AP Calculus AB Summer Assignment 2016
Due: Monday, August 29th (First day of Summer Institute)
Ms. Vella/Ms. Ayinde

AP Calculus AB is a rigorous and challenging course that requires hard work and perseverance. As a result, we must continue to practice our mathematics skills over the summer to be prepared for the fall. There are two parts to this assignment, part one is a review of Algebra II and Trigonometry, while part two delves into some of the beginning topics of Pre-Calculus.

Part One: Algebra II/Trigonometry Review Packet

Directions:
1) Print out the following review packet of Algebra II/Trigonometry.
2) Answer all of the questions and be sure to show all of your work directly on the packet.
3) Remember that you will not receive full credit if all work is not shown!

Part Two:
This part of the assignment is designed to help you segue from Algebra II/Trig into AP Calculus. Videos and online resources are excellent ways to seek explanation or clarification of certain topics and will be encouraged throughout the school year. The first video is a review from this year, while the second is a new topic. Do your best and let me know if you have any questions!

Directions:
1) Print out the worksheet that is attached to this PDF, labeled "AP Calculus AB Summer Assignment Part Two" (4 pages in length).
2) Review and know how to graph commonly used functions. Ex: $y = x^2$, $y = x^3$, $y = |x|$, $y = \sqrt{x}$, etc…
3) Watch the assigned videos (links found on worksheet) and take notes in the allotted sections of the worksheet.
4) Answer the questions corresponding to each video.
5) Be sure to show any work!

The summer assignment will be collected and graded as a quiz. Do your best and let me know if you have any questions!

Have a wonderful and relaxing summer!
Please feel free to email us with any questions!
**vellab@cheznous.org/ayindes@cheznous.org**

Name: _____   Due Date: <u>8/29/16</u>
Ms. Vella/Ms. Ayinde   Summer Assignment Part 1

AP Calculus AB Summer Assignment Part I
Algebra II/Trigonometry Review Packet

Answer all of the following questions. Please write your answer next to the question number. Be sure to show all of your work directly on the packet!

1. 4. Which bold line segment correctly identifies $\sin \dfrac{5\pi}{6}$?

(1)

(3)

(2)

(4)
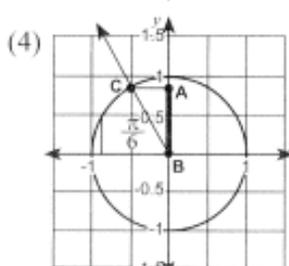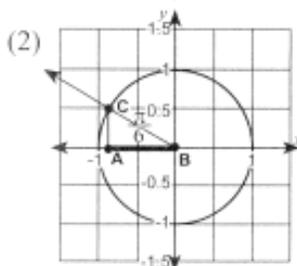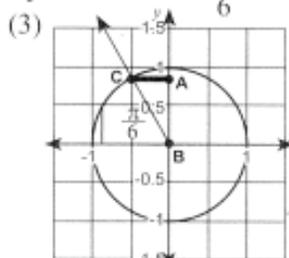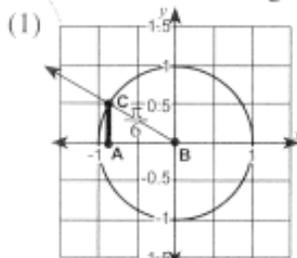
2. 22. Find the inverse $g(x)$ for the function: $f(x) = \dfrac{(x+5)}{(x-2)}$

(1) $g(x) = \dfrac{2x+5}{x-1}$ (3) $g(x) = \dfrac{x-2}{x+5}$

(2) $g(x) = \dfrac{2x+5}{x+1}$ (4) $g(x) = \dfrac{y+5}{y-2}$

3. Factored completely, the expression $6x - x^3 - x^2$ is equivalent to

1) $x(x+3)(x-2)$ 3) $-x(x-3)(x+2)$
2) $x(x-3)(x+2)$ 4) $-x(x+3)(x-2)$

4. 15. Which sine function has a period of 8π, a midline of $y = 3$ and an amplitude of 2?

(1) $f(x) = 2\sin(8x) + 3$

(3) $f(x) = 2\sin\left(\frac{1}{2}x\right) + 3$

(2) $f(x) = 3\sin\left(\frac{1}{4}x\right) + 2$

(4) $f(x) = 2\sin\left(\frac{1}{4}x\right) + 3$

5. 2. The expression $\dfrac{16\left(x^{\frac{1}{4}}y^{-\frac{1}{2}}\right)^6}{\sqrt{9xy^4}}$ is equivalent to

(1) $\dfrac{16x^3}{3y^5}$

(2) $\dfrac{16x}{3y^5}$

(3) $\dfrac{16xy}{3}$

(4) $\dfrac{16}{3xy^5}$

6. 20. Which of the following is equivalent to $32^{-\frac{4}{5}}$?

