

**AP Calculus AB Summer Assignment 2017**  
**Due: Monday, August 28<sup>th</sup> (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 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 parent 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 us 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**

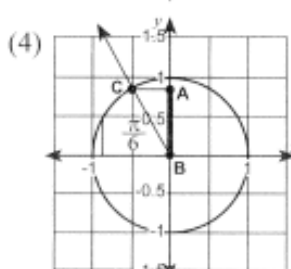
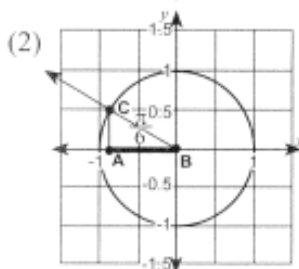
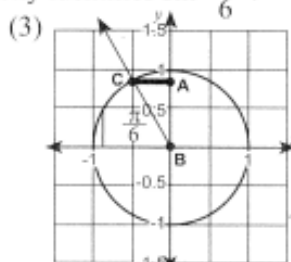
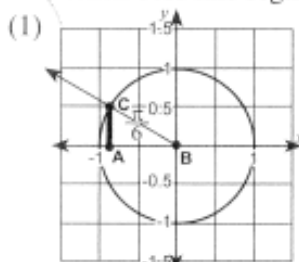
Name: \_\_\_\_\_  
Ms. Vella/Ms. Ayinde

Due Date: 8/28/17  
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  $\sin \frac{5\pi}{6}$  ?



2. 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) $-x(x + 3)(x - 2)$ |

3. 15. Which sine function has a period of  $8\pi$ , 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)  $f(x) = 2\sin\left(\frac{1}{4}x\right) + 3$

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

- (1)  $\frac{16x^3}{3y^5}$       (2)  $\frac{16x}{3y^5}$       (3)  $\frac{16xy}{3}$       (4)  $\frac{16}{3xy^5}$

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

- 1)  $\frac{-\sqrt{3}-5}{2}$   
 2)  $\frac{-\sqrt{3}+5}{2}$   
 3)  $\frac{\sqrt{3}-5}{2}$   
 4)  $\frac{\sqrt{3}+5}{2}$

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

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

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

8. If  $\cos \theta > 0$  and  $\csc \theta < 0$ , in which quadrant does the terminal side of  $\theta$  lie?
- 1) I
  - 2) II
  - 3) III
  - 4) IV
9. At  $x = \frac{\pi}{2}$ , the difference  $2 \sin x - \cos 2x$  is
- 1) 1
  - 2) 2
  - 3) 3
  - 4) 0
10. The value of  $\cos^2\left(\frac{\pi}{4}\right)$  is
- 1) 1
  - 2)  $\frac{1}{2}$
  - 3)  $\frac{1}{4}$
  - 4) 0
11. The expression  $\frac{1 - \cos^2 x}{\sin^2 x}$  is equivalent to
- 1) 1
  - 2) -1
  - 3)  $\sin x$
  - 4)  $\cos x$

