AP Calculus AB Summer Assignment

Welcome to Advanced Placement Calculus AB! This is an extremely rigorous and fast-paced course whose purpose is to provide you with a solid understanding of Calculus concepts, experience with its methods and applications, and the ability to utilize these concepts in problem solving situations. You will learn problem solving methods involving theorems, definitions, and functions represented in different ways that you can apply to various real-world problems. You will also use technology to explore, experiment, interpret results, and support your conclusions.

Because AP Calculus AB is a college-level course, this class will challenge you and I will have very high expectations. **This is NOT a class where every problem you see on tests and quizzes is identical to problems you've done repeatedly in class.** This is because you are expected to take what you know and apply it in this course (and in all math courses going forward), rather than simply regurgitating a rote process. If you have a solid foundation in Algebra, Geometry, and Trigonometry, aren't afraid of being challenged in the way I described, and are interested in seeing math as it relates to your world, this is the class for you! Read on for your summer assignment and get excited for AP Calc!

Directions: Complete the following steps:

1. Get the course textbook (*Calculus: Graphing, Numerical, Algebraic 4th Edition* (Finney, Demana, Waits, Kennedy)) and Math XL access.

To get Math XL access (if it is not already bundled with your textbook):
1. Go to: http://info.mathxlforschool.com/purchase
2. Choose **MathXL for School Student Access**
3. Go through the process of purchasing student access.
4. Login to Math XL and enroll in this course using the course ID: **XL07-V15E-801Z-9CY3**

2. Complete Homework 0 on Math XL. Homework 0 will familiarize you with Math XL, a program we will use frequently throughout this course.

3. Subscribe to PatrickJMT's Youtube channel (https://www.youtube.com/user/patrickJMT/featured). He has made concise, clear videos about almost every high school level math concept (and beyond!). I would recommend watching any/all of his videos related to the topics covered in Chapter 1 of our textbook: lines, functions and graphs, exponential functions, parametric equations, functions and logarithms, and trigonometric functions. I highly recommend the following:
https://www.youtube.com/watch?v=9kKZHQtYP7g (Parametric Equations)
https://www.youtube.com/watch?v=R0RM6FeiD8k (Graphing Trigonometric Functions)
https://www.youtube.com/watch?v=I4mcja8abDc (Trig Identities)
https://www.youtube.com/watch?v=AAW7WRFBKdw (Properties of Logarithms)
This part of the assignment is your opportunity to review crucial prerequisite concepts and skills required for AP Calculus.

4. Complete Homework 1 on Math XL. Homework 1 will give you an opportunity to practice prerequisite skills and review concepts you learned in your prerequisite course which are necessary for success in this course going forward. Homework 1 consists of 59 questions and will take a few hours to complete – I highly recommend that you spread it out over several days. Math XL will save your progress and allow you to return to the assignment as many times as you'd like.

5. Familiarize yourself with the "Need to Know" sheet on the last page of this assignment. This is a list of identities, formulas, and rules that you will be expected to know throughout this course. These things will not be provided for

you on a formula sheet for any homework assignment or exam – the expectation is that you know them and are able to utilize them when solving problems in this course.

Expectations: You will show complete work on lined paper in pencil. You may work with a fellow student if you would like, but you will submit your own assignments through your own account, and you will complete your own work on lined paper (and not copy the work of another student).

Resources: Feel free to utilize your textbook as a resource (in addition to PatrickJMT's videos) while completing Homework 1. The questions on Math XL align with the sections in your book, and this particular assignment comes from Chapter 1. I would advise looking through the lessons and example problems prior to attempting Homework 1. Furthermore, you should feel free to take advantage of the tools provided by Math XL, including View an Example (which guides you step by step through a nearly identical problem), Help Me Solve This (which gives you progressive hints), and Ask My Instructor (which will send me an email about the specific question you're stuck on).

First Day of Class: We will have a Chapter 1 quiz the first day of class. This quiz will consist of 10 (some calculator, some no-calculator) free response questions very similar to the questions you encountered in Homework 1. You will be able to use your work from Homework 1 as reference during the quiz. This quiz will also count as the first score in the Test category of your grade.

Approximate Time for Completion: 8 – 10 hours

NEED TO KNOW

Pythagorean Identities

$$\sin^2 x + \cos^2 x = 1$$

$$1 + \cot^2 x = \csc^2 x$$

$$\tan^2 x + 1 = \sec^2 x$$

$$\sin 2A = 2\sin A \cos A$$

$$\cos 2A = \cos^2 A - \sin^2 A$$

$$= 1 - 2\sin^2 A$$

$$= 2\cos^2 A - 1$$

Properties of the Logarithm

b is a real number such that
$b > 0$ and $b \neq 1$

$$\log_b(xy) = \log_b x + \log_b y$$

$$\log_b\left(\frac{x}{y}\right) = \log_b x - \log_b y$$

$$\log_b x^n = n \cdot \log_b x$$

$$(a+b)^2 = a^2 + 2ab + b^2$$

$$(a-b)^2 = a^2 - 2ab + b^2$$

$$(a+b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$$

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

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

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

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

LOGARITHMIC FUNCTIONS

$$f(x) = \log_b x$$

- The output of a log function is an exponent.
- Log and exp. functions are inverses.
- Domain: (0, ∞)
- Range: (-∞, ∞)
- x-intercept of the graph: (1,0)
- Vertical Asymptote at x = 0 (or the y-axis)