APPM 1360 **EXAM 2** SPRING **2009**

INSTRUCTIONS: Books, notes, flying monkeys and electronic devices are not permitted. Write your (1) name, (2) instructor's name, and (3) recitation section on the front of your bluebook. Also make a scoring table, with places for 4 problems, plus a total score. Work all 4 **problems**. Start each problem on a **new page**. Show you work. Box in your answers. A correct answer with incorrect or no supporting work may receive no credit, while an incorrect answer with relevant work may receive partial credit.

1. (24 points) Integrate: a) $\int\sqrt{4-9t^2}\,dt$ b) $\int\frac{1}{(2x-3)(2x-1)}dx$ c) $\int_0^\infty xe^{-x}dx$

2. (24 points) Do the following converge or diverge? You must give reasons for your answer.

a) $\left\{\frac{\left(\frac{4}{5}\right)^n}{\left(\frac{3}{4}\right)^n}\right\}$ b) $\int_2^\infty e^{-x^2}dx$ c) $\sum_1^\infty\left(\frac{n}{3n+4}\right)^n$

3. (32 points) Do the following series converge or diverge? If possible, find the sum.

a) $\sum_1^\infty\frac{1+4^{n-2}}{4^n}$ b) $\sum_2^\infty\frac{1}{(2n-3)(2n-1)}$

c) $\sum_1^\infty\frac{1}{n(\ln n)^3}$ d) $\sum_1^\infty\frac{n^4 n!}{(2n)!3^n}$

4. (20 points) Decide if the following statements are ALWAYS TRUE or FALSE.

a).If $\lim_{n\to\infty}a_n=0$, then the series $\sum_1^\infty a_n$ converges.

b).The sum of the series $\sum_1^\infty\frac{3}{2^n}=6$

c).The ratio test is one test that you can use to prove the convergence or divergence of the series $\sum_1^\infty\frac{\ln^4 n}{n}$

d) You could compare the series $\sum_1^\infty\frac{e^{-n}}{n}$ to the series $\sum_1^\infty\frac{1}{n}$ to prove if it converges or diverges.

e) If $\sum_1^\infty a_n$ diverges and $0\le a_n\le b_n$ then $\sum_1^\infty b_n$ diverges