(1) $\dfrac{1}{16}$

(2) No real solution

(3) 16

(4) -16

7. The expression $\dfrac{11}{\sqrt{3}-5}$ is equivalent to

1) $\dfrac{-\sqrt{3}-5}{2}$

2) $\dfrac{-\sqrt{3}+5}{2}$

3) $\dfrac{\sqrt{3}-5}{2}$

4) $\dfrac{\sqrt{3}+5}{2}$

8. When simplified, the expression $\left(\sqrt[3]{m^4}\right)\left(m^{-\frac{1}{2}}\right)$ is

equivalent to

1) $\sqrt[3]{m^{-2}}$

2) $\sqrt[4]{m^3}$

3) $\sqrt[5]{m^{-4}}$

4) $\sqrt[6]{m^5}$

9. What is the sum of $\dfrac{3}{x-3}$ and $\dfrac{x}{3-x}$?
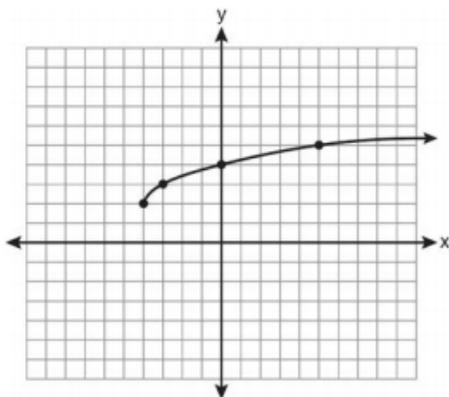
1) 1
2) −1
3) $\dfrac{x+3}{x-3}$
4) 0

10. 13. What is the solution of the equation $\dfrac{2x^2+5x-3}{x^2+2x-3}=7$?

(1) { }   (2) $\left\{-3,\dfrac{6}{5}\right\}$ (3) {−3}   (4) $\left\{\dfrac{6}{5}\right\}$

11. What is the domain of the function $f(x)=\dfrac{2x^2}{x^2-9}$?

1) all real numbers except 0
2) all real numbers except 3
3) all real numbers except 3 and −3
4) all real numbers

12. What are the domain and the range of the function shown in the graph below?

1) $\{x\,|\,x>-4\}$; $\{y\,|\,y>2\}$
2) $\{x\,|\,x\geq-4\}$; $\{y\,|\,y\geq2\}$
3) $\{x\,|\,x>2\}$; $\{y\,|\,y>-4\}$
4) $\{x\,|\,x\geq2\}$; $\{y\,|\,y\geq-4\}$

13. If $\cos\theta > 0$ and $\csc\theta < 0$, in which quadrant does the terminal side of θ lie?
   1) I
   2) II
   3) III
   4) IV

14. What is the radian measure of an angle whose measure is $-420°$?
   1) $-\dfrac{7\pi}{3}$
   2) $-\dfrac{7\pi}{6}$
   3) $\dfrac{7\pi}{6}$
   4) $\dfrac{7\pi}{3}$

15. At $x = \dfrac{\pi}{2}$, the difference $2\sin x - \cos 2x$ is
   1) 1
   2) 2
   3) 3
   4) 0

16. The value of $\cos^2\left(\dfrac{\pi}{4}\right)$ is
   1) 1
   2) $\dfrac{1}{2}$
   3) $\dfrac{1}{4}$
   4) 0

17. The expression $\dfrac{1-\cos^2 x}{\sin^2 x}$ is equivalent to

1) 1
2) −1
3) sin x
4) cos x

18. A population of rabbits doubles every 60 days according to the formula $P = 10(2)^{\frac{t}{60}}$, where P is the population of rabbits on day t. What is the value of t when the population is 320?

1) 240
2) 300
3) 660
4) 960

19. In the equation $\log_x 4 + \log_x 9 = 2$, x is equal to

1) $\sqrt{13}$
2) 6
3) 6.5
4) 18

20. 9. If $\sin\theta = \dfrac{7}{25}$ where θ is an angle in standard position that terminate in quadrant II, what is the value of $\tan\theta$?

