Summer Assignment Part 1
AP Calculus

***These assignments will review the basics from algebra through the first unit of Calculus. They are in the Calculus book (Calculus. Graphical, Numerical, Algebraic Fourth Edition. Finney Demana Waits Kennedy.)which you can check out after the school year is over. You must show all work and please check the odd answers in the back to help you. Don't worry if you have problems with a few of them. You must post at least 4 times over summer break on problems that you had problems with and respond to others' posts. At least write the problems down and show some kind of thoughts that you put into the problem. This is due the day you come back and will be worth 5% of your grade*.**

For each of the Chapters 1-4, use the reference pages to write down 5 of the most important things from each chapter. Then work out the problems from the chapter review checking your answers in the back of the book.

Chapter 1: Prerequisites for Calculus
Reference pages: 7-54

Homework problems: p.55 3-60 multiples of 3 and choose one problem from 63, 65-70

Chapter 2: Rates of Change and Limits
Reference pages: 59-92

Homework problems: p. 96 3-48 multiples of 3 and 53-55

Chapter 3: Derivative of a Function
Reference pages: 99-145

Homework problems: p.148 3-66 multiples of 3 and choose 3 problems from 68-80

Chapter 4: More Derivatives
Reference pages: 153-183

Homework problems: p. 186 3-66 multiples of 3 and 81-83

For each chapter, when you are working on the review exercises, post a question and answer a question about the homework problems on the blog here: http://www.mrandmmeb.com/calculus-blog the password is **calculators**. Do not leave all the work for August. A sample timeline for the homework is below:

Chapter 1: June Chapter 2: June/July Chapter 3: July/August Chapter 4: August.

Summer Assignment Part 2
AP Calculus Free Response

Choose 4 out of the 8 Free Response questions that you feel comfortable doing. Only spend 15 minutes on each problem. It's okay that you don't understand how to completely each problem, just try your best. To help manage your time, do one problem after each chapter you finish for Part 1.

1989 AB1

Let f be the function given by $f(x) = x^3 - 7x + 6$.

(a) Find the zeros of f.

(b) Write an equation of the line tangent to the graph of f at $x = -1$.

(c) Find the number c that satisfies the conclusion of the Mean Value Theorem for f on the closed interval $[1,3]$.

1989 AB4

Let f be the function given by $f(x) = \dfrac{x}{\sqrt{x^2 - 4}}$.

(a) Find the domain of f.

(b) Write an equation for each vertical asymptote to the graph of f.

(c) Write an equation for each horizontal asymptote to the graph of f.

(d) Find $f'(x)$.

1989 BC6

Let f be a function that is everywhere differentiable and that has the following properties.

(i) $f(x+h)=\dfrac{f(x)+f(h)}{f(-x)+f(-h)}$ for all real numbers h and x.

(ii) $f(x)>0$ for all real numbers x.

(iii) $f'(0)=-1$.

(a) Find the value of $f(0)$.

(b) Show that $f(-x)=\dfrac{1}{f(x)}$ for all real numbers x.

(c) Using part (b), show that $f(x+h)=f(x)f(h)$ for all real numbers h and x.

(d) Use the definition of the derivative to find $f'(x)$ in terms of $f(x)$.

1990 AB2

Let f be the function given by $f(x) = \ln \dfrac{x}{x-1}$.

(a) What is the domain of f?

(b) Find the value of the derivative of f at $x = -1$.

(c) Write an expression for $f^{-1}(x)$, where f^{-1} denotes the inverse function of f.

1990 AB4

The radius r of a sphere is increasing at a constant rate of 0.04 centimeters per second. (Note: The volume of a sphere with radius r is $V = \frac{4}{3}\pi r^3$.)

(a) At the time when the radius of the sphere is 10 centimeters, what is the rate of increase of its volume?

(b) At the time when the volume of the sphere is 36π cubic centimeters, what is the rate of increase of the area of a cross section through the center of the sphere?

(c) At the time when the volume and the radius of the sphere are increasing at the same numerical rate, what is the radius?

1993 AB2

A particle moves on the x-axis so that its position at any time $t \geq 0$ is given by $x(t) = 2te^{-t}$.

(a) Find the acceleration of the particle at $t = 0$.

(b) Find the velocity of the particle when its acceleration is 0.

(c) Find the total distance traveled by the particle from $t = 0$ to $t = 5$.

1994 AB 3

Consider the curve defined by $x^2 + xy + y^2 = 27$.

(a) Write an expression for the slope of the curve at any point (x, y).

(b) Determine whether the lines tangent to the curve at the x-intercepts of the curve are parallel. Show the analysis that leads to your conclusion.

(c) Find the points on the curve where the lines tangent to the curve are vertical.