts, not just a blank space in your notebook. The methods that you use to solve a problem, the corrections that you make in your approach, the means by which you test the validity of your solutions, and your ability to communicate ideas are just as important as getting the correct answer.

DO NOT spend a long time on any one problem. Note your approach, formulate your questions and move on. If you have time, you can revisit the problem when you are done.

Texts and Materials

Required text: *Mathematics 3*, written by Mathematics Department faculty at Phillips Exeter Academy (http://www.exeter.edu/academics/84_9408.aspx).

Grades

Mid-semester grades will be determined as follows:

Tests: 60% Quizzes and Warm-up Problems: 20% Homework: 20%

The semester grade is a combination of all your work (80%) and the final (20%).

Tests and Quizzes

Quizzes and tests will cover material from class discussions, homework problems, handouts, and assigned readings. Some questions will ask you to solve problems similar to homework exercises; some will require you to apply what we have studied to an unfamiliar problem.

- Tests and quizzes will typically be closed book and closed notes - most will allow the use of calculators; some will not. A note sheet will generally be permitted.
- There will be 5 tests per semester. These will be 50 minutes in length. They will emphasize the most recent material, but may cover ANY topics discussed
- Unannounced/announced quizzes (~10-15 mins) will be given during non-test weeks. Dutifully working the assigned homework should be adequate preparation for quizzes.
- Unless explicitly stated otherwise, quizzes and tests are individual work.
- By the Honor Code, students are forbidden from discussing the content, format, and level of difficulty of a quiz/test with others until it has been graded and returned to all sections of the course.

Warm-up Problem Sets

Each week you will have 6 warm-up problems that review a topic you have studied previously. These problem sets are intended to be completed at the beginning of class and are generally due at the beginning of each week.

Homework

Homework is essential to learning and will be assigned almost every night. I expect you to make an honest attempt at all the problems on the assignment. The homework grade will be based on whether you have attempted all the problems, not whether they are right. At times, a selected homework problem will be graded based on the clarity, logic, and correctness of your solution. Homework is the basis of our class discussion. Late homework (unexcused) will receive half credit if it is turned in the day after it is due. No other homework will be accepted.

Participation

Students are expected to be active contributors in class. The quality of your class contributions can swing your quarter grade up or down 1/3 of a grade, solely at the discretion of the instructor. To participate fully, you need to get to class on time with your materials (book, protractor, pencil, paper, brain) and be willing to discuss your work and questions on the assigned problems. I expect each student to participate in a meaningful way every day, asking questions, explaining her ideas, and taking down organized notes.

Math Department Guidelines for Learners

Homework

- Homework serves two roles – *exploration* and *reinforcement*. Students will be able to successfully complete some problems and may struggle with others.
- *Exploratory problems* are intended to introduce or extend a concept. Each student is expected to do her best on these problems to stimulate thinking about the key ideas or concepts. Students should bring to class questions that these problems generate.
- *Reinforcement problems* are intended to give students a chance to practice and master skills they have been learning. Students should make every effort to successfully complete these problems to gain confidence, to improve the speed and efficiency of their work, and to identify any gaps in their understanding.

Collaboration

- Generally, students work cooperatively to solve problems. This is true both in class and on homework assignments.
- Learning as a group requires that each participant accept disagreement and ambiguity as a natural part of the process. Each student needs to keep an open mind and be willing to venture into unfamiliar territory with a spirit of camaraderie, adventure, and good humor.
- Each student is responsible for writing up solutions regardless of whether she solved the problem with others. This is an important part of her learning process and solidifies the work she did with others.
- Teachers will be explicit when collaboration is not permitted.

Presentation/Explanation

- Presenting the solutions to problems is an integral part of the learning process for each student. Explaining a solution helps to further solidify her understanding of the material.
- All students will be expected to present and explain problems in class on a regular basis, either in small groups or to the whole class.