

## AP CALCULUS AB SUMMER ASSIGNMENT

Dear Student:

You are to be commended for taking on the challenging course of AP Calculus AB. As you will find out, this is a very demanding academic course. In order to help you to be successful, I have put together a number of exercises that will help you to review skills that you will need for AP Calculus AB. This assignment will be collected during the first week of school for your first grade of the school year. In addition, you will have a quiz during the second week of school that covers the material found in these exercises.

List of Assignments:

1. Summer Worksheet One – work problems without a calculator and document work
2. Summer Worksheet Two – use a graphing calculator to solve these problems
3. Library of Functions Worksheet – complete without the use of a calculator. You do not need to do  $y = \operatorname{arcsec} x$ ,  $y = \operatorname{arccsc} x$ , and  $y = \operatorname{arccot} x$ .

Review Websites:

1. <http://mathmistakes.info/facts/TrigFacts/learn/vals/sum.html> Study this table. Commit these values to memory.
2. <http://mathmistakes.info/facts/TrigFacts/learn/vals/isum.html> Inverse trig functions – Study this table and commit these values to memory.
3. Once you have studied the tables above you can use these flashcards as practice – <http://mathmistakes.info/facts/TrigFacts/flashcards/all/fc81.html>
4. <http://mathmistakes.info/mistakes/algebra/index.html>
5. <http://mathmistakes.info/facts/AlgebraFacts/index.html>

I am looking forward to working with you throughout the upcoming school year. Have a great summer!

## AB Calculus Summer Worksheet One

The following exercises should be done without the use of a calculator.

For #1-10, sketch the graph of the given equations. If x and y intercepts exist, label them with exact values. State the domain and the range of each function.

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

6.  $y = x^3 - x$

2.  $y = \sqrt{16 - x^2}$

7.  $y = \sqrt{x} - 3$

3.  $y = \sqrt{x^2 - 25}$

8.  $y = |x - 3|$

4.  $y = \frac{1}{\sqrt{9 - x^2}}$

9.  $y = (x + 3)^2$

5.  $y = 9 - x^2$

10.  $y = x^2 + 2x - 3$

For #11-15, sketch the graph of each equation. Identify the x and y intercepts. Determine the type(s) of symmetry (x-axis, y-axis, and origin symmetry).

11.  $y = 1 - x^2$

14.  $y = \frac{1}{x}$

12.  $y = (x - 1)^2$

15.  $x = y^3$

13.  $y = x\sqrt{x + 2}$

For #16-20, find the points of intersection of the graphs of the equations. SHOW YOUR WORK.

16.  $x + y = 2$   
 $2x - y = 1$

19.  $x^2 + y^2 = 5$   
 $x - y = 1$

17.  $x + y = 7$   
 $3x - 2y = 11$

20.  $y = x^3$   
 $y = x$

18.  $x^2 + y = 6$   
 $x + y = 4$

For #21 – 31, evaluate without the use of a calculator.

21.  $\sin \frac{7\pi}{6}$

27.  $\sin \pi$

22.  $\cos \frac{11\pi}{6}$

28.  $\sin^{-1} \left( -\frac{\sqrt{3}}{2} \right)$

23.  $\tan \frac{4\pi}{3}$

29.  $\cos^{-1} \left( -\frac{\sqrt{2}}{2} \right)$

24.  $\cot \frac{2\pi}{3}$

30.  $\tan^{-1} (-\sqrt{3})$

25.  $\sec \frac{3\pi}{4}$

31.  $\sec^{-1} \left( \frac{2\sqrt{3}}{3} \right)$

26.  $\csc \frac{7\pi}{4}$

32. Evaluate the limit:  $\lim_{x \rightarrow 0} \frac{\sqrt{x+1} - 1}{x}$

33. Simplify the complex rational expression:  $\frac{x-3}{x - \frac{3}{x-2}}$

34. Simplify the complex rational expression:  $\frac{\frac{x}{x-2} + 1}{\frac{3}{x^2-4} + 1}$

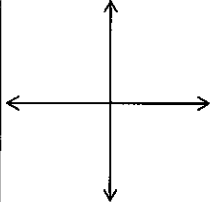
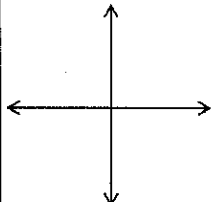
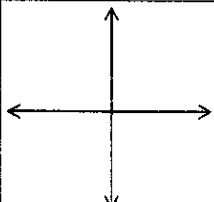
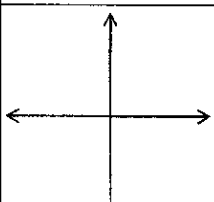
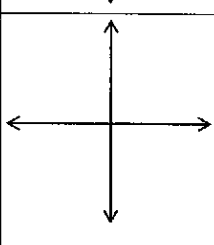
35. Use properties of logarithms to expand the expression:  $\ln z(z-1)^2$

