

Exam 5, Math 141, 1996

PRINT Your Name: _____ Section: _____

There are 8 problems on 4 pages. Problem 4 is worth 30 points. Each of the other problems is worth 10 points. SHOW your work. CIRCLE your answer. **NO CALCULATORS!**

1. State both parts of the Fundamental Theorem of Calculus.

2. Let $A(x) = \int_1^x \frac{1}{t} dt$. Find $A'(x)$.

3. Compute $\int_0^{\pi/2} \sin^4 x \cos x dx$.

4. (10 points for each part) Consider the region R which is bounded by $y = x^2$, $x = 2$, $x = 3$, and $y = 0$.

(a) Find the area of R .

(b) Find the volume of the solid which is obtained by revolving R about the x -axis.

(c) Find the volume of the solid which is obtained by revolving R about the y -axis.

5. Let $f(x) = -x^3 + 3x^2$. Where is $f(x)$ increasing, decreasing, concave up, and concave down? What are the local extreme points and points of inflection of $y = f(x)$. Graph $y = f(x)$.

6. Find the length of $y = 2x^{3/2}$ between $x = 1/3$ and $x = 7$.

7. Find the points on the curve $y^2 + 2x = 9$ which are closest to the point $(0, 0)$.

8. Find the area of the surface which is generated by revolving $y = x^3/3$, for $1 \leq x \leq \sqrt{7}$, about the x -axis.