Advanced Placement Calculus – AB

Course Syllabus – 2018-2019 – Tourtellotte Memorial High School

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Overview:

This course is a rigorous and theoretical study of calculus. It follows the syllabus for the AP level of the advanced placement program. It is expected that all members of the class take the Advanced Placement exam in May. The problem solving and investigation components of this course are based upon the use of a graphing calculator with a table option. Regular and frequent access to a graphing calculator for class activities as well as homework is required. Students will demonstrate and value personal responsibility, character, and ethical behaviors to be successful in this college-level course.

In order to be successful, students must have a solid, rigorous foundation in algebra, geometry, and trigonometry. Specifically, students **must** have a firm understanding of functions and their properties. Students must understand how to manipulate functions algebraically and graphically. Concepts such as domain, range, zeros, and intercepts must be understood. You should be familiar with algebraic functions (roots, quadratics, etc.) and trigonometric functions (sine, cosine, etc.).

Instructional Methodology:

Early on, learning activities will be quite teacher directed as we build the skills necessary for the application of calculus. Ultimately, however, in-class activities will become more focused on student-centered learning. We will regularly consider problems either taken from previous AP exams, or problems of a similar nature in small groups at first in order to hone students' problem-solving strategies.

Technology:

Technology plays a vital role both in developing and applying concepts of calculus. It is therefore required that all students enrolled in AP Calculus AB have access to a graphing calculator both in class and at home. Additionally, the College Board administered exam at the end of the year has sections where a calculator is required. A list of approved calculators can be found on the College Board website. There are calculators available that you may check out from the instructor for a year. There is a contract that must be signed by both the student and the parent explaining the responsibilities involved and the consequences of not returning the

calculator in satisfactory condition. You are encouraged to have your own calculator, however. It will serve you well. My personal recommendation is for any edition of the Texas Instruments calculators TI-83 or TI-84. (I personally still have my TI-85 from my AP Calculus days; the TI-85 is a tad less user-friendly).

The College Board AP exam also has non-calculator active sections as well. Accordingly, there will be some assignments, problems, quizzes, and sections of exams where students will be forbidden from using any technological aids.

Beyond the calculator, there are a variety of other technological sources to which we will turn for insight into Calculus. The website http://www.desmos.com is a terrific resource for graphing functions and for understanding how those graphs change as we make algebraic changes to the function's equation. The website http://www.wolframalpha.com can perform a dizzying array of mathematics, including helping us to solve calculus problems. The website https://www.khanacademy.org contains a wealth of videos explaining the ideas of calculus, along with a selection of practice problems. We will occasionally make use of all of these, but be warned—none of these are available to students on in-class assessments or on the AP exam.

Students are also required to write papers which must be typed using an equation editor of some type so that all papers can be submitted via email.

Assessment:

20% - Homework and Timed AP Practice Exercises

Homework completion is very important for a number of reasons. First, it helps you to realize the concepts from the lesson you understood and those you did not understand. It gives you questions to present in class the following day, which will help initiate a discussion. Second, it helps me to know what you understand and where you are having struggles. The attention to detailed, written explanations sheds light on the level of understanding that you have of these calculus concepts. Additionally, your detailed work and written explanations set you apart from other students, and it is only those students who work the hardest and who master the content with deep understanding who deserve to make a top grade in the class and on the AP exam. Homework packets will be due at the end of each unit for a 50-point completion grade. Throughout the unit, you will periodically have HW quizzes during which you will provide solutions to various HW problems. These will be graded on accuracy and will be recorded as 15-point grades. Typically, I will choose 5 problems for which you must provide your solution from your HW assignment.

A few times each quarter, you will be required to complete in-class assessments that consist of AP formatted questions. These will consist of one free response item and 9 multiple choice items and you will be given 20 minutes to complete them. These will be recorded as 18-point grades.

30% - Quizzes

Quizzes are given periodically and are always announced on the course website. If the assignment sheet says that there will be a quiz, then you will have a quiz whether or not I told you in class that there will be a quiz. Quizzes are typically always a combination of 6 multiple choice problems and 1 free response problem. Quizzes will either be totally calculator permitted or totally non-calculator permitted. There will

be a total of 18 points available on each quiz and a grade out of 100 will be recorded. Quizzes are timed to 44 minutes.

50% - Exams

All exams will be announced and will be in true AP format, with both calculator active and non-calculator active sections. Each calculator active section will have 7 multiple choice and 1 free response item. Each non-calculator active section will have 7 multiple choice items and 1 free response item. Students will be given the calculator active section on day 1 (the first 44 minutes). The non-calculator section will be on day 2 (the second 44 minutes). On day 2, the students can work on both parts. The exam is over at the bell on day 2.

You will receive 100 point grades for each test. In other words, a 100-point grade will be recorded for the calculator active section and for the non-calculator section. On each section, there is a total of 18 points available. You will receive a percentage grade out of 100 based on the scale in the table below. Because exams contain cumulative questions that assess not only material for a particular unit but also material from past units, an adjusted scale like this must be used. It is important to understand that you will only be graded according to this scale if all of your HW for the unit has been completed and on time. Any lapse in this expectation and your tests will NOT be graded according to the adjusted scale.

18	**100%**
16-17.9	**95%**
15-15.9	**90%**
13-14.9	**85%**
11-12.9	**80%**
9-10.9	**75%**
7-8.9	**70%**
5-6.9	**65%**
0-4.9	**60% or less**

Materials Required:

1) 3 Ring Binder – Preferably a 2'' binder because there will be many hand-outs
2) 4 Dividers – General Information, Free Response Example Problems, Notes, Homework
3) Tablet of graph paper that stays in the binder
4) Pencils
5) A graphing calculator acceptable for use on the AP Exam
6) Textbook – Larson, Ron, and Bruce H. Edwards. *Calculus of a Single Variable—AP Edition*, 9th ed. Brooks/Coles: Cengage Learning, 2010

Units: (Any changes to this schedule will be posted on the course website)

Chapter P: Preparation for Calculus -- (2 days)

Chapter 1: Limits and their Properties -- (12 days – one quiz, one test)

Chapter 2: Differentiation -- (30 days – four quizzes, one test)

Chapter 3: Applications of Differentiation -- (33 days – three quizzes, one test)

Chapter 4: Integration -- (27 days – two tests)

Chapter 5: Logarithmic, Exponential, and other Transcendental Functions -- (27 days – two tests)

Chapter 6: Applications of Integration -- (12 days – one test)