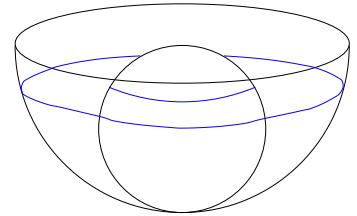# MAT132, Paper Homework 4

1. A spherical ball of radius 2" is placed in a bowl in the shape of a half-sphere of radius 4". Calculate the volume of water needed to fill the bowl to a depth of 3".

   Hint: Think of the bowl as being described by rotating part of the circle $x^2 + (y - 4)^2 = 16$ around the y-axis, and the ball as being obtained by revolving the circle $x^2 + (y - 2)^2 = 4$ around the y-axis.

2. Write an integral that represents the length of the curve $y = \sin(x)$ for $0 \leq x \leq \pi$.

   Use Simpson's rule with $n = 4$ to approximate the value of the integral.