

Arundel High School AP Calculus Summer Assignment

Going into AP Calculus, there are certain skills that have been taught to you over the previous years that we assume you have. If you do not have these skills, you will find that you will consistently get problems incorrect next year, even though you understand the calculus concepts. This summer packet is intended for you to brush up and possibly relearn these topics.

We assume that you have basic skills in algebra. Being able to solve equations, work with algebraic expressions and basic factoring, for example, should now be a part of you. If not, you would not be going on to AP calculus. The topics covered in the packet are skills that are used continually in AP calculus.

The attached summer packet is for all students enrolled in AP Calculus AB in the fall. This packet will be collected on the first day of school. Show all work on separate paper. NO work written in the question packet will be checked.

Rather than give you a textbook to remind you of the techniques necessary to solve the problem, I have given you several websites that have full instructions on the techniques. If and when you are unsure of how to attempt these problems, examine these websites. Don't fake your way through these problems. As stated, students are notoriously weak in them, even students who have achieved well prior to AP calculus. Use the websites.

Realize that certain concepts are interrelated. Domain, for example, may require you to be expert at working with inequalities. Solving quadratic equations may involve techniques used in solving fractional equations.

This packet is due the first day back in school in the fall. It will be graded. You need to get off to a good start so spend some quality time on this packet this summer. Do not rely on the calculator. Use the calculator only on the problems where calculator use is indicated. Half of the AP exam next year is taken without a calculator.

It is a mistake to decide to do this now. Let it go until mid-summer. We want these techniques to be relatively fresh in your mind in the fall. Also, do not wait to do them at the very last minute. These take time.

If you have any questions about any of these problems or techniques used in solving in them, you may contact Ms. Hanna at dhanna@aacps.org. Have a great summer and see you in the fall!

Have a great summer!

Calculus Review Topics

Beginning algebra topics

Negative and fractional exponents

Intermediate algebra topics

Domain

Solving inequalities: absolute value

Solving inequalities: quadratic

Special factoring formulas

Function transformation

Factor theorem (p over q method)

Even and odd functions

Solving quadratic equations and quadratic formula

Advanced algebra topics

Asymptotes

Complex fractions

Composition of functions

Solving rational (fractional) equations

Trig Information

Basic right angle trig

Trig equations

You can do Google searches for any of the topics listed above. However, there are a few web sites that will cover pretty much all of these topics.

Here is a good site for most algebra topics:

<http://www.purplemath.com/modules/index.htm>

Here is a good site for most trig topics:

<http://www.freemathhelp.com/trigonometry-help.html>

Summer Assignment for Calculus AB with Seminar

Show all work or explain all answers on a separate sheet of paper. Use graph paper for graphs. Do NOT use a calculator.

1. Solve $\frac{5}{0}$.
2. Does $\frac{3a+b}{3a+c}$ equal $\frac{a+b}{a+c}$? Why or why not?
3. Simplify $(3x^2y^{-3}z)^4$.
4. Simplify $\frac{5}{y} - \frac{3}{x^2}$.
5. Simplify $\frac{w+1}{14w^4} - \frac{5}{w^3 - 3w^2}$.
6. Simplify the expression $\ln(e^4 \cdot e^{5x})$.
7. Simplify the expression $e^{\ln x - \ln y}$.
8. Rewrite x^{-3} without a negative exponent.
9. Rewrite $x^{2/5}$ in radical form.
10. Rewrite $\log_a b = c$ as an exponential equation.
11. Rewrite $\log 5 - \log 200$ with a single log then solve.
12. Rewrite $\log 3 - (\log 9 + \log x)$ as a single logarithm .
13. Rewrite $5\log x - 4\log(x-3)$ as a single logarithm.
14. Factor $9x^4 - y^6$.
15. Factor $2x^2 - 5x - 12$

16. Solve $5x^2 = 3x + 8$ by any method.
17. Solve $|3x + 2| > 14$.
18. Solve $x^2 - 14x + 3 = 0$ by completing the square.
19. Solve the following system of equations
$$\begin{cases} -8x + 27 = -5 \\ 2x - y = 1 \end{cases}$$
.
20. Solve the following system of equations
$$\begin{cases} 2x - 5y = -11 \\ 3x + 13y = 4 \end{cases}$$
.
21. Solve $\log_4 x = -3$.
22. Solve $\log_5 625 = x$.
23. In a 30-60-90 right triangle, the hypotenuse is 10. Find the length of the other two sides. Draw the triangle and label the angles and sides.
24. If an kite 80 feet high is staked to the ground so that a fixed length of string forms a 50° angle of elevation, how long is the string that tethers the kite? Provide an answer accurate to three decimal places.
25. Write the equation of the line passing through the points $(-3, -8)$ and $(-6, 2)$ in slope-intercept form.
26. Write the solution to the inequality $3(2x - 1) - 5 \leq 10x + 19$ using interval notation.
27. Write the solution to the inequality $2|x - 7| - 5 \leq -1$ in interval notation.
28. Calculate the x and y intercepts of $3x - 4y = -6$.
29. Evaluate the quotient using long division $(x^4 + 6x - 2) \div (x^2 + 3)$
30. Sketch a graph of $f(x) = e^x$.
31. Sketch a graph of $g(x) = \ln x$.
32. Sketch a graph of $y = \sin x$.
33. Sketch a graph of $y = \cos x$.

34. Sketch a graph of $y = |x|$, $y = |x + 3|$, $y = |x - 2| + 3$ in the same plane.
35. Sketch a graph of $y = x^2$, $y = (x - 2)^2$, $y = (x + 1)^2 - 4$ on the same plane.
36. Sketch the graph of $f(x) = 1 - x$
- if $x \leq 1 \leq x^2$
 - if $x > 1$
37. Identify the vertical asymptotes to the graph of $y = \frac{-3}{3x^2 - 23x - 36}$.
38. Identify the horizontal asymptotes to the graph of $y = \frac{2x^2 + 9x - 18}{-12x^2 + 19x - 5}$.
39. Evaluate $\arccos\left(\frac{-1}{2}\right)$.
40. Evaluate $\operatorname{arccsc}(-\sqrt{2})$.
41. Simplify the expression $\cot \theta + \tan \theta$ in terms of sine and cosine only.
42. Find all solutions to the equation $3(\sin \theta + 1) = \sin \theta + 4$ on the interval $[0, 2\pi)$.
43. Find the exact solution to the equation $\sqrt{3} \cot \theta - 1 = 0$.
44. Find the exact solutions to the equation $\tan^2 \theta = \tan \theta$.
45. Find the exact value of the six trigonometric functions for the following values of θ .

$$0, \frac{\pi}{6}, \frac{\pi}{4}, \frac{\pi}{3}, \frac{\pi}{2}, \frac{2\pi}{3}, \frac{3\pi}{4}, \frac{5\pi}{6}, \pi, \frac{7\pi}{6}, \frac{5\pi}{4}, \frac{4\pi}{3}, \frac{3\pi}{2}, \frac{5\pi}{3}, \frac{7\pi}{4}, \frac{11\pi}{6}, 2\pi.$$

46. Determine whether the functions are odd, even, or neither.
- $f(x) = \frac{1}{x} + \frac{1}{x^2 + 1}$
 - $g(x) = 1 - x^4$
 - $f(x) = x^5 + x$