



CEDAR GROVE HIGH SCHOOL MATHEMATICS DEPARTMENT



***YOU WILL NEED A TEXTBOOK FOR THIS
ASSIGNMENT**

SUMMER ASSIGNMENT

AP CALCULUS - AB

Student Name (Print):

Your summer assignment will be due on the first day of school!

*For each day late, 5% of the total point value will be deducted.

Any questions or concerns may be directed to our Math/Science Supervisor

Janine Barboza at barboza.janine@cgschools.org.

Welcome to **AP Calculus AB!**

Calculus AB is designed to be taught over a full high school academic year. It is possible to spend some time on elementary functions and still cover the Calculus AB curriculum within a year. However, if students are to be adequately prepared for the Calculus AB examination, the year must be devoted to topics in differential and integral calculus. These topics are the focus of the AP Exam.

Prerequisites

Before studying calculus, all students should complete four years of secondary mathematics designed for college-bound students: courses in which they study algebra, geometry, trigonometry, analytic geometry, and elementary functions. These functions include those that are linear, polynomial, rational, exponential, logarithmic, trigonometric, inverse trigonometric, and piecewise defined. In particular, before studying calculus, students must be familiar with the properties of functions, the algebra of functions and the graphs of functions. Students must also understand the language of functions (domain and range, odd and even, periodic, symmetry, zeros, intercepts and so on) and know the values of the trigonometric functions of the numbers $0, \frac{\pi}{6}, \frac{\pi}{4}, \frac{\pi}{3}, \frac{\pi}{2}$, and their multiples.

Course Goals

Students should be able to

- Work with functions represented in a variety of ways: graphical, numerical, analytical, or verbal. They should understand the connections among these representations.
- Understand the meaning of the derivative in terms of a rate of change and local linear approximation and they should be able to use derivatives to solve a variety of problems.
- Understand the meaning of the definite integral both as a limit of Riemann sums and as the net accumulation of change and should be able to use integrals to solve a variety of problems.
- Understand the relationship between the derivative and the definite integral as expressed in both parts of the Fundamental Theorem of Calculus
- Model a written description of a physical situation with a function, a differential equation, or an integral.
- Understand the connections of calculus to other disciplines through use of calculus to solve physics problems as well as applications of calculus.
- Use technology to help solve problems, experiment, interpret results, and verify conclusions.
- Develop an appreciation of calculus as a coherent body of knowledge and as a human accomplishment

Here are a few things you should be prepared to have—not necessarily the first day of school—but within the first week.

- 1 *large* 3-ring binders (at least 1.5” or more)
- dividers (recommended)
- pencils, pens, erasers (the norm)
- plenty of notebook paper
- TI-83, TI-84, or TI-89 Calculator

Although much of the class is geared toward the AP Exam, it is not my first priority. While the test itself is actually an excellent representation of a general calculus course, it is ultimately just that...a single test. It should also be noted that each college or university has individual standards concerning credit for certain AP scores. This information should be obtained through your college of choice. Overall, my wish is that you gain an understanding and appreciation of the concepts presented in this course and be able to step confidently into your Calculus classrooms next fall.

The following websites will be useful to you in completing the assignment and preparing to learn new material come September.

<http://archives.math.utk.edu/visual.calculus/>

<http://www.calculus-help.com/tutorials/>

<http://www.centerofmath.org/videos/index.html#subject4>

<http://www.learningpod.com/browse/category/topic/calculus/92>

<https://www.khanacademy.org>

http://www.chaoticgolf.com/tutorials_calc_aaahs.html

Assignments

Section	Assignment	Suggested date of completion
1.1	Read pg 3-8 Problems: pg 9-11 #9-16, 31-36	7/8/2016
1.2	Read: pg 12-18 Problems: pg 19-21 # 5-20 even, 54, 57-62	7/15/2016
1.3	Read: pg 22-25 Problems: pg 26-27 # 5-19 odd, 24, 28, 31, 38 Pg 28 QQ #1-4	7/29/2016
1.5	Read: pg 36-42 (You do not need to know Ex 3) Problems: 43-45 #7-12, 18, 19, 23, 33-38, 52-57	8/12/2016
WS	Misc. Problems	8/26/2016

All work must be done in pencil. Every assignment should start on a new page and all work must be done on notebook paper (including the worksheet attached to this packet). All work must be shown in order to receive full credit.

