AP Calculus AB Summer Assignment 2016

Welcome to Calculus!!! As you enter calculus, it is expected that you have mastered the content in the courses from Algebra to Precalculus as this is important to your success in calculus. You will discover that many times you will be able to do the calculus work, only to find the final answer is incorrect due to an algebraic error in your work.

In order for you to be successful in calculus, you need to review some of the essential pre-requisite skills. These skills are the culmination of all the mathematics you have ever had and are contained in this summer assignment.

- Memorize the trigonometric functions of the basic angles. Learn the "Hand Trick!"
- Make sure you can recognize the graphs of all parent functions.

When you come across a topic that requires a little more review, feel free to search a website, call a friend or email me your questions. Relevant websites can be found at:

- http://patrickjmt.com/
- http://www.khanacademy.org
- www.mastermathmentor.com

- ✓ **You must do each of the problems without a calculator, showing ALL steps which lead to the solution in an organized manner.**
- ✓ **Show all work on every problem to receive credit. Circle all answers. If you need extra space, use the back of the page.**
- ✓ **All work must be done in pencil (No pens).**

For the first day of class, you will need either a three-subject notebook or a two inch binder with paper strictly for calculus. Also get yourself several folders for handouts. Calculus is a fast paced and challenging course. It is extremely important to be organized and always prepared for class.

This packet is due on Tuesday, September 6, 2016. It will count as a homework grade.
Test on this pre-requisite material: Friday, September 9, 2016

Enjoy your summer. If you have question you can email me at caroblumhof@paps.net**.**
Looking forward to seeing you in September!

Mrs. Blumhof

Calculus Summer Assignment

Name_____

<u>This assignment will be collected on the first day of school.</u> No excuses!!!!

1] A line passes through the points (–4, –6) and (8, 4).

  a) Write the equation of this line in point-slope form.

  b) Use point-slope form to write the equation of the line that is perpendicular to the given line at the point (2, –1).

  c) Use point-slope form to write the equation of the line that is parallel to the given line at the point (–2, 5).

2] A high diver jumps off a springboard. Her height above the water is given by $h(t) = -4t^2 + 8t + 10$ where **h** is meters and **t** in seconds.

  a) What is her maximum height and when does it occur?

  b) When does the diver hit the water?

  c) When does the diver return to her initial height?

3] Factor completely:

  a) $3x^2 - 5x - 8$

  b) $4x^3 - 8x^2 - 25x + 50$

  c) $x^3 - 64$

  d) $2x^{\frac{5}{4}} + x^{\frac{3}{4}} - 15x^{\frac{1}{4}}$

4] Simplify:

  a) $\dfrac{x+1}{x} - \dfrac{x}{x+1}$

  b) $\dfrac{4x}{x^2-4} - \dfrac{4}{x+2}$

  c) $\dfrac{x}{1+\sqrt{x+1}}$

5] Find the zeros of each of the following:

  a) $0 = x^3 - 12x^2 + 27x$

  b) $0 = x^3 - 10x^2 - 25x + 250$

  c) $\dfrac{x}{3} - \dfrac{5}{2} = -\dfrac{3}{x}$

6] Simplify:

  a) $\dfrac{\dfrac{1}{x} - \dfrac{1}{5}}{\dfrac{1}{x^2} - \dfrac{1}{25}}$

  b) $\dfrac{1 - \sqrt{1 - x^2}}{x^2}$

  b) $\dfrac{x^{-2} + x^{-1} + 1}{x^{-2} - x}$

7] Solve for x:

  a) $9^{x-3} = 27^{2x}$

  b) $\log_2 x + \log_2 (x - 2) = 3$

  c) $\ln e^x = 4$

8] Simplify:

