# **Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

# AP Calculus 1 **Due: Friday, October 7, 2011**

# Problem Set 1, Quarter 1

Duty, Sulkes

**Directions:** This problem set is pledged. You may only work **with** (not copy) students currently in A.P. Calculus 1. Be careful and accurate with your solution to each problem. You may use your calculator to check your work, but the analytical solutions must be provided to receive full credit. Leave all answers in exact form (i.e. no decimal approximations). Show all your work in the space provided.

1. Find the values of a and b such that is continuous on .



1. Given ,
2. Sketch the graph of the function using transformations. List and graph each of the transformations you used in the order in which you executed them, starting with .
3. List the vertical asymptote(s).
4. Use limits to describe the behavior of the graph on both sides of the vertical asymptote(s).
5. List the horizontal asymptote(s).
6. Given 
7. Rewrite  as a piecewise function in simplified form.
8. Sketch the graph of .
9. Determine whether or not  is continuous at every x. If not, list the x-value(s) of discontinuity and support your answer using the definition of continuity.
10. Given 
11. Using the limit-definition of derivative, show that .
12. Find the x-value(s) at which  has a horizontal tangent.
13. Write an equation for the tangent line at x = -2.
14. The **Normal** line to a function is the line perpendicular to a tangent line at a given point on the function . Write an equation for the normal line at x = 3.

***Pledge: On my honor, I completed this problem set within the guidelines stated in the directions.***

***Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_***