Math 151 Name: _____

QUIZ 3 (SECTIONS 11.1-11.5)

MATH 151 – SPRING 2004 – KUNIYUKI
105 POINTS TOTAL, BUT 100 POINTS = 100%

Show all work, simplify as appropriate, and use "good form and procedure" (as in class).
Box in your final answers!
No notes, books, or calculators allowed.

1) Find the limits. Write ∞ or $-\infty$ when appropriate. If a limit does not exist, and ∞ and $-\infty$ are inappropriate, write "DNE" (Does Not Exist). You do not have to show work. (8 points total; 4 points each)

a) $\lim_{n\to\infty} a_n$, where $a_n = 4 + (-1)^n$

b) $\lim_{n\to\infty} a_n$, where $a_n = 7 - \left(\frac{8}{9}\right)^n$

2) Does the series $\sum_{n=1}^{\infty}\left(\frac{3}{\sqrt{n}} - \frac{4}{n^2}\right)$ converge or diverge? Circle one:
(You do not have to show work.)

Converges Diverges

(4 points)

3) Find the sum of the series $\sum_{n=1}^{\infty}\left(4^n 5^{3-n}\right)$. (12 points)

4) State the Alternating Series Test for the series $\sum_{n=1}^{\infty}(-1)^{n-1} a_n$, where all $a_n > 0$.
(6 points)

5) The series $\sum_{n=1}^{\infty}(-1)^{n-1} \frac{3}{n^{2/3}}$ is … (circle one:)
(You do not have to show work.)

Absolutely Convergent Conditionally Convergent Divergent

(4 points)

6) True or False: If $\sum_{n=1}^{\infty} a_n$ is a convergent positive-term series, then $\sum_{n=1}^{\infty} (-1)^n a_n$ must also be a convergent series. Circle one:
(You do <u>not</u> have to show work.)

True False

(4 points)

Problems 7) and 8) are based on our discussions in class. Assume that all hypotheses for the tests are satisfied, and you apply the tests correctly. You do <u>not</u> have to show work. (8 points; 4 points each)

7) You use the Basic Comparison Test, and the test shows that the series $\sum_{n=1}^{\infty} a_n$ converges. When you try to use the Ratio Test on this series, you find that $\lim_{n\to\infty} \left| \frac{a_{n+1}}{a_n} \right| = 1$. Is this possible? Circle one:

Yes, it is possible. No, it is not.

8) You use the Integral Test, and the test shows that the series $\sum_{n=1}^{\infty} b_n$ diverges. When you try to use the Root Test on this series, you find that $\lim_{n\to\infty} \sqrt[n]{|b_n|} = 0.8$. Is this possible? Circle one:

Yes, it is possible. No, it is not.

9) For each of the following series:

- Determine whether it converges (write "C") or diverges (write "D").
- Whenever you use a test for convergence/divergence, name it. (You may abbreviate as in class.)
- Whenever you use the Integral Test, state the assumptions (hypotheses) for the test and verify as we have done in class. Set up and work out the integral using good form.
- Show work (as suggested in class). You may ask me if you can write a particular statement without proof.
- You may use the back of the test if you run out of room. Write "SEE BACK" and indicate the problem you're working on.

(59 points total)

a) $\sum_{n=3}^{\infty} \frac{n^{4/3}}{n^2 - 2}$

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

c) $\sum_{n=1}^{\infty} \frac{5^n}{n+4^n}$ (Use a Comparison Test.)

d) $\sum_{n=1}^{\infty} \cos(\pi n)$

e) $\sum_{n=4}^{\infty} \frac{1}{n(\ln n)^{3/2}}$ (Use the Integral Test.)

State the assumptions (hypotheses) for the test and verify as we have done in class. Set up and work out the integral using good form.

YOU MAY CONTINUE ON THE NEXT PAGE.

9) continued)