12. 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

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

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

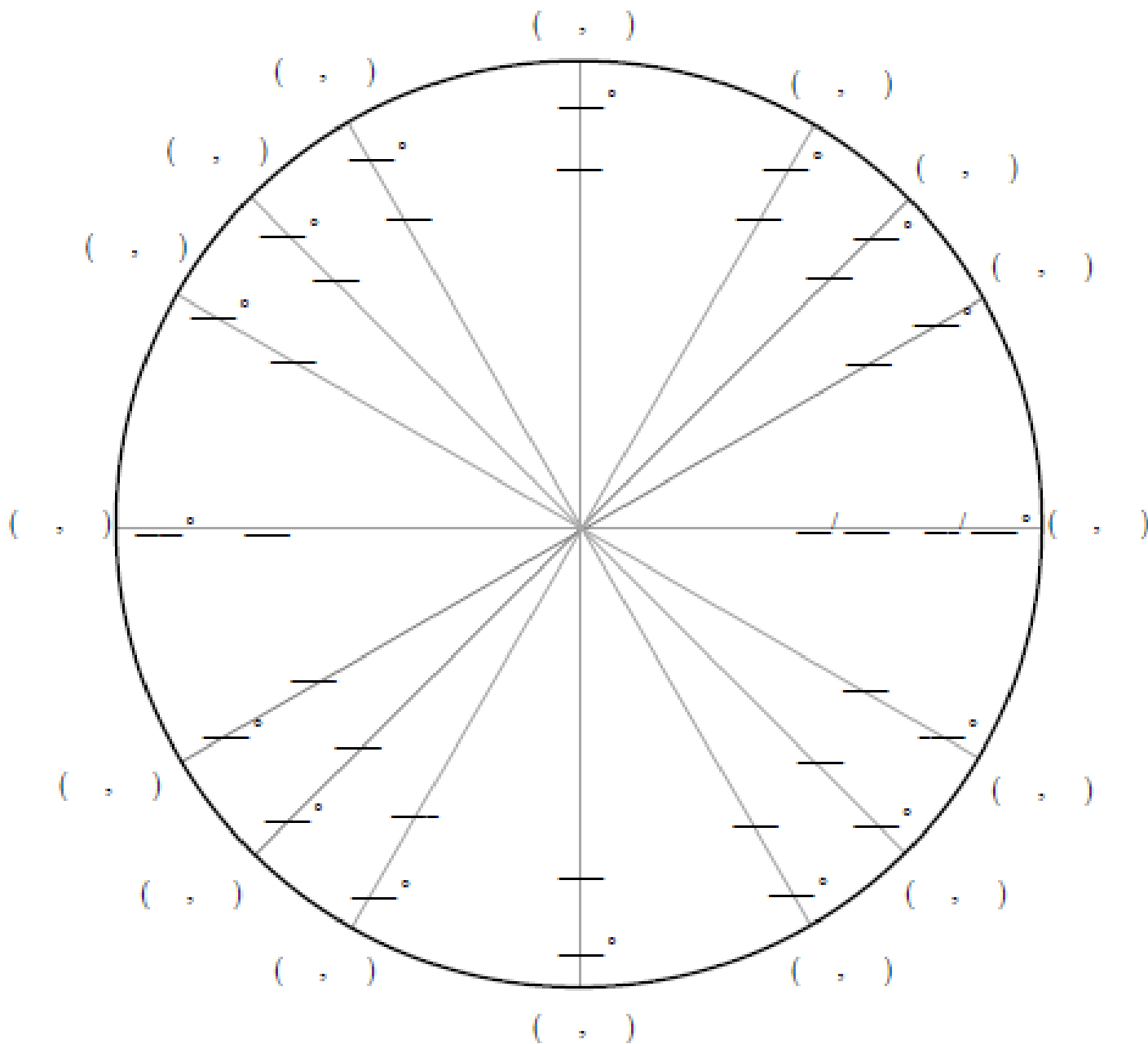
14.  9. If  $\sin \theta = \frac{7}{25}$  where  $\theta$  is an angle in standard position that terminate in quadrant II, what is the value of  $\tan \theta$ ?

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

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

$$3x - y = 3$$

Fill in the following unit circle. The radian measures are most important as degrees are rarely used in AP Calculus. This needs to be COMPLETELY known, understood, and memorized BEFORE the start of the summer institute. Then answer the questions on the next page using the unit circle.



Answer the following trigonometric exact values.

16.  $\csc \frac{5\pi}{6}$

17.  $\cos \frac{4\pi}{3}$

18.  $\sin \frac{5\pi}{3}$

19.  $\cot \frac{5\pi}{4}$

20.  $\sec \frac{11\pi}{6}$

21.  $\sin \frac{9\pi}{4}$

22.  $\tan \frac{7\pi}{3}$

Give one possible radian measure that could satisfy the following.

23.  $\sin^{-1}\left(-\frac{1}{2}\right)$

24.  $\tan^{-1}(\sqrt{3})$

25.  $\sec^{-1}(2)$

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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?**

