

MATH 160-03

NAME

EXAM 4

NOVEMBER 30, 1999

YOU MUST SHOW YOUR WORK TO RECEIVE CREDIT

1. (10) Use the Riemann sum with $n = 4$ and the right endpoints to approximate the area under the graph of $f(x) = x^3$, $0 \leq x \leq 2$.

2. (5) State the Fundamental Theorem of Calculus.

3. (20) Find each of the following definite integrals:

a) $\int_0^1 6x^2 - 8x + 9 dx$

b) $\int_0^2 12e^{3x} dx$

c) $\int_1^3 \frac{2}{x^3} + \frac{4}{x} dx$

d) $\int_1^4 6\sqrt[3]{x} dx$

4. (15) Find the area of the region bounded by the curves $y = x^2 + 3x + 5$ and $y = -x^2 + 5x + 9$. Include a sketch of the region.

5. (10) Find the average value of the function $y = f(x) = 4x - x^2$, $0 \leq x \leq 2$.

6. (10) Find the volume of the solid of revolution generated by revolving about the x-axis the region under the curve $y = 3x$ from $x = 0$ to $x = 2$.

7. (20) Find the following indefinite integrals.

a) $\int x^2 \sqrt{x^3 + 4} dx$

b) $\int \frac{x+4}{5x^2+40x+21} dx$

c) $\int \frac{1}{(2x-6)^2} dx$

d) $\int x e^{x^2+4} dx$

8. (10) Let $z = f(x, y) = 27 - 3x - 9y$.

EITHER a) Graph the level curves for heights -9 , 0 and 9

OR b) Graph the function in 3 space.