  a) $\left(-5x^3\right)^{-2}$

  b) $\left(x^{\frac{1}{2}} - x\right)^{-2}$

  c) $\left(4x^2 - 12x + 9\right)^{-\frac{1}{2}}$
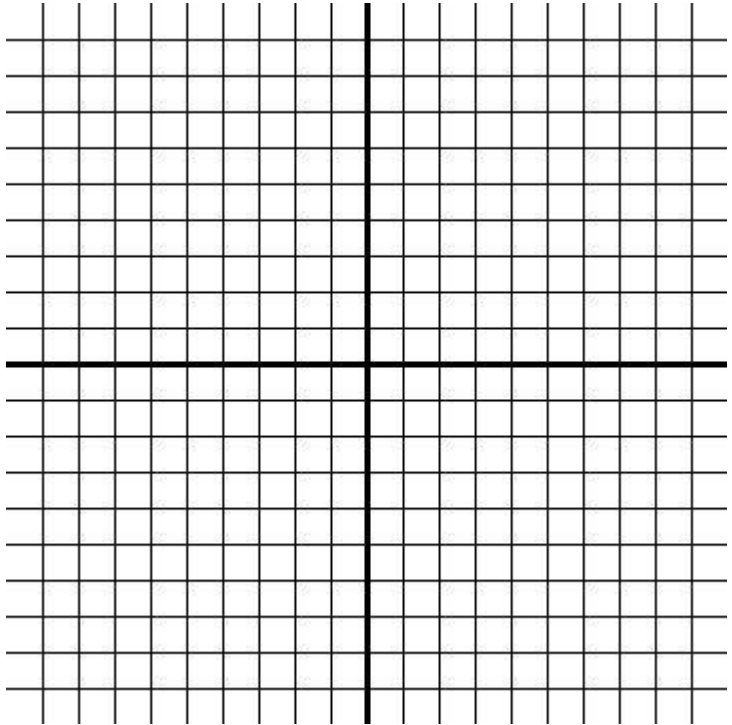
  d) $(-32x^{-5})^{-\frac{3}{5}}$

9] Graph this piecewise function:

$$f(x) = \begin{cases} x+3 & x \geq 1 \\ 2 & -1 < x < 1 \\ 2 - x^2 & x \leq -1 \end{cases}$$

a) What is the value of $3f(1)$?

b) What is the value of $f(-7)$?

c) What is the value of $4f(-6) + 5f(0)$?

10] Given: $f(x) = x^2 - 5x + 8$

a) Find: $f(5) - f(-4)$
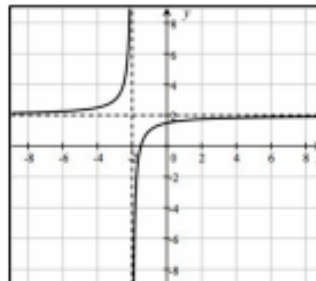
b) Find: $f(x+2) - f(2)$

c) Find: $\dfrac{f(x+h) - f(x)}{h}$

11] Use interval notation to identify the domain for each of the following functions:

a) $f(x) = \dfrac{x+1}{x^2 - 1}$

b) $f(x) = \dfrac{x+2}{\sqrt{x-3}}$

c)

14] Find the horizontal asymptotes for each of the following:

a) $f(x) = \dfrac{4x^2 + 2x - 5}{3 - 5x + 3x^2}$

b) $f(x) = \dfrac{3x + 7}{3 - 4x + 5x^2}$

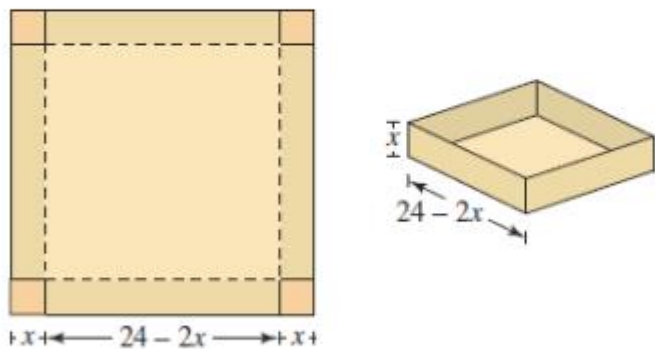c) $f(x) = \dfrac{8x + 6 - 5x^3}{5x^2 - 6x + 4}$

15] List the vertical asymptotes and/or holes for the following functions if they exist.

a) $f(x) = \dfrac{x - 3}{x^2 + 5x - 6}$

b) $f(x) = \dfrac{x - 2}{x^2 - 3x + 2}$

16.

Volume An open box of maximum volume is to be made from a square piece of material 24 centimeters on a side by cutting equal squares from the corners and turning up the sides (see figure).

(a) Write the volume V as a function of x, the length of the corner squares. What is the domain of the function?