MATH 1352-008   Exam III   November 19, 1998

Answer the problems on **separate paper**. You do <u>not</u> need to rewrite the problem statements on your answer sheets. Do your own work. **Show all relevant steps** which lead to your solutions. **<u>Retain</u>** this question sheet for your records.

1. Evaluate each of the following integrals. If you use references from the supplied tables, be sure to explicitly identify each item which you reference.

A. $\displaystyle\int \frac{x^3 + 2}{4 - x^2}\, dx$

B. $\displaystyle\int \frac{\tan^{-1} x}{(x + 1)^2}\, dx$

C. $\displaystyle\int \tan^3 t\; dt$

D. $\displaystyle\int e^y \cos(e^y)\, dy$

E. $\displaystyle\int \frac{x}{\sqrt{1 + x}}\, dx$

F. $\displaystyle\int \frac{\sqrt{1 + \sqrt{z}}}{z}\, dz$

G. $\displaystyle\int \frac{6}{y^3\sqrt{y^2 - 9}}\, dy$

H. $\displaystyle\int_1^\infty \frac{d\theta}{(\theta + 1)^{5/3}}$

2. A (right) cylindrical tank (10′ diameter and 14′ tall), which is filled with water (weight density $= 62.5$ lbs/ft^3), needs to be pumped out. The pump will displace the water to an outlet valve located at the top of the tank. How much more work will it be to pump out the second half of the tank (the bottom half) than the first half of the tank (the top half)?