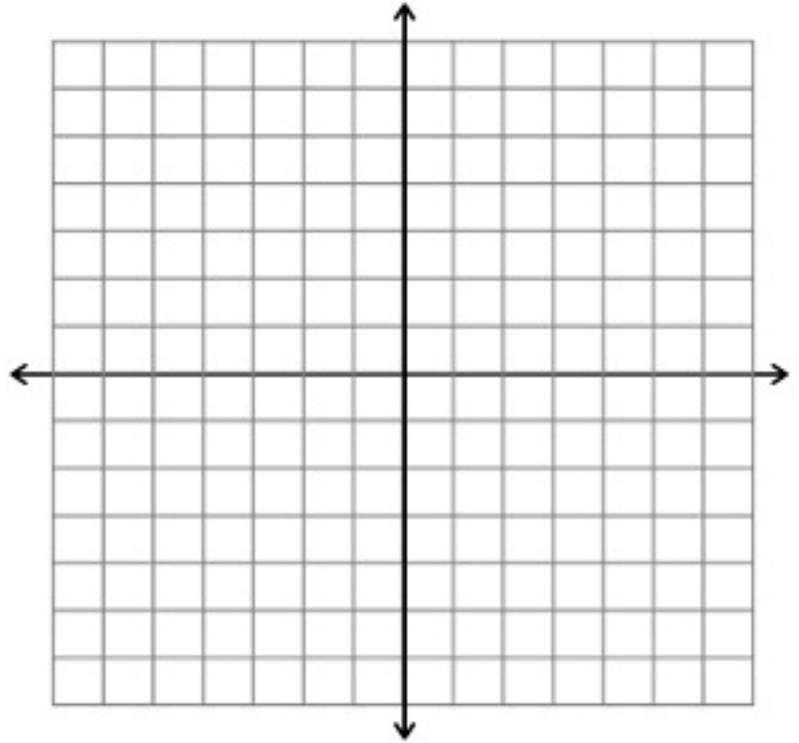
**Important examples from video:**



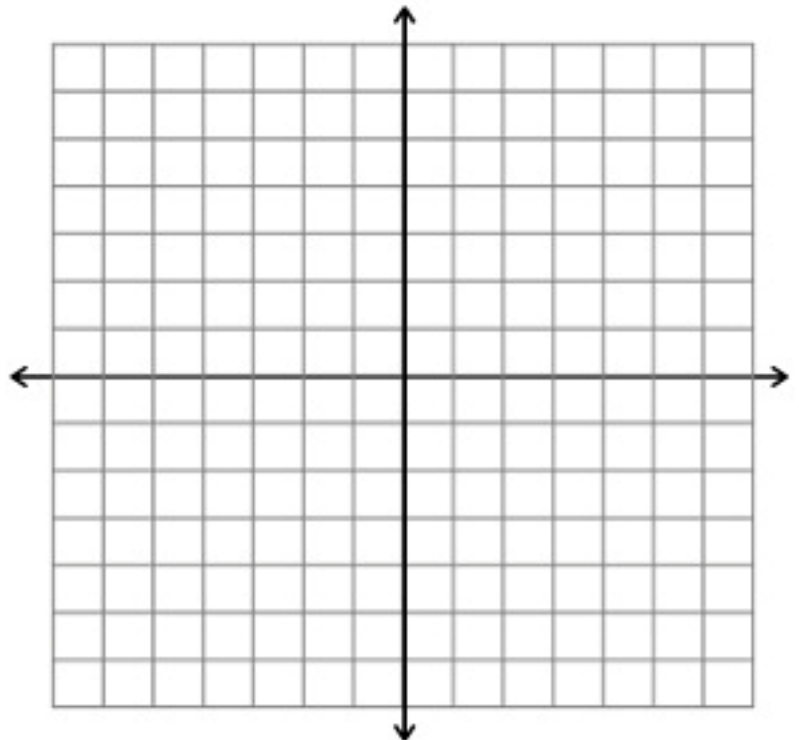
**Questions on Video #1:**

Graph the following functions. State and label the vertical and horizontal asymptotes, if any, and any transformations the graphs undergo.

1.  $f(x) = \frac{1}{x+3} - 2$



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.

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

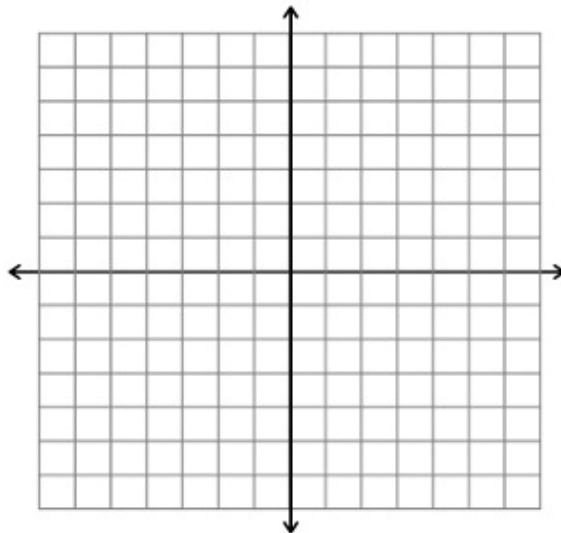
a.  $f(-2)=?$

b.  $f(3)=?$

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

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

Graph



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

a.  $f(3)=?$

b.  $f(-2)=?$

c.  $f(0)=?$

d.  $f(2)=?$

e.  $f(.5)=?$

f.  $f(3) + f(4) - f(-1) + f(1) + f(0)=$

Graph

