

**SUNY College at Oneonta**  
**Math 174, Calculus II**  
**The course of Dr. Mihailovs**

**Final Exam**

**December 18, 1998**

Name \_\_\_\_\_

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Points											

1. Find  $f^{-1}$  for  $f(x) = \frac{x+2}{2x+3}$ .

2. Find  $g'(a)$ , where  $g$  is the inverse function of  $f(x) = x^7 + x^3 + 1$ ,  $a = 3$ .

3. Find  $f'(x)$  for  $f(x) = \frac{e^{2x}\sqrt{3x+1}}{\sqrt[3]{2x^2+2x+1}}$ .

4. Find  $\int_{-\infty}^0 \frac{5e^{5x} dx}{\sqrt{1-e^{10x}}}$ .

5. Find  $\int_{-\infty}^0 \frac{5e^{5x} dx}{\sqrt{1+e^{10x}}}$ .

6. Find  $\lim_{x \rightarrow 0} \frac{x^3}{x - \sin x}$  .

7. Find  $\int_0^{\pi/2} x^2 \cos x \, dx$  .

8. Find  $\int \sin^3 x \cos^{100} x \, dx$  .

9. Find  $\int_3^4 \frac{x^3 - 2x^2 + x - 1}{x^2 - 3x + 2} \, dx$  .

10. Find  $\int_2^3 \frac{dx}{1+\sqrt{x-2}}$  .

11. Use Simpson's Rule with  $n = 2$  to find an approximate value of  $\ln 1.5 = \int_2^3 \frac{dx}{x}$  .

**12.** Find the area of the surface obtained by rotating the curve  $y = \cos x$  from  $x = 0$  to  $x = \pi/3$  about the  $x$ -axis.

**13.** Find the Cartesian equation of the curve  $x = 3 + 2 \sin t$ ,  $y = 1 + 3 \cos t$ .

14. Find the equation of the tangent to the curve  $x = t \tan t$ ,  $y = 3t^2 + 2$  at  $t = 0$ .

15. Find the length of the cardioid  $r = \sin^2 \frac{\theta}{2}$ .

16. Test the series  $\sum_{n=1}^{\infty} \frac{\ln n}{n(\ln^2 n + 1)}$  for convergence or divergence.

17. Find the radius of convergence of the series  $\sum_{n=0}^{\infty} \frac{3^n x^{2n}}{\sqrt{n}}$ .

18. Find  $\sum_{n=0}^{\infty} \frac{(-1)^n}{(2n+1)!} \left(\frac{\pi}{6}\right)^{2n+1}$ .

19. Expand  $\sqrt{1-4x^2}$  as a power series.