(1) $\dfrac{7}{24}$ (2) $-\dfrac{7}{24}$ (3) $\dfrac{24}{7}$ (4) $-\dfrac{24}{7}$

21.   Solve the following system of equations
       algebraically: $9x^2 + y^2 = 9$

$$3x - y = 3$$

22.
    Growth of a certain strain of bacteria is modeled by
    the equation $G = A(2.7)^{0.584t}$, where:
    $G =$ final number of bacteria

    $A =$ initial number of bacteria

    $t =$ time (in hours)

    In approximately how many hours will 4 bacteria
    first increase to 2,500 bacteria? Round your
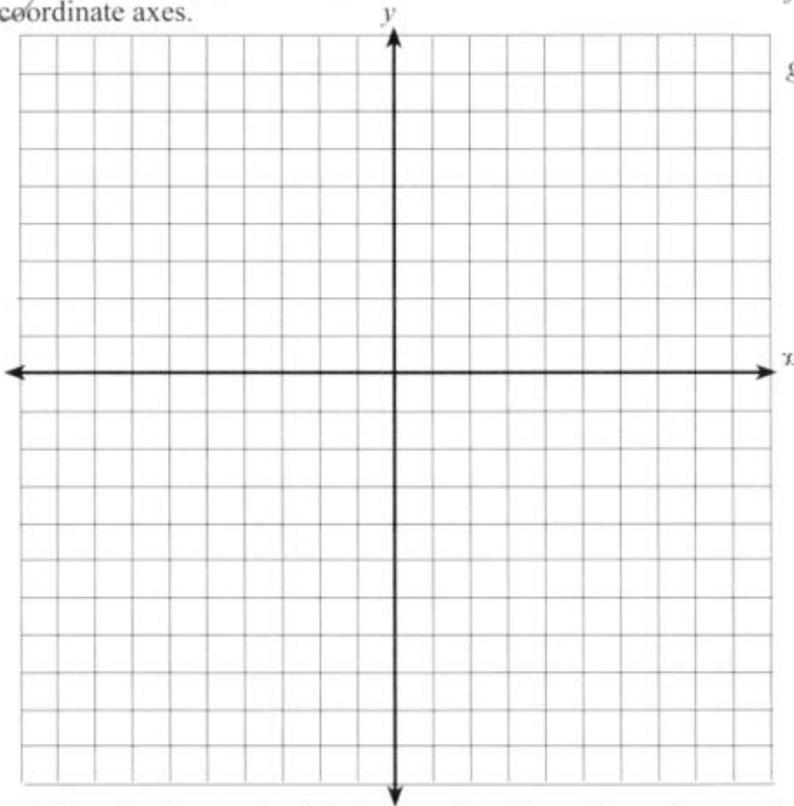   answer to the *nearest hour*.

23.   30. Solve the following equation. $-\dfrac{3}{x} + \dfrac{5}{2x} = -6$
       Explain each step in the process.

24.

37. Sketch the graph of this pair of functions on the same coordinate axes.

$$f(x) = \left(\frac{1}{2}\right)^x$$

$$g(x) = -\left(\frac{1}{2}\right)^x + 4$$

Describe the graph of $g(x)$ as a series of transformations on the graph of $f(x)$. Identify the intercepts and describe the end behaviors of $f(x)$ and of $g(x)$.

25. Solve $\sqrt{3x+1} = x-1$. Justify your solution(s).

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Ms. Vella/Ms. Ayinde   Summer Assignment Part II

AP Calculus AB Summer Assignment Part II

1. Watch the following YouTube video, called "Horizontal and Vertical Graph Transformations."
    a. https://www.youtube.com/watch?v=3Q5Sy034fok
    b. Take notes on the video. There are questions below to use as a guideline.

Notes:
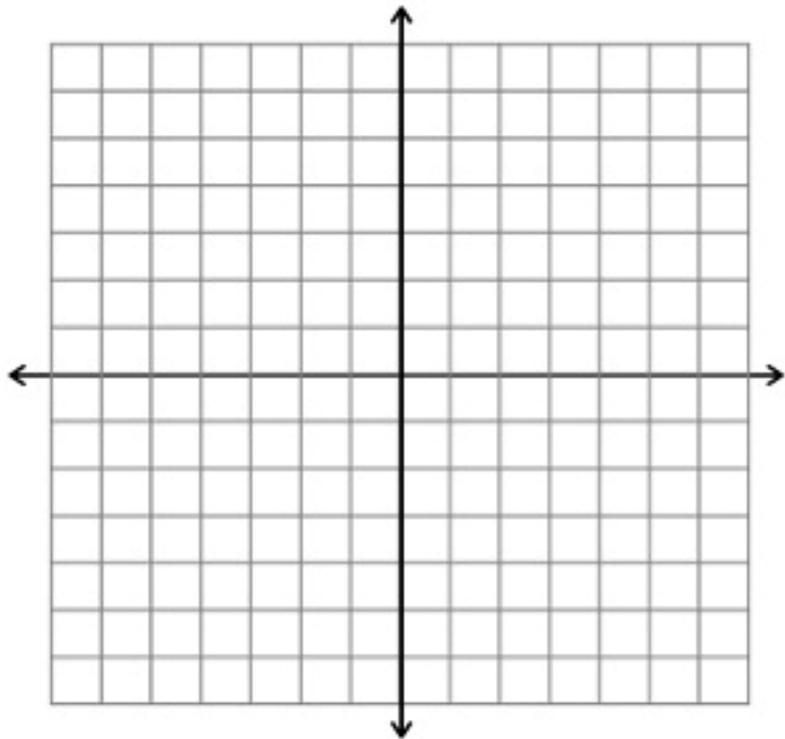**When do we have a horizontal transformation? How does this affect horizontal asymptotes?**

When do we have a vertical transformation? How does this affect vertical asymptotes?

