Mathematics 10: Algebra III and Analytic Geometry
Course Syllabus
2007-2008

❖ Course Description

This course includes topics from algebra, coordinate geometry, and trigonometry. To our understanding of the real numbers, we add the idea of order. We work with absolute value and linear and quadratic inequalities; students prove simple theorems concerning order, absolute value, and inequalities. Students enhance their skills working with radicals and rational expressions involving polynomials. 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 the exponent rules. Students solve systems of linear equations, 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. Analytic properties of functions are emphasized. Coordinate geometry encompasses the straight line, the circle, distance, midpoint, parallel and perpendicular lines, intersection, and tangency of a circle and line, and regions representing simultaneous inequalities. Trigonometry begins with trigonometric ratios, is generalized by the unit circle, and includes values of the functions at common angles, the law of sines, the law of cosines, the area of a triangle, and Heron's formula. Students prove some important identities. We stress the importance of definitions and statements of mathematical results and their proofs and converses. Throughout the course students write direct and indirect proofs. Combinatorics includes permutations, combinations, and Pascal's triangle.

❖ Textbook

Mathematics 1: Japanese grade 10. Kunihiko Kodaira, editor You must return in good condition the same textbook you were issued.

❖ Mastery Grade

Your trimester mastery grade is determined by full period exams, brief quizzes, and any graded assignments. Homework is *not* figured into the mastery grade. Your scores on quizzes and any graded assignments will make up 20% of your trimester grade. Exams will make up 80%.

❖ Quizzes and Exams

You can expect
- a quiz nearly every week,
- an exam at the end of a topic or at the end of a group of related topics.

A quiz may be given at any time without prior announcement. Your lowest quiz score will be dropped. Exams will be announced well in advance and will generally be 60 minutes long. If you are absent for a quiz or an exam, *you* are expected to arrange to make it up.

❖ Effort

Good effort is shown when
- you do all homework carefully and thoughtfully, even if you do not get the correct answer;
- you ask specific questions rather than saying, "I don't get it";
- you are eager to learn at the very start of class, as evidenced by being quietly seated at an uncluttered desk, and equipped with pencil (not pen), eraser, notebook, and homework;
- you thoughtfully, respectfully, and politely contribute to class discussions;
- you ask questions to better understand a topic or to explore it;
- you start without delay on in-class work and stick to it; and
- you take notes during class and keep an organized notebook.

❖ Behavior

Good behavior is shown when
- you meet customary social expectations (for example, speaking politely);
- you follow our class guidelines.

We will decide on guidelines that create an environment of joyful and purposeful learning for everyone.

❖ Notebooks

An organized three-ring binder is required.

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❖ Class 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 do the mathematics along with your teacher. It is like climbing a mountain step by step with an experienced guide, rather than merely hearing or seeing some directions. Taking notes raises your thinking to a higher level, because you interpret, judge, evaluate, and organize what you are seeing and hearing in class while it is happening.

❖ Homework

Doing assignments on time is the most important action you can take to succeed in mathematics.

In mathematics, your learning depends on your thoughtfully working the assigned problems and staying caught up. This is the best way to prepare for exams and to understand new material as it is presented in class. **Expect 40 minutes of work outside of class for every class meeting** (since class meets four out of five days, this is 2 hr 40 min a week).

In sports, music, and theater you play or perform like you practice. Sloppy practice, sloppy performance. Just as you would insist on doing your personal best when practicing a sport at which you desire to excel, so too you should insist on your best when you practice mathematics.

❖ Web resource

I will maintain a simple web site at **http://math.mnrt.net/** . I hope that parents and students will make use of this. If you are absent, you can get the day's assignment and any handouts from class at this site. I usually update it by about 5:30 p.m.

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,
- 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 given during class. Parents will find the definitive answer to the question: "Do you have any mathematics homework?"

Please follow the link for *Standards for Success*. These excellent standards will help you to understand how and why what we are doing in class is preparing you for future success.

❖ 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.

❖ Knowing and doing mathematics

Mathematics is *not* a grab bag of facts, procedures, techniques, and tricks. Knowing mathematics means using a few basic ideas with skill, insight, and understanding. It means you can often solve a problem seemingly *unlike* any you have already done or seen done.

You improve in mathematics through thoughtful and purposeful practice and discussion. Watching someone else do mathematics and feeling like you get it is no guarantee that *you* can do it on your own. Jump in! Question, discuss, argue, and practice!

❖ Parents

Thank you for reviewing this with your student. Throughout the school year, please contact me when you have questions, comments, or concerns. I check e-mail whenever I return to my desk. E-mail will catch my attention the quickest, then we can arrange to talk by phone or meet in person. I try to check phone messages at the end of the day.

❖ Parent signature

Please review this with your parents and ask a parent to sign it below. I will not collect this, but I will check in class for a parent's signature.

Parent signature _____ .