36. Use properties of logarithms to expand the expression:  $\ln \left( \frac{x^2-1}{x^3} \right)^3$

## AB Calculus Summer Worksheet Two

Please use a graphing calculator to solve the following problems. Much of the work that we do in AP Calculus AB and BC requires the use of a graphing calculator. It is **highly recommended** that you have your own graphing calculator as you will need it to complete some of your homework assignments throughout the school year. The calculator that we will be using in class is the TI-84 Plus.

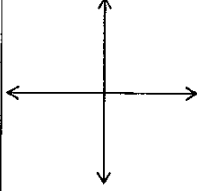
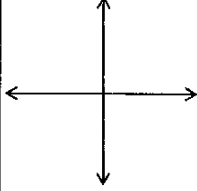
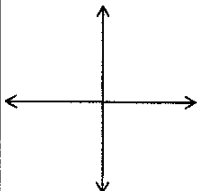
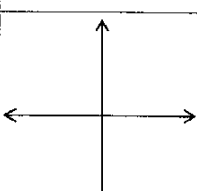
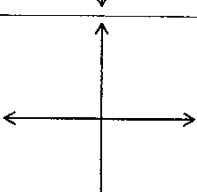
1. Find the coordinate of the point of intersection of  $g(x) = e^{x+1}$  and  $f(x) = -\frac{2}{3}x + 3$ .
2. Find the coordinate of the point of intersection of  $g(x) = \ln x + 3$  and  $f(x) = 2^{-x} - 1$ .
3. Find the zeros (x-intercepts) of the polynomial  $f(x) = x^3 - 2x^2 + 4x - 5$ .
4. Find the zeros of the polynomial  $g(x) = x^4 - 7x^2 + 10$ .
5. Find the zeros of  $h(x) = 3e^{-x^2} - 1$ .

Name & Equation	Graph	Domain (set)	Domain (int.)	Range (set)	Range (int.)
1 Reciprocal of a square: $y = \frac{1}{x^2}$					
2 Sine: $y = \sin x$					
3 Cosine: $y = \cos x$					
4 Tangent: $y = \tan x$					
5 Exponential Decay: $y = ab^x$ $0 < b < 1$ $a > 0$					

LIBRARY OF FUNCTIONS: Worksheet #2 (PAGE 2 of 5)

	Name & Equation	Graph	Domain (set)	Domain (int.)	Range (set)	Range (int.)
6	<b>Cosecant:</b> $y = \csc x$					
7	<b>Cotangent:</b> $y = \cot x$					
8	<b>Secant:</b> $y = \sec x$					
9	<b>Exponential Growth:</b> $y = ab^x$ $b > 1$ $a > 0$					
10	<b>Arcsine:</b> $y = \sin^{-1} x$					

LIBRARY OF FUNCTIONS: Worksheet #2 (PAGE 3 of 5)

	Name & Equation	Graph	Domain (set)	Domain (int.)	Range (set)	Range (int.)
11	Arccosine: $y = \cos^{-1} x$					
12	Arctangent: $y = \tan^{-1} x$					
13	Arccotangent: $y = \cot^{-1} x$					
14	Arsecant: $y = \sec^{-1} x$					
15	Arcosecant: $y = \csc^{-1} x$					

LIBRARY OF FUNCTIONS: Worksheet #2 (PAGE 4 of 5)

Name & Equation	Graph	Domain (set)	Domain (int.)	Range (set)	Range (int.)
16 Common Logarithm: $y = \log x$					
17 Natural Logarithm: $y = \ln x$					
18 Reciprocal Function: $y = \frac{1}{x}$					
19 Square Root Function: $y = \sqrt{x}$					
20 Cube Root Function: $y = \sqrt[3]{x}$					



LIBRARY OF FUNCTIONS: Worksheet #2 (PAGE 5 of 5)

	Name & Equation	Graph	Domain (set)	Domain (int.)	Range (set)	Range (int.)
21	Absolute Value $y =  x $					
22	Greatest Integer less than or equal to x $y = x$					
23	Identity Function $y = x$					
24	Square Function $y = x^2$					
25	Cube Function $y = x^3$					
26	Constant Function $y = c$					