AP Calculus 1

2017-2018

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What is AP Calculus 1?

Calculus 1 is the first college level course in a typical 3 course Calculu series. Calculus is the study of changing functions. Now that you have mastered the foundations of Algebra, these concepts will be generalized as we study Calculus to see how functions change and relate to each other. We will be studying the big ideas of Limits, Derivatives, and Integrals with the Fundamental theorem of Calculus.

This course is a college level course designed to prepare you for the Advanced Placement (AP) Calculus AB test in the spring. Calculus is the mathematical basis for most college level science and engineering classes, so this course will meet the prerequisite for many of these college courses.

The A.P. Test

We require that all students take the Advanced Placement test in the Spring. Here are some reasons why:

- The AP test is a major focus for the year. Everything we study will lead up to several weeks of intense test preparation and application of the big ideas of Calculus. This is a rewarding experience that culminates with completion of the AP exam on May 15th .
- A passing score is a gateway to guaranteed college credit. This is not always true about SOU and RCC credit.
- The test scores provide a national measuring stick for students and teachers.
- Many of the prestigious universities are requiring AP test scores for admissions

Grades

The standard grading scale will be used:
90%-100%   A
80%-89%   B
70%-79%   C
Below 69%   F
All exams must be passed to pass the class

Points Breakdown
80%   Exams
10%   Quizzes
10%   Assignments

What you need in class:

- Pencils, Pens, Spiral
- TI-Nspire CAS CX or TI-89 calculator
- A brave, willing attitude!

Textbook: Calculus of a Single Variable, Ninth Edition;
Ron Larson 2010

Unit Tests

Standard tests are comprehensive exams that encompass several weeks of material. In most cases, several days will be dedicated to review. For the most of the tests, a practice test is made and students are expected to complete. A vast majority of the problems will be application problems with various parts (like the AP test). Most chapter tests have two parts: calculator and non-calculator. STUDENTS MUST PASS ALL STANDARD TESTS TO PASS THE CLASS.

I cannot imagine a student meeting their potential on these tests without hours of study. It is up to the student how those hours are dispersed throughout the week of the test.

Quizzes

Regular quizzes are small exams that incorporate class discussions and assignments. Some quizzes will be advertised on specific days, while other will be of a surprise nature. Students that actively participate/communicate in class should do very well on these quizzes.

Homework

Homework is merely practice for quizzes and tests. Students that habitually do their assignments and ask pertinent questions in class will have much more success on quizzes and chapter tests.

Absent Work

Make-up test and quizzes should be made-up as soon as possible. Make-up test must be taken within 2 school days of the exam. Make-up tests may be different and more difficult than the original test to compensate for the extra preparation time.

Unit Reassessment Policy: *You will be allowed to retake assessments (within 2 weeks after test is returned) and* <u>*replace their score*</u> *for any learning target portion of the assessment if you meet the following criteria:*

1. *You must have completed all of the assignments for the unit, and*
2. *You must come in to correct and discuss the first assessment with Mr. Knight.*
3. *You must demonstrate understanding of the concepts* <u>*before re-testing*</u>

Curricular Requirements

The following are concepts that will be learned by students during this year in Calculus 1 as determined by the College Board.

- CR1: The course is structured around the enduring understandings within…
    a. Big Idea 1: Limits.
    b. Big Idea 2: Derivatives.
    c. Big Idea 3: Integrals and the Fundamental Theorem of Calculus.
- CR2: The course provides opportunities for students to…
    a. reason with definitions and theorems.
    b. connect concepts and processes.
    c. implement algebraic/computational processes.
    d. engage with graphical, numerical, analytical, and verbal representations and demonstrate connections among them.
    e. build notational fluency.
    f. communicate mathematical ideas in words, both orally and in writing.
- CR3: Students have …
    a. access to graphing calculators.
    b. opportunities to use calculators to solve problems.
    c. opportunities to use a graphing calculator to explore and interpret calculus concepts.
    d. access to a college-level calculus textbook.

Calculus
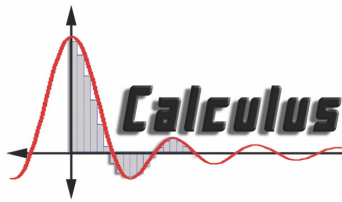
A technologically Advanced (semi-paperless) Classroom

The technology in our world is growing exponentially (Moore's law) every day. Today's high school students today need to be prepared to work in careers that may not even exist today using more advanced technology then we possess today. In this course students will be working with digital curriculum and resources daily.

