Math 251 Churchill High School and Lane Community College Winter Trimester 2018-2019

Differential Calculus

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Course Description

MTH 251 is a first-term calculus course that includes a selective review of precalculus followed by development of the derivative from the perspective of rates of change, slopes of tangent lines, and numerical and graphical limits of difference quotients. The limit of the difference quotient is used as a basis for formulating analytical methods that include the power, product, and quotient rules. The chain rule and the technique of implicit differentiation are developed. Procedures for differentiating polynomial, exponential, logarithmic, and trigonometric functions are formulated. Analytical, graphical, and numerical methods are used to support one another in developing the course material. Opportunities are provided for students to work in groups, verbalize concepts with one another, pursue guided project activities, and explore concepts and applications using technology. Use of a programmable graphing calculator is required.

Objectives: Upon successful completion of this course, the student will be able to:

1. understand the definition of the derivative as the limit of the difference quotient for a function.
2. be able to use the definition of the derivative to find derivatives of certain elementary functions.
3. find derivatives numerically utilizing technology.
4. visualize and interpret derivatives graphically.
5. understand and use the derivative of a function as a function in its own right.
6. understand the development and use of procedures for differentiating polynomial, exponential, logarithmic, and trigonometric functions, including the inverse sine & inverse tangent functions.
7. use the power, product, quotient, and chain rules to find derivatives of functions.
8. use the technique of implicit differentiation to find derivatives of implicitly defined functions.
9. find equations of tangent lines to the graphs of functions at specific points.
10. understand local linearity and that the tangent line to the graph of a function at a specific point is the best linear approximation for the function at that point.
11. use linear approximation to estimate function values.
12. use the methods and techniques of differential calculus to solve a variety of application problems, including optimization and related rate problems.
13. use a programmable graphing calculator as an effective tool in confirming analytical work and obtaining numerical and graphical results related to differential calculus.

Required Materials

1. *Calculus, Single Variable*, 3rd edition, by Hughes-Hallett, Gleason, et al. We will cover selected sections from Chapters 1, 2, 3, and 4 of the text.
2. A programmable graphing calculator: the TI-83 Plus or TI-84 Plus is recommended.
3. Graph paper. A graph paper notebook would work best.

Class Format

Most classes will begin with a warmup. These warmups are for your own benefit. They will be the types of questions you'll see on quizzes or tests. During warmup time, attendance will be taken. After the warmup, we will go over homework questions, then proceed to new material. There will be quizzes or in-class assignments on some days instead of new material.

Classwork
Classwork is an extremely important part of your learning. Math is a very interactive discipline where practice is vital to your understanding. After most lessons you will have an in-class assignment. These will be checked or turned in by the end of class for a score on that assignment. When time is given in class to work on class work or homework you are expected to be working on it. This means you will be working on Calculus and no other subject. Since my class is Calculus you will lose credit for the assignment given if you are working on another subject's work or not working at all. Throughout the course of the trimester we'll have approximately 40 of these assignments. If you have an excused absence you will be excused from the assignment. However, you can still do them. These assignments will be posted on my blog. If you decide to do the assignment please show me at the beginning of class on the day you return.

Homework
Every once in awhile you will have a homework assignment that will be for extra credit. The points will be added to your test scores. These problems are more thought provoking and difficult. They will be due on test day for the chapter we're working on.

Tests and Quizzes
On the last day of every week we will have either a test or a quiz. You will be allowed to use notes on most of the quizzes but not on the tests.

Late Work
No late classwork or homework is accepted. Classwork is due at the end of class and homework at the end of the week. If you miss a quiz or test, you have one week from your return to make it up.

Grading
You will be assigned a letter grade on your transcript based on the following breakdown: 70% of your grade will be based on tests, 15% on quizzes, and 15% on classwork. You may choose to take this class as a Pass/No Pass class. You have to let me know by midterm grading if you choose this option.

Attendance Policy
I am required to submit attendance online within the first ten minutes of class. If you come to class after the ten minutes are up, you will be required to go to the front office to get an admit slip.

Electronics Policy
Cell phones are a distraction to your learning. If I see them out during class, I will give you a choice to give them to me for the period or to leave for the class.

Getting Help
1. Come to office hours.
2. Consult with classmates and form study groups – math doesn't have to be a solitary struggle.
3. Get help from a free or paid tutor.
4. Consult your lesson notes which will be posted to my website.

Si necesita más información en Español sobre esta clase, por favor comuníquese con María Ladona al 541-790-5151 o por correo electrónico schaad_ma@4j.lane.edu.