Grade 11 Mathematics, 2013-14 School Year

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Advanced Algebra and Trigonometry Syllabus
2013-14 School Year

Course Description

Essential areas covered are exponential, logarithmic, and trigonometric functions, and finite progressions. Trigonometry includes the trigonometric form of a complex number and de Moivre's theorem. Progressions includes writing proofs by mathematical induction.. After learning enough combinatorics to understand the binomial theorem, we prove the theorem by mathematical induction. We begin calculus by considering finite, and then infinite, progressions. This will introduce students to the idea of limit upon which calculus rests. Indeed, calculus may reasonably be considered the study of this idea and its implications. Topics will include limit, continuity, Intermediate Value Theorem, the derivative, applications of the derivative, and possibly an introduction to integration. Throughout the year, the ability and inclination to visualize or sketch the graph of a function is stressed. We emphasize the importance of definitions and statements of mathematical results and their proofs. Students write direct and indirect proofs.

Core Goals

- Learn to master a content rich topic in mathematics, such as trigonometry, by understanding its first principles so well that you can develop the content from them on your own.
- Acquire the tendency to look for connections between areas of mathematics that might not at first appear to be related, then take advantage of such relationships to work a problem that initially seemed intractable.
- Acquire technical proficiency in the topics studied in this course.
- Read and write mathematical proofs that are more sophisticated than those you have previously considered.
- Acquire some understanding of the limit
- Skillfully apply the fundamental ideas of calculus when creating proofs, deriving formulae, and working applied problems

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 6 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.

Required Materials

Textbook & Resources
Basic Analysis, Japanese grade 11. Kunihiko Kodaira, editor.
Calculus, 8th edition, Varberg, Purcell, Rigdon
Student Solutions Manual for Calculus, 8th edition, Varberg, Purcell, Rigdon

Web

I maintain a web site at 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 three-ring binder with five divider tabs is required. For students taking the IB Mathematical Studies Exam, an IB approved graphing calculator is required. Students who are not taking this examination will find an inexpensive scientific calculator entirely satisfactory.

Course Outline

- Exponential and logarithmic functions
- Trigonometric functions
- Finite progressions
- Mathematical induction
- The Binomial Theorem
- Basic combinatorics
- Limit, continuity, Intermediate Value Theorem
- The Derivative

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.