MATH 111: CALCULUS
HOMEWORK DUE WEDNESDAY WEEK 13

Problem 1. Use the method of cylindrical shells to find the volume of an ellipsoid centered at the origin with major axis a and minor axis b. This is the solid of revolution formed by rotating $(x/a)^2 + (y/b)^2 = 1$ about the x-axis.

Problem 2. Draw the graphs of $y = x^n$ for $n = 1, 2, 3, 4, 5$ and x in $[0, 1]$ and make a prediction regarding whether the arclength of these curves is an increasing or decreasing function of n. Now compute the length $y = x^n$ on $[0, 1]$ and confirm your prediction. What does this arclength approach as $n \to \infty$? Does that make sense geometrically?

Problem 3. Find the surface area of the region generated by rotating the graph of $y = x^2$ for x in $[1, 3]$ about the y-axis.