Math 151 Name: _____

FINAL

MATH 151 – FALL 2003 – KUNIYUKI
45 POINTS TOTAL; 3 POINTS FOR EACH PROBLEM
An appropriate sheet of notes is allowed.

Give the best answers based on the notes and our discussions in class.

1) We would use a *u*-substitution to evaluate $\int \tan^5 x \sec^5 x \, dx$. What would be our choice for *u*?

2) We would use a trig substitution to evaluate $\int \frac{1}{x^3 \sqrt{9x^2 - 25}} \, dx$. What would we use as our trig substitution?

3) We want to integrate $\int \frac{1}{x^2 (x-3)(x^2+16)} \, dx$ using partial fractions.
Write the <u>form</u> of the partial fraction decomposition for the integrand, $\frac{1}{x^2 (x-3)(x^2+16)}$.

4) Find $\lim_{x \to 0} \frac{4x}{\tan x}$. Write ∞ or $-\infty$ if appropriate. If the limit does not exist, and ∞ and $-\infty$ are inappropriate, write "DNE" (Does Not Exist).

5) True or False: Both 0^0 and 1^∞ are indeterminate limit forms. Circle one:

True False

6) Fill in the boxes:

$$\int_{-3}^{5} \frac{1}{(x+1)^5} \, dx = \int_{\square}^{\square} \frac{1}{(x+1)^5} \, dx + \int_{\square}^{\square} \frac{1}{(x+1)^5} \, dx$$

$$= \lim_{\square} \int_{\square}^{\square} \frac{1}{(x+1)^5} \, dx + \lim_{\square} \int_{\square}^{\square} \frac{1}{(x+1)^5} \, dx$$

7) Find the sum of the geometric series $\sum_{n=1}^{\infty} 3\left(\frac{1}{4}\right)^{n-1}$.

8) When using the Integral Test, we use an interpolating function $f(x)$ to analyze the series $\sum a_n$. For example, we use $f(x)=\frac{1}{x^2}$ to analyze $\sum \frac{1}{n^2}$. State the assumptions (hypotheses) that we require of f if we are going to apply the Integral Test.

9) The series $\sum_{n=1}^{\infty}(-1)^{n-1}\frac{1}{n^{3/4}}$ is … (circle one)

Absolutely Convergent Conditionally Convergent Divergent

10) Write the first four nonzero terms of the Maclaurin series for $f(x)=\cos x$.

11) True or False: A Maclaurin series $\sum_{n=0}^{\infty} a_n x^n$ can have $[-2,5)$ as its interval of convergence. Circle one:

True False

12) Write the form for the Taylor series representation of $f(x)$ centered at c, assuming it exists.

13) $x=\cos^2 t, y=\sec^4 t$. Eliminate the parameter to get an equation in x and y.

14) The graph of the polar equation $\theta=4$ is a … (circle one).

Circle Line Neither

15) Write the rectangular equation $x^2+y^2=4y$ as a polar equation in r and θ.