Calculus I **Isaiah Wood**
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Course Description

Calculus is the study of continuous change. Generally, it is broken into three parts: Differential Calculus, Integral Calculus, and Multivariable Calculus. This course will cover a quick review of fundamentals before beginning Differential Calculus and will end with an introduction to Integral Calculus.

This course will emphasize the importance of proof and the development of equations. The techniques used to identify a pattern, create an equation, test, expand, and perfect our ideas will be critical as we continue through the year. I also hope to include some historical background and older texts for us to work through and understand the development of the ideas that have become fundamental to mathematics.

Course Objectives

Students will study functions and their many traits. We will discover what it means for a function to tend to a limit, whether it is finite or infinite. We will study tangent lines, slopes, and areas of functions. Particularly, we will focus on the intricacies of curved functions and all the many things we can learn about them as well as their applications.

By the end of the year students will be able to:

- Define a Limit
- Calculate limits at a point and infinity
- Use the definition of a Derivative to Identify the slope of a function
- Solve Problems with Product, Quotient, and Chain Rules for Derivatives
- Use Implicit Differentiation Techniques
- Calculate Extreme Values and Sketch a Graph
- Use Optimization to Identify Minimum and Maximum values
- Use the two parts of the Fundamental Theorem of Calculus
- Do basic Integration and Antiderivatives

Topics of Study

<u>First Semester</u>
Chapter 1: Review of Algebra
Chapter 2: Limits and Continuity
Chapter 3: Derivatives

<u>Second Semester</u>
Chapter 3 Continued
Chapter 4: Applications of Derivatives
Chapter 5: Introduction to Integrals

Daily Course Materials

The Textbook is *Rogawski Calculus – Early Transcedentals* (provided by the school).

Pencils AND erasers, don't forget the eraser. You will make mistakes.

Notebook and/or folder with paper are necessary. Graph paper is recommended as an addition to lined paper.

A TI-83 or TI-84 variant Calculator is acceptable. It needs to be a graphing calculator! Do not use a TI-89 or symbolic graphing calculators. We will not rely on our calculators; they will be used sparingly.

Policies and Procedures

This is not an exhaustive list of all policies and procedures.

- Please use the restroom before class or inform me at the beginning of class to go
- Line up outside the classroom and stop all conversations when class begins
- Have all of your classroom materials when entering the class
- Conduct yourself with respect, courtesy and patience
- No food or drinks allowed in class, aside from a sealed water bottle
- Do your own work on every assignment. Cheating of any kind will not be tolerated
- Absences will strongly affect your ability to do math, try your best to be in class and on time
- If you are absent or miss class, it is your responsibility to gather the assignments and notes for your fellow students, so be good and responsible friends!
- Adhere to the school Honor Code

Grades

- In Class Participation (25%)
- Homework/In-class work (25%)
- Quizzes (20%)
- Tests (30%)

Sense of wonder and depth of inquiry will have an effect on all of your grades. To achieve full credit, you must show a sense of wonder and depth of inquiry. This is achieved by having a positive attitude, asking quality questions, good effort on assignments and trying your best.

Assessments

Tests will always be announced at least one week in advance. I usually announce them a month or more in advance, even. Quizzes and Tests are closed book. The best way to prepare for these is to make sure you don't fall behind: do your homework and ask all your questions in a timely manner.

Make-ups for Tests and quizzes should be done within one week. If you miss a test and do not make it up within one week you will receive a score of 0.

Participation

Participation is important for being successful in class. Daily participation will be graded with the following scale:

7/10 is the standard grade for a student who is in class, but passive.

Students can earn a +2 for volunteering to present to the class.

Students can earn a +1 for asking/answering questions in class.

Students earn a -1 for being unprepared for class (leaving book, notes, etc. in locker)

Students earn a -1 for being late to class

Students earn a -1 for each minor redirection (being asked to be quiet, stop talking, etc.)

Students earn a -2 for each major redirection (throwing things, sleeping, repeated corrections)

Students earn a 0 for an unexcused absence or if they get a detention in class.

Late Homework

Turning in an assignment late is something students should avoid. If there is a valid reason for not completing the homework the student should email or speak to the teacher to let them know. Otherwise, homework that is late by one day will receive a 50% deduction in score and homework two or more days late will receive a score of 0.

Homework and Assignment Standards

Failure to follow any of these standards *will* result in lost points.

- Please do all homework with pencil. Homework written in pen will get a 10 pt deduction. (out of 50)
- In the top right corner of each paper write your name, date and page number of the assignment.

- Copy all problems and diagrams exactly as they appear in the text. This includes word problems!
- Show every step
- Between problems make sure there is space; skip a line
- Attempt every problem!
- If applicable, check your answer
- Your work must be your own! You may collaborate, but do not copy
- Students will spend an average of 25 minutes per night on homework.

Homework is graded with the following point distribution:

5 pts for the header on each page

5 pts for Bell Work

5 pts for organization and legibility. This includes drawing relevant diagrams

10 pts for showing work, even if wrong

10 pts for attempting every problem

15 pts for the correct answer on randomly chosen problem(s)

Encouragement and Tips for Success

Mathematics is very difficult. Mastery takes lots of practice and perseverance. When you feel like the numbers are trying to fight with you, take a breath and try again with a new perspective on the problem.

Take notes during class and use them on homework assignments.

Check your assignments after they are graded and review them to make sure you can solve each problem.

Participate in class. Don't be afraid to work out a problem on the board, the best way to learn is to teach. Take the opportunity, even if you are unsure.

Prepare for class by doing homework beforehand and reading about the topic of tomorrow's class today, when possible.

Seek help. Math is hard. Ask questions; don't wait until you are struggling. If you don't understand one thing it will come back to haunt you later.

And lastly, have fun. Work with your friends on problems. Find other ways to solve equations. Think of applications and draw conclusions about things you have learned. Math is infinite and there are endless possibilities.