AB Calculus Summer Work

Dear Student:

You are to be commended for taking on the challenges of Advanced Placement Calculus. As you will soon realize, this is a demanding yet fulfilling experience. To help you pave the road to success, I have created a number of exercises to help you focus on skills and bodies of knowledge that are the foundations of success for AP Calculus. Please work all problems during the summer recess and be prepared to submit the assignment on the first day of school.

List of Assignments:

1. Library of Functions Worksheet; complete without a calculator
2. Fact of Fiction Worksheet; consider all possibilities before arriving at a conclusion.
3. Summer Worksheet One; work problems without a calculator, document work.
4. Summer Worksheet Two; use a graphing calculator to solve these problems.

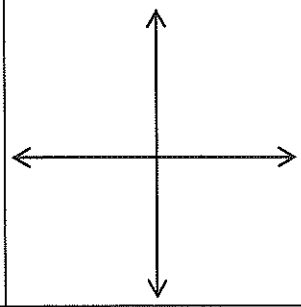
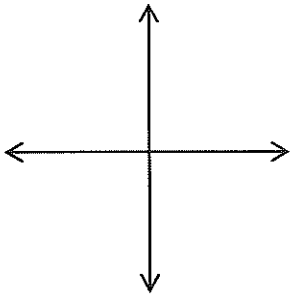
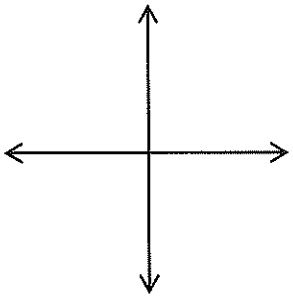
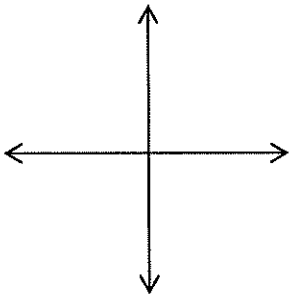
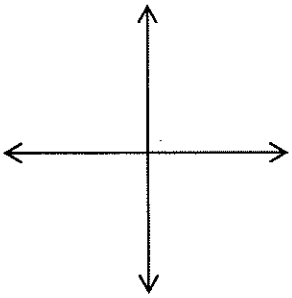
Review Websites:

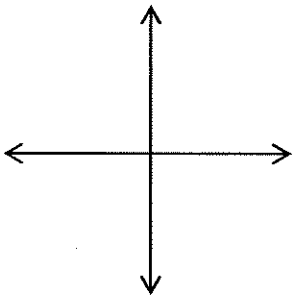
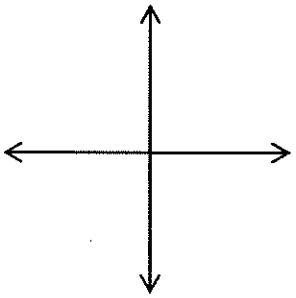
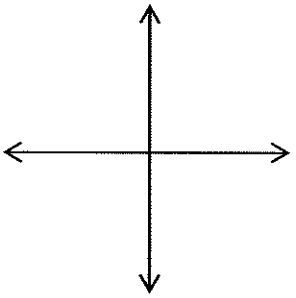
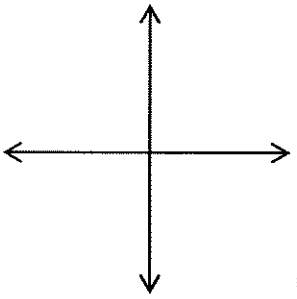
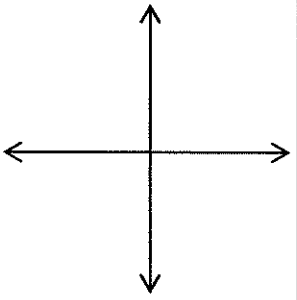
1. http://mathmistakes.info/facts/TrigFacts/learn/vals/sum.html. Study this table! Commit to memory!
2. http://mathmistakes.info/facts/TrigFacts/learn/vals/isum.html. Study this table! Commit to memory!
3. Please copy and paste the following URL into your browser if it does not function well when you click on it.
http://mathmistakes.info/facts/TrigFacts/flashcards/all/fc81.html?0,90,81,0,1073741823,1073741823,1073741823,1073741823,1073741823,127. Use these flashcards to improve retention once you have studied the tables at the websites above.
4. http://mathmistakes.info/mistakes/algebra/index/html, Reviewing this website will help you answer the Fact or Fiction Worksheet listed above.
5. http://mathmistakes.info/facts/AlgebraFacts/index.html. Studying information on this website will help you answer Fact or Fiction Worksheet listed above.

