

Dear Prospective AP Calculus Student,

You are receiving this packet of information regarding AP Calculus because you are currently enrolled in the course in Fall 2009. If you do not want to take AP Calculus next year, please notify Mrs. Parker and your counselor in Student Services. I am pleased to welcome you to the HSHS AP Calculus program. Calculus is a fun, intriguing course filled with lots of challenges. We will work through these curricular obstacles together so that each student in the program is well prepared for college mathematics.

This packet contains information regarding your summer assignment. The summer assignment is a required part of the course. I will be available over the summer via email if you have questions and/or concerns involving the assignment. Please do not hesitate to contact me. After reading through this packet, complete the bottom portion of this letter, detach it, and return it to Mrs. Parker in room 1712 by Tuesday, June 2<sup>nd</sup>.

Have a great summer!

Catrina Parker  
[cparker4@wcpss.net](mailto:cparker4@wcpss.net)  
HSHS Math Department

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I, \_\_\_\_\_, have read and understand the requirements of the summer assignment for AP Calculus.

Student Signature: \_\_\_\_\_

Student Email: \_\_\_\_\_

Parent/Guardian Name: \_\_\_\_\_

Parent/Guardian Signature: \_\_\_\_\_

## *What should I complete for my AP Calculus summer assignment?*

- ∞ AP Calculus Summer Assignment – Part 1: Pre-Calculus Topics
- ∞ AP Calculus Summer Assignment – Part 2: Limits, Continuity, Introduction to Derivatives
- ∞ Study the unit circle and trigonometric identities.

## *Why should I complete this assignment?*

- ∞ Completing this assignment will ensure that you are prepared for AP Calculus.
- ∞ Parts 1 & 2 will be collected, graded, and count as quiz grades.

## *Important Dates for AP Calculus: August 2009* *Holly Springs High School*

*Tuesday, August 25<sup>th</sup>:*

**FIRST DAY OF SCHOOL ☺ Practice Test #1 (covers all of summer assignment topics)**

*Wednesday & Thursday, August 26<sup>th</sup> & 27<sup>th</sup>*

**Review summer assignment topics and prepare for Test #1.**

*Friday, August 28<sup>th</sup>*

**Both parts of the summer assignment will be collected on this day.**

**Students will turn in two answers sheets – one for Part 1 and another for Part 2.**

**Each part will count as a quiz grade for Fall 2009.**

**Test #1 – covers summer assignment topics**

*AP Calculus Summer Assignment 2009 - Part 1: Pre-Calculus Topics  
Holly Springs High School*

*I. Sequences & Series*

1. What is the sum of the terms of the infinite geometric sequence  $2, \frac{1}{2}, \frac{1}{8} \dots$ ?
2. In the sequence below,  $a_1 = \frac{1}{2}$  and  $a_n$  represents the  $n$ th term.  
 $\frac{1}{2}, -\frac{1}{4}, \frac{1}{8}, -\frac{1}{16}, \dots, a_n$  Write an equation for  $a_n$ .
3. Find the  $36^{\text{th}}$  term of the sequence:  $2, 5, 8, 11, 14, \dots$

*II. Polar Equations & Their Graphs*

4. Convert each point from polar to rectangular coordinates.  
a.  $(4, 150^\circ)$                       b.  $(-2, 270^\circ)$
5. Convert each point from rectangular to polar coordinates.  
a.  $(2, -2)$                               b.  $(-5, -12)$
6. Write  $r = 10\sin\theta$  in rectangular form.
7. Convert  $xy = 6$  to polar form.
8. Graph the polar equations below. Label as line, circle, cardioid, limaçon, or rose curve.  
a.  $r = 2$                                       b.  $r = 2\cos\theta$   
c.  $r\cos\theta = 2$                               d.  $r = 1 + \cos\theta$   
e.  $r = 2\sin\theta$                                 f.  $\theta = \frac{3\pi}{4}$

*III. Parametric Equations & Their Graphs*

9. Change the set of parametric equations below to rectangular form.  
 $x = 2t + 1$   
 $y = 4t^2 - 1$
10. Create a table of values and graph the function from #9 where  $-3 < t \leq 4$ .
11. Find the rectangular form of the equation of the plane curve defined parametrically by the equations  $x = 4\cos t$  and  $y = \sin t$ , where  $0 \leq t \leq 2\pi$ .

#### *IV. Exponential, Logarithmic, & Inverse Functions*

12. Decide whether  $f(x) = 2x - 1$  and  $g(x) = 1/2 x + 1$  are inverse functions.
13. Find the inverse of  $f(x) = (2x + 1)/(x - 3)$
14. Solve  $9^{x+1} = 27^x$  for  $x$ .
15. Find the value of  $x$  if  $\log_2 x = -5$ .
16. Solve  $\log x - (1/3)\log 8 = \log 7$  for  $x$ .
17. Solve  $20e^{2k} = 17$  for  $k$ .

#### *V. Polynomial & Rational Functions*

18. Graph  $f(x) = (x^2 - 16)/(x + 8)$ . Label the  $x$ -intercepts,  $y$ -intercept, vertical asymptote, horizontal asymptote, and slant asymptote where necessary.

#### *VI. Graphing Functions w/o a Calculator*

19. Graph each equation below by hand. Include a table of values with your graph.
  - a.  $y = e^x$
  - b.  $y = e^x - 2$
  - c.  $y = \cos x$
  - d.  $y = \cos 2x$
  - e.  $y = \tan x$
  - f.  $y = \tan^{-1} x$
  - g.  $y = 1/x$
  - h.  $y = 1/(x + 2)$

NAME: \_\_\_\_\_ DATE: \_\_\_\_\_ BLOCK: \_\_\_\_\_

*AP Calculus Summer Assignment 2009 Answer Sheet*

*Part 1: Pre-Calculus Topics*

*Holly Springs High School*

Complete each problem in the space provided. Your work should be neat and legible.

If your work cannot be read and/or your answer cannot be found, you will NOT get credit.

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1.

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2.

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3.

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7.

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8. *Please attach a separate sheet of graph paper for this problem.*

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9.

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10. *Please attach a separate sheet of graph paper for this problem.*

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11.

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12.

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13.

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14.

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15.

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16.

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17.

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18. *Please attach a separate sheet of graph paper for this problem.*

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19. *Please attach a separate sheet of graph paper for this problem.*