Name _____ Instructor _____

Analytic Geometry and Calculus II
Math 221 - Test 1A
June 27, 1997

You must show all relevant work to receive full credit. The point value of each problem is shown in the left hand margin.

(10) 1. Simplify the following.

(a) $\log_5 \frac{1}{125}$

(b) $27^{\frac{-2}{3}}$

(10) 2. Compute the derivative y' of the following.

(a) $y = x^3 e^{2x}$

(b) $y = \log_7 \sqrt{x}$

(10) 3. Find the antiderivatives.

(a) $\displaystyle\int \frac{e^{\sqrt{x}}}{\sqrt{x}}\, dx$

(b) $\displaystyle\int \frac{(\ln x)^2}{x}\, dx$

(10) 4. Compute $\frac{dy}{dx}$ using implicit differentiation or logarithmic differentiation, whichever is appropriate.

$x = ye^y$

(9) 5. At the start of an experiment there are 1,000 bacteria present in a colony. After 4 hours the number of bacteria present has doubled. How long until there are 6,000 bacteria present in the colony?

(10) 6. Compute the derivative of $y = (\cosh x)(\sinh x)$.

(10) 7. Integrate.

$$\int \frac{dx}{\sqrt{1-x^2}}$$

(10) 8. Evaluate the limit.

$$\lim_{x \to 0} \frac{e^{3x} - e^{-3x}}{2x}$$

(21) 9. Integrate.

(a) $\displaystyle\int (\cos^4 x)(\sin^3 x)\ dx$

(b) $\displaystyle\int_0^{\frac{\pi}{6}} (\sec^3 t)(\sin t)\ dt$

(c) $\displaystyle\int \frac{\ln x}{x^3}\ dx$ Hint: Use integration by parts.