Math 205
**Assignment #3**
Due: January 30, 2015

1. Sketch the curve $y = x^2 - \frac{1}{8}\ln x$ and find the length along the curve from x = 1 to x = 3. (5 marks)

2. Sketch the region formed by rotating the curve $y = 2x - x^2$ around the x-axis between x = 0 and x = 2 and find the volume of revolution (5 marks)

3. Question #54, pg 429 from the 6th edition of your text – Hughes-Hallett or HH (5 marks)

4. Question #67, pg 430 from the 6th edition of HH (5 marks)

5. At home you might have a napkin ring like the one shown on the right. It's a sphere of radius R with a hole drilled down the middle. Use the process of cylindrical shells to find the volume of this ring if its radius is R and height is h. (5 marks)
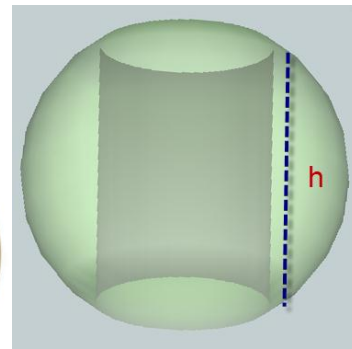
6. Consider the following function: $f(x) = \begin{cases} x & \text{if } x \text{ is irrational} \\ 0 & \text{if } x \text{ is rational} \end{cases}$ What would the graph of this function look like in the region 0 < x <1? Explain whether or not this function has an area using the Riemann Sum definition. Decide whether or not the function has an area and if so, what do you think the area is? (5 marks)