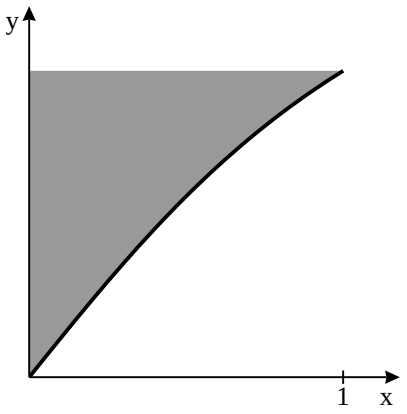
Instructions: DO NOT TURN IN. This is practice for the midterm. I will base some of the midterm problems on some of the problems here.

1 Stewart, section 7.7: #5, 9, 10, 13, 30, 32, 35, 39

2 Stewart, section 7.8: #1, 3, 7, 9, 13, 19, 27, 30, 31, 64, 69, 70

3 The portion of the graph of $y = \tan^{-1} x$ between $x = 0$ and $x = 1$ is rotated around the y-axis to form a container. The container is filled with water. Use $n = 6$ subdivisions and Simpson's Rule to approximate the work required to pump all the water out over the side. Distance is measured in meters and the density of water is 1000 kg/m^3.



4 The rocket in Problem 3 of Week 4 required the following force when the rocket was at a distance of x from the center of the moon:

$$F(x) = \frac{R^2 P}{x^2} \text{pounds.}$$

a) The total amount of work done raising the payload from the surface (an altitude of 0, so $x = R$) to an altitude of R ($x = 2R$) is

$$W = \int_a^b F(x)\,dx = \int_R^{2R} \frac{R^2 P}{x^2}\,dx = \underline{\qquad\qquad\qquad\qquad} \text{ mile-pounds.}$$

b) How much work will be needed to raise the payload from the surface of the moon to the "end of the universe"?