If you want to get the most out of this assignment, then you should not begin this assignment until the beginning of August. If you complete it too early, then you have defeated the purpose of this assignment, which is to help prepare you for the beginning of AP Calculus BC.

There are 2 parts to the summer assignment:

1. Please purchase the Barron's Book (currently the 14th edition is on the bookshelves and has practice exams that are consistent with the new format), either with or without the CD. Read Chapter 2 and answer the following problems on Limits:

From the 14th edition: pp.102−107 all
From the 13th edition: pp.104−109 all

Most questions are the same and are probably on the same pages.

The answers are in the book, so check your work, and try to understand your mistakes. Do all work on a separate sheet of paper. All work is due the first day of school. Hand in work, not just answers!

2. Complete the attached assignment (beginning with the next page, on Precalc material), without the use of a calculator, except where indicated. Do all work on a separate sheet of paper. All work is due the first day of school. Hand in work, not just answers! Chapter 1 in the Barron's book covers some of the same material, so use it as resource.

You will be tested on this material at the end of the first week of the year!!!
If you do not understand something, ask me about it during the first 2 days.

If you have any questions, email me at sgoldman@hhh.k12.ny.us

Enjoy your Summer!!!!!

NAME_____ AP CALC BC

SUMMER ASSIGNMENT – DUE SEPTEMBER 5 (FIRST DAY OF SCHOOL)

Directions: Answer all of the following questions on a separate sheet of paper. All work must be shown. You will be tested on this material sometime during the first week of school.

PART I: ANSWER ALL QUESTIONS WITHOUT USING YOUR CALCULATOR

1. Determine if each of the following are true. If not, explain why not. Assume all expressions are defined for all real numbers in the domain.

a. $\frac{2k}{2x+h}=\frac{k}{x+h}$ b. $\frac{1}{p+q}=\frac{1}{p}+\frac{1}{q}$ c. $\frac{x+y}{2}=\frac{x}{2}+\frac{y}{2}$

d. $3\left(\frac{a}{b}\right)=\frac{3a}{3b}$ e. $3\left(\frac{a+b}{c}\right)=\frac{3a+b}{c}$ f. $\sqrt{a^2+b^2}=a+b$

2. Simply each of the following expressions

a. $\dfrac{\frac{x}{2}}{\frac{x}{4}}$ b. $\dfrac{\sqrt{x-2}+\frac{5}{\sqrt{x-2}}}{x-2}$ c. $e^{2\ln x}+\ln e^{x^2}-\ln 1+\ln e$

3. Solve for y': $xy'+y=1+y'$

4. Solve for x

a. $4x^2-21x-18=0$ b. $2x^2-3x+3=0$ c. $x^4-9x^2+8=0$

5. Write an equation of the line that passes through $\left(e^2,2\right)$ and has a slope of $\frac{1}{e^2}$.

6. What are the coordinates of the point at which the line passing through the points (−1, 3) and (−2, 4) intersect the y –axis?

7. If $f\left(x\right)=x^2-3x+4$, then find $f\left(x+2\right)-f\left(2\right)$ in simplest form.

8. If $f\left(x\right)=\frac{1}{x}$, then find $\frac{f\left(x+h\right)-f\left(x\right)}{h}$ in simplest form in terms of x and h.

9. Find the domain of each of the following functions (use interval notation):

a. $g\left(x\right)=\dfrac{1}{4x^2-21x-18}$ b. $h\left(x\right)=\sqrt{x^2-5x-14}$

c. $p\left(x\right)=\dfrac{\sqrt[3]{x-6}}{\sqrt{x^2-x-30}}$ d. $y=\ln\left(2x-12\right)$

10. Write an expression for the area of an equilateral triangle whose side is represented by x.

11. Sketch the graph of each of the following functions:

a. $f(x)=x^2$ b. $f(x)=x^3$ c. $f(x)=\sqrt{x}$ d. $f(x)=\sqrt[3]{x}$ e. $f(x)=e^x$

f. $f(x)=\ln x$ g. $f(x)=|x|$ h. $f(x)=\begin{cases}1, & x\le 0\\ -1, & x>0\end{cases}$ i. $f(x)=\begin{cases}2x, & x<-1\\ 2x^2, & -1\le x<2\\ -x+3, & x>2\end{cases}$

12. Sketch $f(x)=\dfrac{1}{x}$.

Describe the effect that each of the following would have on $f(x)$ without the use of a graph.

a. $f(x)-4$ b. $f(x-4)$ c. $-f(x+2)$

d. $5f(x+3)$ e. $f(2x)$ f. $|f(x)|$

13. Given $f(x)=x-3$ and $g(x)=\sqrt{x}$, write each of the following in simplest form in terms of *x*.

a. $f(g(x))$ b. $g(f(x))$ c. $f(f(x))$

14. Answer each of the following for $f(x)=2x-2$:

a. Sketch the graph of $f(x)$.

b. Determine if *f* has an inverse function.

c. Sketch the graph of $f^{-1}(x)$.

d. Write an equation for $f^{-1}(x)$.

15. Simplify using only positive exponents. Do not rationalize the denominator.

a. $\dfrac{\sqrt{4x-16}}{\sqrt[4]{(x-4)^3}}$ b. $\left(\dfrac{1}{x^{-2}}+\dfrac{2}{x^{-1}y^{-1}}+\dfrac{1}{y^{-2}}\right)^{-\frac{1}{2}}$

16. Write an expression for the surface area of a box given the each of the following conditions:

a. The dimensions of the base are *x* and *y* and the height is *h*.

b. The dimensions of the base are *x* and *y* and the height is *h*, but the box does not have a top.

c. The box has a square base and no top, and the side of the base is *x* and the height is *h*.

17. A seven foot ladder, leaning against a wall, touches the wall *y* feet above the ground. Write an expression (in terms of *y*) for the distance from the foot of the ladder to the base of the wall.

18. Write an expression for the area of a semicircle whose diameter is represented by *x*.

19. Solve each of the following systems of equations:

a. $2a + b = -7$
$4a + b = 4$

b. $3x + 4y = 7$
$6x - 8y = 2$

20. Copy and complete the chart

θ	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$
$\sin\theta$					
$\cos\theta$					
$\tan\theta$					

21. Solve each of the following for all values of x in the interval $0 \le x < 2\pi$

a. $\sin 2x + \sin x = 0$ b. $2\sin^2 x = 1 - \sin x$ c. $2\tan x - \sec^2 x = 0$

22. Which of the following expressions is *not* equivalent to the other two expressions?

A. $\cos^2 x$ B. $(\cos x)^2$ C. $\cos x^2$

23. Which of the following expressions are equivalent?

A. $(\sin x)^{-1}$ B. Arcsin x C. $\sin\left(\frac{1}{x}\right)$ D. $\frac{1}{\sin x}$

24. Solve for x

a. $\ln x + \ln x = 0$ b. $\ln 6 + \ln x - \ln 2 = 3$ c. $\ln(x+5) = \ln(x-1) - \ln(x+1)$

25. Solve for the value of k when $x = 1$ and $y = -2$.

a. $\frac{y^3}{3} = \frac{x^2}{2} + k$ b. $y = ke^{\frac{3x^2}{2}}$

PART II: ANSWER ALL QUESTIONS USING YOUR CALCULATOR

26. Answer the following based on the graph of $y = x^3 - x$:
    a. Determine if the points (3, 2) and (2, 6) are on the graph.
    b. Is the function even, odd or neither? Explain.
    c. Find the x-intercepts and y-intercept.

27. Find the points of intersection of the following system of equations:

$y = \ln(x-2)$
$x - y = 4$