

Welcome to A. P. Calculus

Assignments For Summer 2016

- α This summer, I am NOT assigning specific HW out of the book. You only have to do the review sheet (old test) before you return. **I WILL CHECK IT** the first day back.
- α I suggest you start on the following in early August, if not before. If you wait too long, you'll run out of time during your last blast of summer. If you start too early, you'll just get rusty all over again. Use your judgment as to when, but DO the problems.
- α Below is a brief summary of each section. You only need to refer to the book as much or as little as necessary in order to do the review sheet. If you would like to get a book at any point during the summer, contact me via e-mail. This may require some time to get into school, so please plan accordingly.
- α **Find a friend** to work with! This will be invaluable and NECESSARY as you go through the next year.
- α The questions and answers are posted on the Calculus section of my website. This document is posted as well. We will not spend time going over the review sheet, except to answer a question or two. You should get all questions taken care of BEFORE RETURNING by working with a friend, or emailing me as a last resort.
- α We will cover the review chapter of the Calculus book quickly, spending a few days focusing on Trigonometric, Exponential, and Logarithmic Functions. Your first exam will be during the second week in September on the Review Chapter.

If you have questions or problems, email me!

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Website: <https://apstudent.collegeboard.org/apcourse/ap-calculus-ab>

A. P. Calculus

Things you should know:

- My first goal: Teach a solid calculus course to prepare you for the next year, **WHEREVER** you take your next math course.
- My second goal: Teach the topics in the AP Calculus outline by ETS and the College Board
- As always, you **MUST** show work and justify answers. I can only read your paper, not your mind.
- You do not need to work every problem the way I do. Students often find much better (cool) ways than their instructor to work problems. Impress me!
- A grapher is required – TI-83 or higher recommended. If I catch you playing calculator games in class, I will clear the memory!!!!
- You must not just know the material for the test – **you must OWN it**. Just knowing it for the test causes a false sense of security which hurts you on the semester exam or the A. P. Exam.
- **Some of you** will need to more focused and more serious than you were in Trig/Precalc. You will not be able to get by doing things the way you did in that course, at least not for long! You must be actively engaged in trying to understand the material and think about it, not just wait for it to “come to you.”
- I encourage you to develop study groups on your own to help each other through rough spots which we all have at times. You **NEED** to learn to collaborate at this level.
- You must use proper notation and complete mathematical statements in the course. This means fraction bars, parentheses, equal signs, left sides of equations, and anything else needed for clarity and correctness. More on this later as we get into the new school year.
- Keep yourself **ORGANIZED**. You’ll get a lot of handouts and generate a lot of work to keep track of. You have to be able to find things from any time earlier in the year due to the cumulative nature of the course and to review for semester exams or the A. P. Exam.
- To be successful in this course you have to become more of a “student of mathematics” than just a math student. There is so much more than we can ever cover! So Much Math, So Little Time!
- In spite of the fear which this sheet may have struck in you, most students do enjoy the course even though it is a lot of work. Let’s look forward to a great year together!

AP Calculus Summer Assignment

1. Equations of lines – Write the equation of the line with the given characteristics. Your answer can be in slope-intercept, point-slope, or standard form.
 - a. Vertical line through $(3, 2)$
 - b. Slope = -2 and passes through $(-1, 3)$
 - c. Slope = $\frac{3}{5}$ and passes through $(5, 0)$
 - d. Passes through $(1, 2)$ and $(-1, -1)$
 - e. Parallel to $2x + y = 4$ and passes through $(-2, 2)$
 - f. Perpendicular to $2x + y = 4$ and passes through $(-2, 2)$

2. Domain/Range – Identify the domain and range of each function.
 - a. $f(x) = 1$
 - b. $f(x) = (x - 1)^2$
 - c. $f(x) = \sqrt{x - 1}$
 - d. $f(x) = \frac{1}{x+1}$
 - e. $f(x) = \sin x$

3. Composite Functions
 - a. Given $f(x) = x - 1$ and $g(x) = x^2 + 2$, evaluate:
 - i. $f(g(-3))$
 - ii. $g(f(3))$
 - iii. $f(g(x))$
 - iv. $(g \circ f)(x)$
 - b. Each function is written in the form $(f \circ g)(x)$. Identify $f(x)$ and $g(x)$.
 - i. $\cos(3x)$
 - ii. $(x + 3)^2$
 - iii. e^{2x-1}
 - iv. $\ln(x^2 - 3x + 5)$

4. Inverse Functions – Given $f(x)$, find $f^{-1}(x)$.
 - a. $f(x) = 2x + 3$
 - b. $f(x) = \frac{1}{x^3}$
 - c. $f(x) = \frac{x+2}{x-2}$
 - d. $f(x) = e^x$

5. Piecewise Functions –
 - a. Given $f(x) = \begin{cases} 3 - x, & x \leq 1 \\ 2x, & x > 1 \end{cases}$
 - i. Evaluate $f(-2)$, $f(1)$, and $f(\frac{5}{2})$.
 - ii. Graph $f(x)$.
 - b. Given $g(x) = \begin{cases} 4 - x^2, & x < 1 \\ \frac{3}{2}x + \frac{3}{2}, & 1 \leq x \leq 3, \\ x + 3, & x > 3 \end{cases}$
 - i. Evaluate $g(2)$, $g(0)$, and $g(3)$.
 - ii. Graph $g(x)$.

6. Degree-Radian Conversion – *Convert the following degree measures to radians.*
- 90°
 - 240°
 - -60°
 - 135°
 - -270°
7. Evaluate Trig Functions – *Evaluate the following expressions. All measures are in radians. Give exact values (no decimals).*
- $\sin\left(\frac{3\pi}{2}\right)$
 - $\tan\left(\frac{11\pi}{6}\right)$
 - $\cos\left(\frac{5\pi}{6}\right)$
 - $\cos(2\pi)$
 - $\sin\left(\frac{7\pi}{4}\right)$
 - $\tan\left(\frac{4\pi}{3}\right)$
8. Log/Exponent Rules
- Write the following as a single log.*
 - $2 \ln 5 - 3 \ln 2$
 - $\ln 3 + 5 \ln 2$
 - $2 \ln a - 5 \ln b + \ln c$
 - Write the following as a single power with positive exponents.*
 - $(x^3 \cdot x^{-5})^{-2}$
 - $\frac{2^x \cdot 2^y}{2^z}$
 - $(e^2 \cdot e^3)^{1/2}$
9. Log/Exponent Equations – *Solve each equation for x.*
- $e^x = 2$
 - $e^{0.05x+2} = 3$
 - $2 \ln x = 3$
 - $3 \ln(x - 2) = 9$