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# Syllabus

## Algebra 3 & Analytic Geometry

### 2011-2012 School Year

#### Course Description

This course includes topics from algebra, coordinate geometry, and trigonometry. We work with absolute value and linear and quadratic inequalities; students prove theorems concerning order and absolute value. Students enhance their skills working with rational expressions and expressions containing radicals. The idea of number is extended to the complex numbers. Factoring polynomials, begun in eighth grade, continues to be an important topic; students learn new techniques and practice on cases more difficult than those previously encountered. Students explore the relationship of the solutions and coefficients of quadratic equations. We prove the remainder and factor theorems and apply them to higher degree polynomials. We define integral and rational exponents and practice applying the exponent rules. Students solve systems of linear equations in three variables, and systems of a linear and quadratic equation. Students learn about functions by considering specific functions including polynomial, rational, inverse functions, and functions of a variable that occurs within the scope of a radical. Coordinate geometry topics include the straight line, the circle, distance, midpoint, parallel and perpendicular lines, intersection, and tangency of a circle and line, and regions representing simultaneous inequalities. Throughout the course, students write direct and indirect proofs, and the importance of definitions and statements of mathematical results and their proofs and converses are stressed.

#### Core Goals

- Acquire technical proficiency in each of the topics studied in this course
- Develop the skills required to read, write, discuss, and understand mathematical proofs
- Understand the relationship between the algebraic and geometric representations of various functions
- Formulate mathematical arguments and communicate them clearly, using appropriate mathematical terms and notation
- Acquire the tendency to look for connections between areas of mathematics that might not at first appear to be related

#### Expectations

**Take notes.** In mathematics class, every important point is made *both* audibly in spoken words *and* visually in words, symbols, and drawings that go on the board. When you take notes on a

solution, derivation, or proof, you think through the mathematics along with your teacher. Taking notes raises your understanding to a higher level, because you interpret, judge, evaluate, and organize what you are seeing and hearing in class while it is happening.

**Do homework.** Your success in this course depends on your thoughtfully preparing assignments in time for the next class, in which we will discuss your comments and answer your questions about the assignment you completed. Since each class builds upon the previous one, missing an assignment will leave you unable to follow and understand the material presented in the next class. This cascading effect once begun is hard to stop.

Expect to spend about 4 hours per week outside of class seriously working on mathematics without distractions. If you stick to this, you will find you hardly need to study before and exam, because you will already know the material.

### **Textbook & Resources**

*Mathematics 1: Japanese grade 10.* Kunihiko Kodaira, editor.

### **Web**

I maintain a web site at [www.math.mnrt.net](http://www.math.mnrt.net). This is a valuable resource. If you are absent, you can get the day's assignment and any handouts from class at this site. I update the site every weekday almost always by 5:30 PM.

Here you will find

- the current assignment and all past assignments,
- copies of everything handed out in class including problem sets, and solutions to selected problems, but not including in-class exams and quizzes,
- my notes when the day's topic was especially complex,
- links to sites of mathematical interest.

This is not intended as a substitute for keeping an assignment notebook, which you are required to do. If you are absent from class, check here for the day's assignment and any handouts provided during class. Parents will find the definitive answer to the question: "Do you have any mathematics homework?"

### **Required Materials**

An organized 2-in. three-ring binder with five divider tabs. Pencils. High quality erasers that do not smudge. Red correcting pencils. 6-in. plastic see thru ruler.

### **Course Outline**

- The real numbers: classification, calculating expressions containing radicals
- Sets: intersection, union, and complementary sets
- Polynomials: addition, subtraction, multiplication; expansion; factoring
- Rational expressions; division of polynomials
- Quadratic equations with real and complex roots; relations between solutions and coefficients
- Systems of equations consisting of a linear and quadratic equation
- The Remainder, Factor, and Rational Root Theorems
- Solving selected higher degree equations
- Solving quadratic inequalities

- Proving equalities and inequalities; direct and indirect proof
- Plane figures and expressions: straight lines, circles, regions represented by inequalities
- Real valued functions and their graphs

## Grading & Evaluation

Your trimester mastery grade is determined by full period exams, brief quizzes, and any graded assignments. Your scores on quizzes will make up 20% of your trimester grade. Exams and graded assignments will make up 80%. Exams and quizzes will have strict time limits, because they seek to assess your level of proficiency with the material that we recently covered. Proficiency often means that you can work a problem in a couple of minutes using the recent material we covered, rather than suffering 15 minutes of furious labor because you were unfamiliar with the recent material we covered.

**It's a fact: homework is the single most important ingredient in determining your grade on examinations and quizzes, and therefore your course grade. If you slack off on homework, you will get a poor course grade.**

A quiz may be given at any time without prior announcement. Expect a short quiz about once per week. Your lowest quiz score will be dropped. Exams will be announced well in advance and will require a full class period to complete.

## Absence Policy

If you are absent for a quiz or an exam, *you* are expected to arrange to make it up. If you miss a class meeting, borrow another student's notes to copy. Discussing those notes with the other student will further benefit both you and your kind classmate.

## Late Work Policy

Homework is considered practice, so you will not be graded on it. There will be some graded assignments including take-home exams. The MCDS High School late work policy will apply to graded assignments. This policy states that for each day work is late, 10% will be deducted from the grade, up to 50%. If the work is never turned in, it will count as zero.

## Getting Help

Please seek my help outside of class. I teach because I love to do mathematics with you. The student who makes the extra effort to get help when needed makes a very good impression on the teacher. Do not expect the impossible, though. If you have not kept up with assignments, meeting with me for an hour as the exam date approaches is not going to do you much good. If that was all it would take for you to do well, I would not be giving all these assignments in the first place. Remember that asking specific questions rather than saying, "I don't get it" will bring you the most useful help as well as evidence the effort you made in trying to master the material.

**Signature**

I have read and discussed this syllabus with my child \_\_\_\_\_  
Parent's Signature

I have read and discussed this syllabus with my parent(s) \_\_\_\_\_  
Student's Signature