Grade 13 Mathematics, 2014-15 School Year

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Calculus II Syllabus
2014-15 School Year

Course Description

This course will begin with a careful treatment of infinite sequences and series. We will develop a variety of tests to determine whether or not a given series converges and whether or not we can know what a convergent series converges to. We then consider calculus in three dimensions. In the process, students become familiar with several coordinate systems and three dimensional vectors.

Core Goals

- Extend fundamental ideas such as that of limit to functions of several variables.
- Technical proficiency in multivariable calculus.
- Understanding the fundamental ideas that underlie techniques.

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 when we discuss your comments and answer your questions. 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.

Your teacher respects your time. Homework will very rarely be given on weekends and never on

vacations. There will be no projects to complete outside of class. Expect to spend about 30 minutes per evening seriously working on mathematics without distractions.

Participate in class. You will understand the ideas of mathematics more quickly and more deeply by participating in class discussion. When your teacher or another student asks you to elaborate on an idea you have expressed, you have a wonderful opportunity to explore your own thoughts and practice articulating them clearly. Clarity of expression and clarity of thought develop together. The give and take of classroom discussion, though messy, is an essential and irreplaceable element in building your understanding of mathematics.

If as described above, you take notes, do homework, and participate, then you will find your understanding so solid and your skill so proficient that you will not need to study for exams.

Textbook & Resources

Textbooks. *Calculus, 8th edition*, Varberg, Purcell, Rigdon. *Student Solutions Manual for Calculus, 8th edition,* Varberg, Purcell, Rigdon. *Thomas' Calculus including second order differential equations*, Weir, Giordano.

Web. I maintain an easy to use web site at **www.math.mnrt.net** . This is a valuable resource. If you are absent from class, check here for the day's assignment and any handouts or problem sets that were given out in class. If you lose a problem set or a handout, get another one here. Parents will find the definitive answer to the question: "Do you have any mathematics homework?" I update the site every weekday almost always by 5:30 P.M.

At **www.math.mnrt.net** you will find

- The current assignment and all past assignments.
- PDF copies of **every** item handed out in class.
- Copies of exams and quizzes are not included.
- Notes, if the day's topic was especially complex.
- An electronic copy of your textbook.
- Links to sites of mathematical interest.

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 ($12) scientific calculator entirely satisfactory.

Course Outline

- Sequences and series
- Vector functions and space curves, velocity and acceleration
- Arc length and curvature, normal and binormal

- Motion in space, planetary motion
- Partial derivatives
- Tangent planes and normals
- Linear approximation
- Gradient and total differential
- Local and absolute extrema
- Lagrange multipliers
- Higher derivatives, exact differentials
- Double and iterated integrals, including polar coordinates
- Applications of double integrals
- Triple and iterated integrals, including cylindrical and spherical coordinates
- Applications of triple integrals, volume and surface areas.
- Vector fields, surface integrals and line integrals
- Flux, Green's theorem
- Divergence Theorem, Stokes' theorem

Grading & Evaluation

- Trimester grade determined by full period exams, brief quizzes, and any graded assignments.
- Quiz scores count no more than 20% of your trimester grade.
- Exams and graded assignments count no less than 80% of your trimester grade

Exams and quizzes will usually have strict time limits, because they seek to assess your level of proficiency. Proficiency often means that you can work a problem in a couple of minutes using the content we covered, rather than suffering 15 minutes of furious labor because you were unfamiliar with that content. Expect a short quiz about once per week, but 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. Typically the exam will be given no sooner than two weeks after we have finished the material the exam covers.

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. If you want to do some homework, you might check **www.math.mnrt.net** . I sometimes post assignments during the day, instead of at the end of the day, in case an absent student feels like doing homework. I definitely do not expect you do homework while you are ill.

Late Work Policy

Homework is considered practice, so you will not be graded on it. There may be some graded assignments

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.