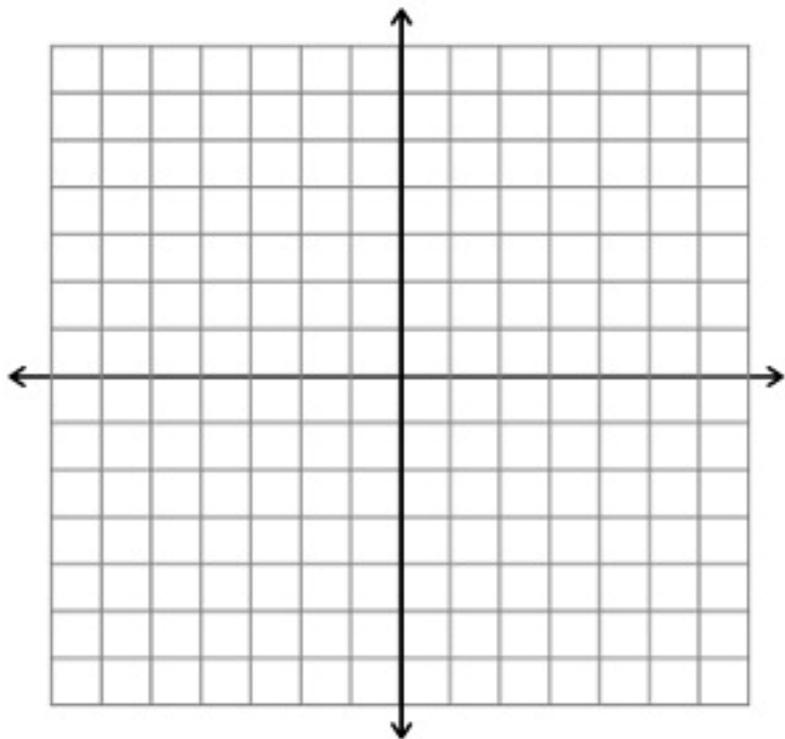**Important examples from video:**

Questions on Video #1:

Graph the following functions. Label the vertical and horizontal asymptotes and any transformations the graphs undergo.

1. $f(x) = (x-1)^2 + 4$

2. $f(x) = |x - 3| - 4$

Now, watch the following YouTube video on piecewise functions, called "Piecewise Functions"
   a.   https://www.youtube.com/watch?v=hy0N-90gCu0

Notes:
What is a piecewise function?

How do we determine which part of the function to plug our x-value into?

How can we graph piecewise functions?

Important examples from video:

Questions on Video #2:

Answer the following questions regarding the function. Then graph the function.

1.

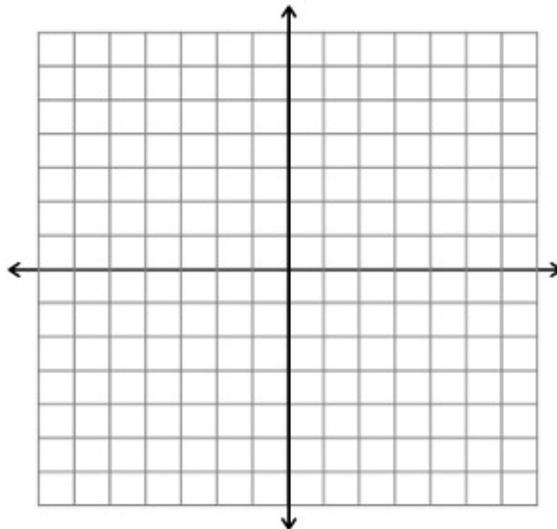$$f(x) = \begin{cases} 2x^2 - 1, & x < 1 \\ x + 4, & x \geq 1 \end{cases}$$

Graph

a. f(-2)=?

b. f(3)=?

c. f(4)+f(-2)=?

d. f(-3)-f(6)+ f(3)=?

2. $g(x) = \begin{cases} e^x & \text{if} & x < 0 \\ (x-1)^2 & \text{if} & 0 \leq x < 1 \\ x+1 & \text{if} & x \geq 1 \end{cases}$

a. f(3)=?

Graph

b. f(-2)=?

c. f(0)=?

d. f(2)=?

e. f(.5)=?

f. f(3) + f(4) – f(-1) + f(1) +f(0)=