MATH 1352-008 Exam III-A April 16, 2008
Make-up

Answer the problems on separate paper. You do not need to rewrite the problem statements on your answer sheets. Work carefully. Do your own work. **Show all relevant supporting steps!** Attach this sheet to the front of your solution pages.

Bald solutions to problems – answers without accompanying, supporting work – will receive ***no*** credit.

1. (16 pts) Choose two of the following. Compute the limit of the sequence, if it exists. Show all supporting work.

a. $\left\{\dfrac{4-3n^2}{2n^3+7n^2}\right\}$ b. $\left\{\dfrac{\ln n^2}{n\sqrt{n}}\right\}$ c. $\left\{\dfrac{n^2}{\sqrt{n^3+2n^2}}\right\}$

2. (8 pts) Choose one. Find the sum of the series, if it exists. Show all supporting work.

a. $\displaystyle\sum_{k=1}^{\infty} 2\left(\frac{-4}{3}\right)^k$ b. $\displaystyle\sum_{k=2}^{\infty} \frac{4}{9}\left(\frac{4}{5}\right)^k$

3. (12 pts) Choose one. Determine whether the series converges or diverges. Show all supporting work.

a. $\displaystyle\sum_{k=2}^{\infty} 2\frac{k^{3/2}+k}{k^2+1}$ b. $\displaystyle\sum_{k=1}^{\infty} \frac{1}{\sqrt{k^4+3k}}$

4. (12 pts) Choose one. Determine whether the series converges or diverges. Show all supporting work.

a. $\displaystyle\sum_{k=1}^{\infty} \frac{k4^k}{(k+2)!}$ b. $\displaystyle\sum_{k=1}^{\infty} \frac{2^k}{k^4}$

5. (12 pts) Choose one. Determine whether the series converges absolutely, converges conditionally or diverges. Show all supporting work.

a. $\displaystyle\sum_{k=1}^{\infty} \frac{(-1)^{k+1}k}{k^2+2}$ b. $\displaystyle\sum_{k=1}^{\infty} (-1)^{k+1}\frac{3k}{5^k}$

7. (16 pts) Choose one. Find the convergence set for the power series. Show all supporting work.

a. $\displaystyle\sum_{k=1}^{\infty} \frac{x^k}{k4^k}$ b. $\displaystyle\sum_{k=1}^{\infty} \frac{x^k}{4^k}$

7. (12 pts) Choose one. Determine how many terms of the series are necessary to estimate its sum to four-place accuracy. Using those terms, estimate the sum of the series. Show all supporting work.

a. $\displaystyle\sum_{k=1}^{\infty} (-1)^{k+1}\frac{k(k+4)}{10^k}$ b. $\displaystyle\sum_{k=1}^{\infty} (-1)^{k+1}\frac{4k}{10^{k+1}}$

8. (12 pts) Choose one. Show all supporting work.

a. Find the first 4 non-zero terms in Taylor's expansion of $f(x) = \sin \pi x$ at $c = 2$.

b. Find the MacLaurin series expansion for $f(x) = \dfrac{e^x - e^{-x}}{2x}$