AP Calculus AB

This fall you will be in the Calculus AB class. It is a rigorous college level class. You will be expanding all of the math knowledge that you have acquired over the last three years of college prep math. In order to be able to start with the new material as soon as possible, you will need to do some preparation at home during the summer. Below is a list of problems that will need to be done before you come to school in August. Much of it is a review from last year's Math Analysis class. Use your Math Analysis notebook to help you do the problems. This assignment will be due on the first day of school. You will need a graphing calculator for this class, it is also required for the AP test. Graphing calculators go on sale during August, so it you do not own one please buy one. The recommended brand and model of calculator for this course is Texas Instrument TI 83, TI 83 Plus, TI 84, or TI 84 Plus. Have a great summer

Assignments
Pg. 9-11: #14, 16, 20, 32, 38, 44, 57
Pg. 19-20: # 6, 10, 15, 18, 22, 24, 28, 30, 32, 34, 42, 44, 46, 49 (use interval notation when possible)
Pg. 26-27: # 1-4,9-12, 24, 35,38
Pg. 44: # 1-6, 8, 10, 11, 37-40, 46, 48
Pg. 52-53: # 1-10, 27-40
Pg. 56-57: # 3-5, 8, 13, 20-26 (even) 28, 30, 37-40, 59, 62,64,65
BE SURE TO SHOW YOUR WORK FOR ALL THE PROBLEMS

Notes/Formulas for Sec 1.1

Slope of two points = $\frac{rise}{run} = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$

Point slope equation: $y = m(x - x_1) + y_1$ Slope of m and through (x_1, y_1)

Parallel lines have the same slope

Perpendicular lines have slopes that are opposite reciprocals

Distance = (rate)(time)

Notes/Formulas for Sec 1.2

Domain: Set of all x-values for which the function is defined

Range: Set of all y-values for which the function is defined

Interval notation: Brackets [ ] mean to include, parenthesis mean to exclude ( ), you may use one of each.

Even function: $f(-x) = f(x)$, symmetric about the y-axis
Odd function: $f(-x) = -f(x)$, symmetric about the origin

Notes/Formulas for Sec 1.3

Exponential Growth: $y = k \bullet a^x$ where k > 0 and a > 1
Exponential Decay: $y = k \bullet a^x$, where k > 0 and 0 < a < 1

Half life: $P(t) = P_0\left(\frac{1}{2}\right)^{t/k}$ where P_0 is the initial amount and k is the half life of the substance.

Growth Model: $P(t) = P_0(1 + r)^t$ where P_0 is the initial amount and r is the rate as a decimal.

Decay Model: $P(t) = P_0(1 - r)^t$ where P_0 is the initial amount and r is the rate as a decimal.

Notes/Formulas for Sec 1.5

One to One: Passes horizontal line test

Function will have an inverse if it passes the horizontal line test.

To find an inverse, switch $f(x)$ to y. Switch the x and y, then solve for y.

Logarithms

$y = \log_a x$ if and only if $a^y = x$

Inverse properties of logarithms

$a^{\log_a x} = x$ $\qquad$ $e^{\ln x} = x$

$\log_a a^x = x$ $\qquad$ $\ln e^x = x$

Properties of logarithms (works for natural logarithms too)

$\log_a xy = \log_a x + \log_a y$

$\log_a \frac{x}{y} = \log_a x - \log_a y$

$\log_a x^y = y\log_a x$

Change of base formula: $\log_a x = \frac{\log x}{\log a}$

Notes/Formulas for Sec 1.6

Convert from degrees to radians: multiply by $\frac{\pi}{180^\circ}$

Convert from radians to degrees: multiply by $\frac{180^\circ}{\pi}$

Arc Length = $r\theta$ (r = radius and θ = the angle in **radians**)

$\sin^{-1}$ is defined between $-\frac{\pi}{2} \le \theta \le \frac{\pi}{2}$

$\cos^{-1}$ is defined between $0 \le \theta \le \pi$

$\tan^{-1}$ is defined between $-\frac{\pi}{2} < \theta < \frac{\pi}{2}$

If r is the radius

$\sin\theta = \frac{y}{r}$ $\qquad$ $\csc\theta = \frac{r}{y}$

$\cos\theta = \frac{x}{r}$ $\qquad$ $\sec\theta = \frac{r}{x}$

$\tan\theta = \frac{y}{x}$ $\qquad$ $\cot\theta = \frac{x}{y}$

Also remember that what quadrant your ordered pair lies in will determine if the values of x and y are negative or positive, and thus whether your trig functions are negative or positive.