Google Classroom:
Classroom.google.com

Online Textbook:
**www.knightmath.com/
calculus/text.php**

User: calculus
Password: Newton

- **Digital Textbook:** Calculus of a Single Variable, Ninth Edition; Ron Larson 2010
  Our textbook is available online through Google Classroom or at www.knightmath.com/calculus
  If connecting to the internet is a problem, accommodations will be made…just talk to me.
- **Google Classroom:** This is where students will do online assignments, participate in online class discussions, find helpful videos, and turn in digital copies of written work.
- **Internet Access:** If students have limited internet access at home, they can use school iPads or computers (in labs and library) during before school, during cave time, during office hours, or after school (library)

**Technology Policy: We have the privilege of having a class set of iPads which we will use often. Students are expected to use these responsibly. Cell phones should be away in your bag during class.

**Other Course
Documents:**
www.knightmath.com/
calculus

Need Help? We will have three intervention times each week – 2 on Tuesday and 1 on Wednesday. Students can come get help then or during lunch in my room.

1. Helpful resources like videos, examples, and notes are available at www.calcchat.com and/or www.knightmath/precalculus
2. It is important to keep up with your work and ask questions right away when you need help. I am happy to help. Don't hesitate to ask!

Differentiation strategies available in this class may include extension activities, acceleration, or other activities, depending on the needs of the student.

How to Succeed in Calculus:

- *Read through the notes and online textbook.*
- *Begin working on the online and written assignments on the first day they are assigned. Don't put them off. .*
- *Complete all assignments as best as you can.*
- *Use online resources like videos and discussion forums to learn better and help others.*
- *Make sure you study for tests and complete unit reviews.*

AP Calculus 1: 1ˢᵗ Semester Outline

			Topic	Larson Text	Timeline
First Semester	Unit 1: Limits and Their Properties	A	Finding Limits Graphically and Numerically	1.2	Sept. 11-29 (3 wks)
		B	Evaluating Limits Analytically	1.3	
		C	Continuity and One-Sided Limits	1.4	
		D	Infinite Limits	1.5	
	Unit 2: Differentiation	A	The Derivative and the Tangent Line Problem	2.1	Oct. 2 – Nov. 9 (6 wks.)
		B	Basic Differentiation Rules and Rates of Change	2.2	
		C	Product and Quotient Rules and Higher-Order Derivatives	2.3	
		D	The Chain Rule	2.4	
		E	Derivatives of Logarithms and Exponentials	5.1, 5.4	
		F	Derivatives of trigonometric Functions	5.6	
		G	Implicit Differentiation	2.5	
			Differentiation Gate Exam		
	Unit 3: Applications of Differentiation	A	Extrema on an Interval	3.1	Nov. 13 – Dec. 15 (4.5 wks)
		B	Rolle's Theorem and the Mean Value Theorem	3.2	
		C	Increasing and Decreasing Functions and the First Derivative Test	3.3	
		D	Concavity, the Second Derivative Test, and Curve Sketching	3.4, 3.6	
		E	Limits at Infinity and L'Hospital's rule.	3.5	
		F	Related Rates	2.6	
		G	Optimization Problems	3.7	
	Unit4: Integration	A	Antiderivatives and Indefinite Integration	4.1	Jan 2 – 25 (4 wks)
		B	Area	4.2	
		C	Riemann Sums and Definite Integrals	4.3	
		D	The Fundamental Theorem of Calculus	4.4	
		E	Integration by Substitution	4.5	
		F	Numerical Integration	4.6	
Second Semester	Unit 5: Integrating Transcendental Functions	A	The Natural Logarithmic Function: Integration	5.2	Jan 29 – Feb. 16 (3 wks.)
		B	Inverse Functions	5.3	
		C	Exponential Functions: Integration	5.4, 5.5	
		D	Inverse Trigonometric Functions: Integration	5.7	
			Integral Gate Exam		Feb. 20-23
	Unit 6: Differential Equations	A	Slope Fields and Euler's Method	6.1	Feb. 26 - Mar. 15 (3 wks.)
		B	Differential Equations: Growth and Decay	6.2	
		C	Separation of Variables	6.3	
		D	First-Order Linear Differential Equations	6.4	
	Unit 7: Applications of Integration	A	Area of a Region Between Two Curves	7.1	March 19-April 13 (3 wks.)
		B	Volume: The Disk Method	7.2	
		C	Volume: The Shell Method	7.3	
			AP Review and Exam		April 16- May 18 (5 wks.)
			Final Calculus Projects		May 21 - June 13 (3.5 wks.)