Math 181 Name _____
Spring, 2010

Homework #4
Due _____
No late papers accepted! No exceptions!

1. A right circular conical tank, point down, with top radius 5 feet and height 10 feet is filled with a liquid whose weight-density is 60 pounds per cubic foot. How much work does it take to pump the liquid to a point 2 feet above the tank?

2. A flat vertical gate in the face of a dam is shaped like the parabolic region between the curve $y = 4x^2$ and the line y - 4, with measurements in feet. The top of the gate lies 5 feet below the surface of the water. Find the force exerted by the water against the gate. (Density of water is 62.4 pounds per cubic foot.)

3. Find each derivative.

a) $y = \ln(\cosh x)$

b) $y = (4x^2 - 1)\cosh(\ln x)$

c) $y = \arcsin h(\tan x)$

4. Evaluate the integrals.

a) $\int \tanh \frac{x}{7} dx$

b) $\int \csc h^2 (5 - x) dx$

c) $\int 4 \cosh(3x - \ln 2) dx$