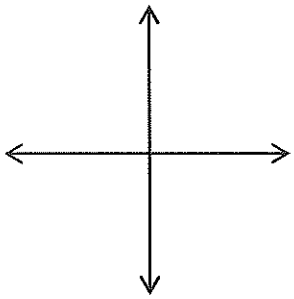
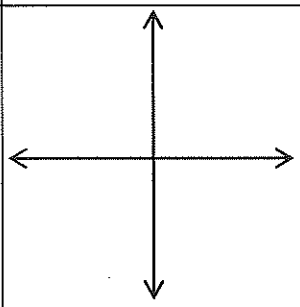
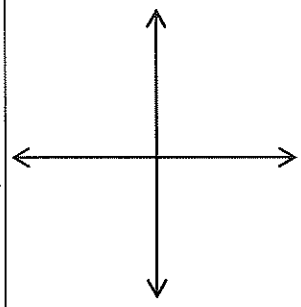
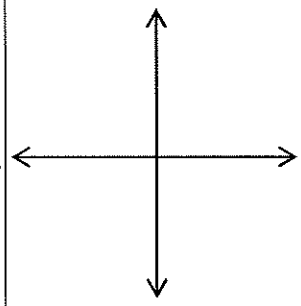
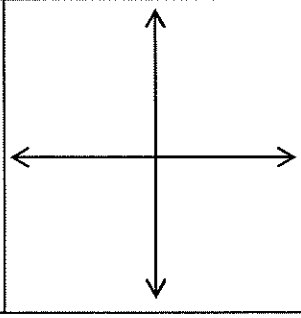
Have a great summer! I am looking forward to working with you throughout the school year!

Mrs. Joyce/Mr. Hicks

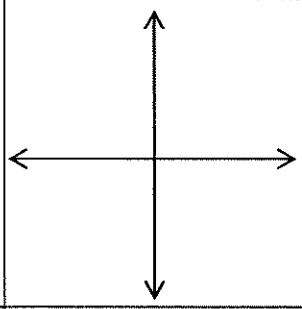
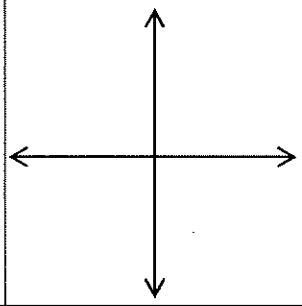
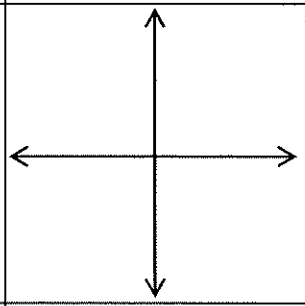
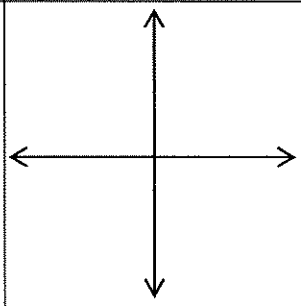
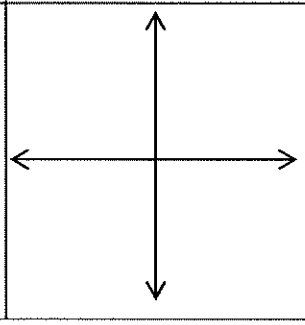
LIBRARY OF FUNCTIONS: Worksheet #2 (*PAGE 1 of 5*) **NAME:** _____

