

Name _____ Instructor _____

MATH 104 - MIDTERM EXAM
Thursday October 24, 2002, 7:00PM-8:30PM
McCosh 50

Note: This midterm was considered a little too easy. The average was about 70 percent, not a problem, but there was no question hard enough to distinguish well between A and A- students.

1. (10 points) Find $\int \frac{e^{\sin x}}{\tan x \csc x} dx$.
2. (12 points) Find $\int \frac{dx}{\sqrt[3]{x+1} - 1}$.
3. (12 points) Find $\int_1^e x(\ln x)^2 dx$.
4. (12 points) Find $\int x^3(x^2 - 4)^{3/2} dx$. (Assume that $x > 0$.)
5. (10 points) Find $\int \frac{dx}{4x^3 + 4x^2 + x}$.
6. (12 points) Find $\int \frac{dx}{x + 4\sqrt{x} + 13}$.
7. (10 points) The region enclosed by the curves $y = x^2$ and $y = x^3$ is revolved around the line $x = 5$. Find the volume of the resulting solid.
8. (10 points) The base of a solid is the region below the curve $y = \sqrt{\arctan x}$ and above the x -axis, for $0 \leq x \leq 1$. (See diagram.) The cross-section through each plane perpendicular to the x -axis is a square lying above the base. Find the volume.
9. (12 points) Sketch the curve given in polar coordinates by

$$r = 3\theta, \quad \text{for } 0 \leq \theta \leq \pi,$$

and find the length of this curve.