

M178 Exam 4 – Fall 2004

Name: _____

Instructions: To receive credit, you must show all work leading to an answer. Circle or box your final answer.

1. Evaluate the following integrals

a) $\int (7x^{-3} + 3x^{-2} + x^{-1} - 10) dx$

b) $\int_{\ln 2}^{\ln 7} e^x dx$

c) $\int_3^5 \frac{x^2 - 9}{x + 3} dx$

2. FIND THE AREA UNDER THE CURVE

$$f(x) = \frac{1}{x^2} \quad \text{over } [2, 6]$$

3. Find the area bounded by the curves from $x = -1$ to $x = 2$

$$y = -x + 2 \quad \text{and} \quad y = 4 - x^2$$

4. Use integration by parts

a) $\int x^3 \ln x dx$

b) $\int xe^x dx$

5. Integrate using substitution

a) $\int \frac{x + 3}{(x^2 + 6x - 1)^2} dx$

b) $\int \frac{x}{\sqrt{9 + x^2}} dx$

6. AVERAGE VALUE PROBLEM

Find the **average value** of the given function over the interval $[-2,1]$

$$f(x) = -2x^3 + x - 2$$

7. World consumption of copper is running at the rate of $13e^{.05t}$ billion tons per year, where t is the number of years since 1990. Determine the total consumption of copper from the year 1995 to the year 2005.

8. Find the area bounded by the line $y = 2x - 1$ and the curve $y = x^2 - 4$ over the interval $[1, 5]$