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

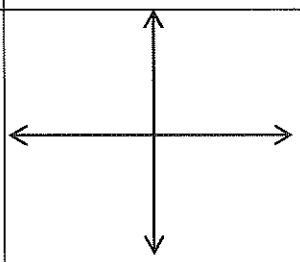
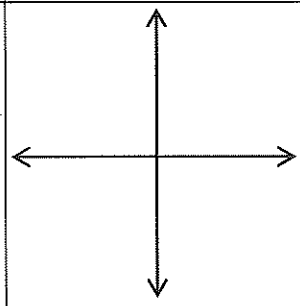
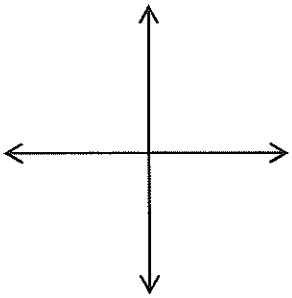
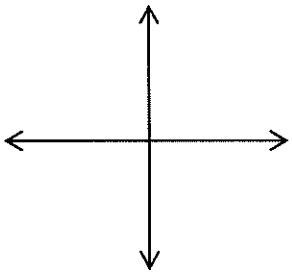
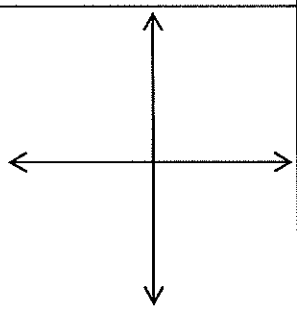
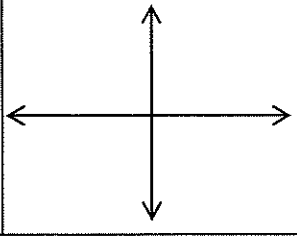
	Name & Equation	Graph	Domain (set)	Domain (int.)	Range (set)	Range (int.)
6	**Cosecant:** $y = \csc x$					
7	**Cotangent:** $y = \cot x$					
8	**Secant:** $y = \sec x$					
9	**Exponential Growth:** $y = ab^x$ $b>1$ $a>0$					
10	**Arcsine:** $y = \sin^{-1} x$					

	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	**Arcsecant:** $y = \sec^{-1} x$					
15	**Arccosecant:** $y = \csc^{-1} x$					

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:** $y = 1/x$					
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** $y = \lfloor x \rfloor$					
23	**Identity Function** $y = x$					
24	**Square Function** $y = x^2$					
25	**Cube Function** $y = x^3$					
26	**Constant Function** $y = c$					

Math Fact OR Wishful Thinking?

State whether the statement is true or false (T or F).

