Name _____ Instructor _____

Analytic Geometry and Calculus II
Math 221 - Test 1B
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) $\log_4 \frac{1}{64}$

(b) $16^{\frac{-3}{4}}$

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

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

(b) $y = \log_2 \sqrt[3]{x}$

(10) 3. Find the antiderivatives.

(a) $\displaystyle\int \frac{e^{\frac{1}{x^3}}}{x^4}\, dx$

(b) $\displaystyle\int \frac{(\ln x)^3}{x}\, dx$

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

$xe^y = y$

(9) 5. In 1600 the population of Utopia was 2,000 people. By 1640, the population had doubled. In what year will the population reach 6,000 people?

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

(10) 7. Integrate.

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

(10) 8. Evaluate the limit.

$$\lim_{x \to 0} \frac{\ln(1+x)}{x}$$

(21) 9. Integrate.

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

(b) $\int_0^{\frac{\pi}{3}} (\tan^2 t)(\sin t)\ dt$

(c) $\int \frac{lnx}{x^4}\ dx$ Hint: Use integration by parts.