Miscellaneous Problems You Need to Know

Factor.

1. $x^3 - 8$

2. $3x^2 - 5x + 2$

Calculate the zeros of each of the following.

3. $x^2 + 8x + 7 = y$

4. $y = \sqrt{2x - 6}$

5. $y = \frac{2x-4}{x+3}$

6. Expand $(2x - 3y)^4$ (hint: use Pascal's triangle and binomial expansion)

7. A business installs a wheelchair ramp that raises 22 inches over a horizontal length of 24 feet. What is the slope of the ramp? (watch your units)

Rationalize the denominator.

8. $\frac{2\sqrt{3}}{\sqrt{5}}$

9. $\frac{2+\sqrt{3}}{\sqrt{6}}$

10. $\frac{1}{\sqrt{5}+\sqrt{2}}$

Rationalize the numerator.

11. $\frac{2\sqrt{3}}{7}$

12. $\frac{2+\sqrt{3}}{5}$

13. $\frac{\sqrt{x+1}}{2}$

Simplify to one fraction.

14. $\frac{2}{x} + x$

15. $\frac{1}{x+1} - \frac{3}{x-1}$

16. $\frac{3x}{x^2-1} - \frac{3}{x-1}$

17. $\frac{1}{x} + \frac{3}{2x^2} + \frac{4}{x+2}$

Rewrite with fractional exponents.

18. $\sqrt{3}$

19. $2\sqrt[4]{3}$

20. $(\sqrt[3]{2x})^5$

21. $\sqrt[5]{(2x-3)^2}$

Determine the domain for each of the following functions. State if the function is continuous or discontinuous and where any holes or asymptotes occur.

22. $f(x) = 2x - 6$

23. $g(x) = \frac{1}{x}$

24. $h(x) = \sqrt{3x - 1}$

25. $k(x) = \frac{3}{x+1}$

26. $p(x) = \frac{5x+6}{x^2+2}$

27. $r(x) = \begin{cases} 2x - 1, & x < 3 \\ x^2, & x \geq 3 \end{cases}$

Evaluate the following expressions. Give exact answers.

28. $\sin \pi$

29. $\cos \frac{\pi}{2}$

30. $\tan \frac{\pi}{4}$

31. $\csc \frac{\pi}{3}$

32. $\cot \frac{-2\pi}{3}$

33. $\sec \frac{5\pi}{6}$

34. $\sin \frac{\pi}{6} + \tan \frac{3\pi}{4}$

35. $\csc -3\pi$

36. Factor and simplify. Express the answer as a fraction without negative exponents.

$$3x(2x + 5)^{-1/2} + 3(2x + 5)^{1/2}$$

37. Express as a single fraction: $\frac{\frac{3}{2(x+h)} - \frac{3}{2x}}{h}$

38. Expand: $\left(x^{5/2} + \frac{3}{\sqrt{2}}\right)^2$

39. Solve for x. $x^2 - 4 = x$

40. Find the smallest value of x that satisfies the following equation. $|2 - x| = 5$

41. Write the *general* form of the equation of the line passing through the point (-2, 5) with slope $-\frac{3}{4}$

42. Solve for p. $hp - 1 = q + kp + 6p$

43. Solve for x. $3(x + 2)^{-1} - \frac{4}{x} = 0$

44. Find the domain of f. $f(x) = \sqrt{5 - 3x}$

45. Solve for x. $e^{\ln(2x+1)} = 5x$

46. Solve for x. $\frac{e^{2x+2}}{e^2} = 4$

47. Solve for x. $(e^2)^{3x} = e^2 e^{3x}$

48. Solve for x. $e^{[3 \ln x - \ln(x^2 - 2x - 4)]} = 1$

49. Find the x-intercept of the function $f(x) = 2 \ln x - 1$. (exact answer only)

50. If $\cos \theta = \frac{12}{13}$ and θ is in the fourth quadrant, find $\csc \theta$.

51. Simplify $(\sin \theta - \sin^3 \theta) \csc \theta$.

52. Find all θ in the interval $[0, 2\pi)$ that satisfy the equation $\cos \theta \tan \theta + \sqrt{3} \cos \theta = 0$

53. Write the given expression in algebraic form: $\sin\left(\arctan \frac{x}{4}\right)$

54. Compute $\arctan(-1)$.