1. $(a+b)^2 = a^2 + b^2$

2. $(xy)^n = x^n y^n$

3. $(2x)^2 = 2x^2$

4. $\dfrac{ab+ac}{a} = b+c$

5. $\dfrac{a}{ab+ac} = \dfrac{1}{b+c}$

6. $\dfrac{4x+3y}{w} = \dfrac{4x}{w} + \dfrac{3y}{w}$

7. $\dfrac{w}{4x+3y} = \dfrac{w}{4x} + \dfrac{w}{3y}$

8. $\dfrac{ab+ac+d}{aw} = \dfrac{b+c+d}{w}$

9. $\dfrac{\log a}{\log b} = \log a - \log b$

10. $\log ab = \log a + \log b$

11. $\dfrac{\ln a}{\ln b} = \dfrac{a}{b}$

12. If $\ln a = \ln b$, then $a = b$

13. $2(x)^n = (2x)^n$

14. $\dfrac{a}{ax} = x$

15. $\dfrac{1}{x^{-n}} = x^n$

16. $\left(\dfrac{a}{b}\right)^{-n} = \left(\dfrac{b}{a}\right)^n$

17. $x \log a^w = \log a^{xw}$

18. $\log x \cdot \log w = \log(x+w)$

19. $-2^4 = 16$

20. $-x^2 = x^2$

21. $\dfrac{\sqrt{xy}}{x} = \sqrt{y}$

22. $\dfrac{\dfrac{-a}{b}}{c} = \dfrac{ac}{b}$

23. $\dfrac{\dfrac{a}{b}}{c} = \dfrac{ab}{c}$

24. $\sqrt{x^2+y^2} = x+y$

25. $\dfrac{1}{\sqrt{x}+\sqrt{y}} = \sqrt{x}+\sqrt{y}$

26. $\dfrac{1}{0} = 0$

27. $x^0 = 0$

28. $\dfrac{a}{b} + \dfrac{c}{d} = \dfrac{a+c}{b+d}$

29. $\dfrac{a}{b} \cdot \dfrac{c}{d} = \dfrac{ad}{bc}$

30. $a(x+y)^n = (ax+ay)^n$

31. $\dfrac{x+2}{x+5} = \dfrac{2}{5}$

32. $3x + 3x = 6x^2$

33. $1^{-1} = -1$

34. $a^2 + b^2 = (a+b)(a-b)$

35. $a^3 - b^3 = (a-b)(a^2+2ab+b^2)$

AB Calculus Summer Work **Worksheet One**

The following exercises are to be done without the use of calculators.

Problems 1- 11, sketch the graph of the equations. If *x* and *y* intercepts exist, label with exact values. State the domain and range in set and interval notation.

1. $y=-\frac{2}{3}x+2$
2. $y=\sqrt{16-x^2}$
3. $y=\sqrt{x^2-25}$
4. $y=\dfrac{1}{\sqrt{9-x^2}}$
5. $y=9-x^2$
6. $y=x^3-x$
7. $y=\sqrt{x}-3$
8. $y=|x-3|$
9. $y=(x+3)^2$
10. $y=x^2+2x-3$
11. $y=|x^2+2x-3|$

Problems 12-20 Sketch the graph of the equations, identify x and y intercepts and test for symmetry with respect to each axis and the origin.

12. $y=-3x+2$
13. $y=-\frac{1}{2}x-4$
14. $y=1-x^2$
15. $y=(x+3)^2$
16. $y=x^3+2$
17. $y=x\sqrt{x+2}$
18. $x=y^3$
19. $y=\dfrac{1}{x}$
20. $y=6-|x|$

Problems 21- 25, find the points of intersection of the graphs of the equations.

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

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

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

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

25. $y=x^3$
$y=x$

Problems 26-36, evaluate.

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

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

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

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

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

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

32. $\sin\pi$

33. $\sin^{-1}\frac{-\sqrt{3}}{2}$

34. $\cos^{-1}\frac{-\sqrt{2}}{2}$

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

36. $Sec^{-1}\frac{2\sqrt{3}}{3}$

37. Evaluate the limit; $\lim_{x\to 0}\frac{\sqrt{x+1}-1}{x}$.

38. Simplify the complex rational expression; $\frac{x-3}{x-\frac{3}{x-2}}$.

39. Simplify the complex rational expression; $\dfrac{\dfrac{x}{x-2}+1}{\dfrac{3}{x^2-4}+1}$.

Problems 40-43, factor.

40. $(x+1)^{\frac{3}{2}}-x^2(x+1)^{\frac{1}{2}}$.

41. $(x^2+4)^{\frac{3}{2}}-x^2(x^2+4)^{-\frac{1}{2}}$

42. $x^{\frac{4}{3}}-10x^{\frac{2}{3}}+9$

43. $x^{4k+1}-x^{2k+1}-6x$

Problems 44-45, use properties of logarithms to expand the logarithmic expression.

44. $\ln z(z-1)^2$

45. $\ln\left(\dfrac{x^2-1}{x^3}\right)^3$

AB Calculus Summer Worksheet Two

Please use a graphing calculator to solve the following problems. Solve all problems **accurate to three decimal digits** and verbally explain the procedures used for entering the information into the calculator. If you do not own a graphing calculator, and do not wish to purchase a TI-84 graphing calculator during the summer, you may download a graphing calculator emulator from the following link; http://mrnagy.pbworks.com/Graphing-Calculator-Emulator. This is an executable file and works with Windows platform only. If you elect to download, save first, then open the zip file.

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 $g(x)=x^3-2x^2+4x-5$.
4. Find the zeros of the polynomial $g(x)=x^4-7x^2+10$.
5. Find the zeros of $h(x)=3e^{-x^2}-1$.