Math 151   Name: _____

QUIZ ON CHAPTER 10
MATH 151 – SPRING 2003 – KUNIYUKI
100 POINTS TOTAL

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). Indicate indeterminate forms whenever appropriate, though you don't have to indicate signs for them. (46 points total)

a) $\displaystyle\lim_{x\to 2} \frac{x - 2\cos(\pi x)}{x^2 - 4}$ (6 points)

b) $\displaystyle\lim_{x\to 0} \frac{2^x - 1}{3^x - 1}$ (4 points)

c) $\displaystyle\lim_{x\to 3} \frac{e^{2x}}{\ln(x+1)}$ (2 points)

d) $\lim\limits_{x\to\infty} \dfrac{x^2+1}{x\ln x}$ \qquad\qquad (10 points)

e) $\lim\limits_{x\to 0^+} x\cot x$ \qquad\qquad (8 points)

f) $\lim\limits_{x\to 0} (\cos x)^{1/x^2}$ \qquad\qquad (16 points)

2) Indicate whether the integral converges or diverges. If it converges, find its value. Either way, show all work, as in class! (51 points total)

a) $\int_{-\infty}^{1} \frac{1}{1+x^2} \, dx$ (9 points)

Does the above integral converge or diverge?

b) $\int_{-\infty}^{\infty} \frac{x}{\left(x^2+4\right)^{2/3}} \, dx$ (12 points)

Does the above integral converge or diverge?

c) $\displaystyle\int_0^9 \frac{1}{\sqrt[3]{x-1}}\, dx$ (18 points)

Does the above integral converge or diverge?

d) $\int_1^\infty \frac{1}{x(\ln x)^2} dx$ \qquad\qquad (12 points)

Does the above integral converge or diverge?

3) True or False: If the function f is continuous and positive-valued on $[0,\infty)$, and if $\int_0^\infty \frac{1}{f(x)} dx$ converges, then $\int_0^\infty \frac{1}{f(x)+x} dx$ converges. (3 points)