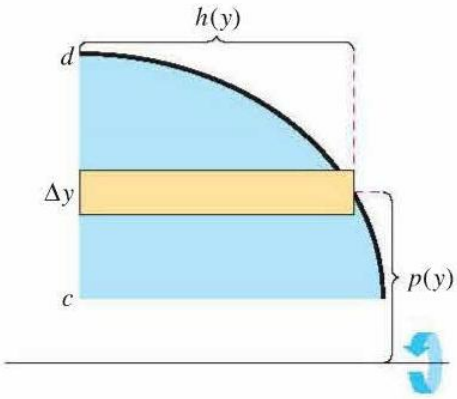
Section 7.3

The Shell Method: To find the volume of a solid of revolution with the shell method, use one of the following formulas, as shown in the figure:

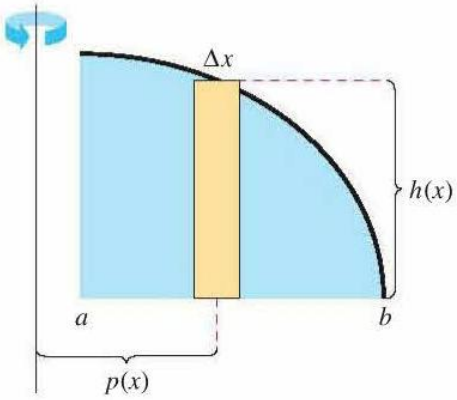
Horizontal Axis of Revolution

$$\text{Volume} = V = 2\pi \int_c^d p(y)h(y)\,dy$$



Vertical Axis of Revolution

$$\text{Volume} = V = 2\pi \int_a^b p(x)h(x)\,dx$$



1) Find the volume of the solid of revolution formed by revolving the region bounded by $y = x - x^2$ and the x-axis about the y-axis.

2) Find the volume of the solid of revolution formed by revolving the region bounded by the graph of $y = 1 - x$, the x-axis, and the y-axis is revolved around the x-axis.

3) Find the volume of the solid generated by revolving the following region around the y-axis: Region is $y = \frac{1}{x^2}$, the x-axis, and the lines $x = 1$ and $x = 2$.

   a) Find the volume using the shell method.

   b) Find the volume using the washer method.

4) Find the volume of the solid formed by revolving the graph of $y = 4 - x^2$ around the x-axis.

   a) Find the volume using the disk method.

   b) Find the volume using the shell method.

5) Find the volume of the solid formed by revolving the region bounded by the graphs of $y = x^4 + 2x^2 + 1, y = 1$, and $x = 1$ about the line $x = 2$.

Homework for 7.3: #4, 9, 12, 18, 22, 25, 30