Name (Please Print) _____ Rec. Instr. _____

Your Signature _____ Class Time _____

ANALYTIC GEOMETRY AND CALCULUS II

Exam 3

November 16, 1999

Be neat, clear and complete. Show all work. No notes, books, reference material or calculators are allowed. No credit will be given for answers without supporting work.

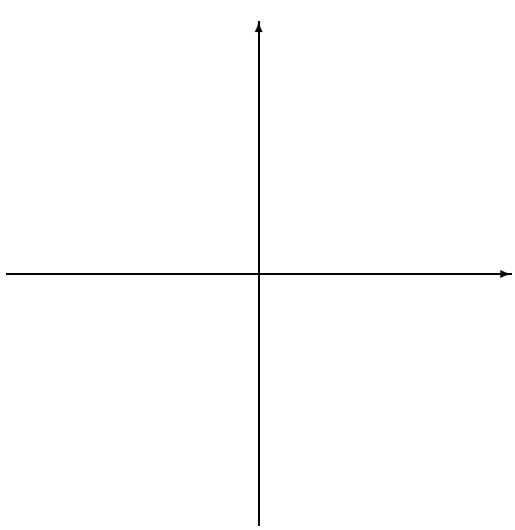
(9) 1. Evaluate $\lim_{n\to\infty}(3n+5)^{1/n}$

2. Find the sum of the series:

(8) a) $\sum_{n=1}^{\infty} \frac{5}{3^n}$

(8) b) $\sum_{n=3}^{\infty} \frac{1}{(n-1)(n+1)}$

(11) 3. Find the area that is common to the two circles $r = \sin\theta$ and $r = \cos\theta$. Draw a graph.



4. Let $f(x) = \cos x + \sin x$.

(10) a) Write the Taylor polynomial $P_4(x)$ for $f(x)$ at $a = \pi$. Also, write the remainder term, $R_4(x)$.

(6) b) Write the Taylor series for f at $a = \pi$.

5. Test each of the following series for convergence. You <u>must</u> determine whether each series converges absolutely, converges conditionally, or diverges. Also, you <u>must</u> state which test you are using in each case. A correct answer without proper justification will receive no credit.

(8) a) $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^n}{n^{5/7}}$

(8) b) $\displaystyle\sum_{n=2}^{\infty} \frac{1}{n \ln n}$

(8) c) $\displaystyle\sum_{n=2}^{\infty} \frac{2n+1}{n^3-1}$

(8) d) $\displaystyle\sum_{n=1}^{\infty} \frac{(-1)^n \ln n}{n}$

(8) e) $\displaystyle\sum_{n=1}^{\infty} \left(\frac{5}{2n}\right)^n$

(8) f) $\displaystyle\sum_{n=1}^{\infty} \frac{n!}{(-2)^n}$