Name:_____

Exam 1- Take-Home Portion

Show all your work to receive full credit for a problem.

Attach this sheet to the solutions you hand in. Even if you attempt the problems in any order, write the solutions in the chronological order.

Please sign and date the following statement:

I declare that the work I am submitting is entirely my own and that I did not confer with anyone (except maybe the instructor) in completing this exam. Further, I declare that I did not use any sources other than my class notes and the course textbook.

Signature: _____

Date: _____

8. The following problems are about limits and continuity.

   (a) (4 pts)Show that

   $$\lim_{(x,y)\to(0,0)} \frac{2x^2y}{x^2+y^2} = 0.$$

   what can you say about the continuity of $f(x,y) = \frac{2x^2y}{x^2+y^2}$ at the point $(0,0)$?

   (b) (4 pts)Show that

   $$\lim_{(x,y)\to(0,0)} \frac{x^2}{x^2+y^2}$$

   does not exist. What can you say about the continuity of the function $g(x,y) = \frac{x^2}{x^2+y^2}$ at the point $(0,0)$?

   (c) (4 pts) Use level curves to show that

   $$\lim_{(x,y)\to(0,0)} \frac{x\cos y + y\sin y}{x^2+y^2}$$

   does not exist. (You may use the applet in Mike May's homepage, for which there is a link on Lyceum, or any other graphing program you like).