MATH 166
SUMMER 2012
QUIZ 4

1. Suppose that I have a sphere of radius $R > 0$. I drill a hole of some smaller radius from the north pole to the south pole in such a way that the remaining "napkin ring" stands at height h.
   a) (5 pt) Find a formula for the volume of the left over "napkin ring".
   b) (5 pt) What (should) happens to your formula when $h = 0$ and when $h = 2R$?

2. (5 pt) Suppose that 5000 foot pounds of work is required to stretch a spring from its natural length of 5 feet to a length of 7 feet. If this spring is hung from the ceiling and a 2000 lb safe is attached to the spring, how long will it be?

3. (5 pt) Find the average value of the function $f(t) = \sin(at)$ on the interval $[0, \frac{\pi}{a}]$. Does your answer make sense?