PROBLEM OF THE MONTH #2

FEBRUARY 2015

Directions: Write a complete solution to the problem below showing all work. Your paper must have your name, W#, and Southeastern email address. Solutions are to be placed in the envelope for Problem #2 located in the Department of Mathematics Office, Fayard 308 by 4:30 p.m., **Thursday, March 12**. No late papers will be accepted.

All papers with a correct solution will be entered in a drawing for a great prize!

Questions concerning the problem of the month should be sent to either Dr. Tilak de Alwis (tdealwis@selu.edu), or Dr. Randy Wills (rwills@selu.edu)

Problem: *A funnel-shaped tank*

Consider the region R bounded by $y = -\frac{1}{\sqrt{x}}, x = 0, x = 1,$ and $y = -1$.

(a) Calculate the area of the region

(b) A funnel-shaped tank is formed by revolving the region R around the Y-axis. Calculate the volume of this tank.

(c) If the funnel-shaped tank is full of liquid of density ρ, then calculate the work done to empty it to a horizontal level 1 unit above the top of the tank