Problem Set 6.2
Solids of Revolution: Method of Disks

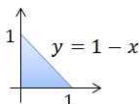$$\Delta V \approx \pi r^2 h$$

1. (1) Find the volume of the solid generated by revolving the region R bounded by $y = 1 - x$, x-axis, and y-axis <u>about the x-axis</u>.
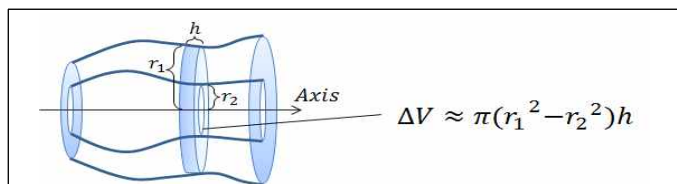
Sol. $r = 1 - x$, $h = \triangle x$.

Then, $\triangle V \approx \pi(1-x)^2 \triangle x$.

Thus, $V = \displaystyle\int_0^1 \pi(1-x)^2 dx =$

(2) Find the volume of the solid generated by revolving the region R <u>about the y-axis</u>.

Solids of Revolution: Method of Washers

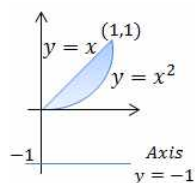$$\Delta V \approx \pi(r_1^2 - r_2^2)h$$

2. (1) Find the volume of the solid generated by revolving the region R bounded by $y = x$ and $y = x^2$ <u>about the line $y = -1$</u>.

Sol. $r_1 = x + 1$, $r_2 = x^2 + 1$, $h = \triangle x$.

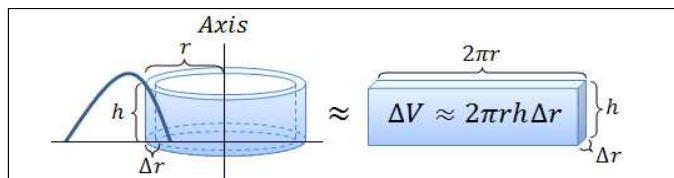Then, $\triangle V =$

Thus, $V =$

(2) Find the volume of the solid generated by revolving the region R <u>about the line $y = 1$</u>.

Problem Set 6.3
Solid of Revolution: Method of Shells

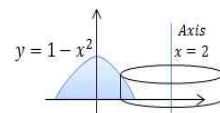$$\Delta V \approx 2\pi r h \Delta r$$

3. (1) Find the volume of the solid generated by revolving the region R bounded by $y = 1 - x^2$ and x-axis <u>about the line $x = 2$</u>.

Sol. $r = 2 - x$, $h = 1 - x^2$, $\triangle r = \triangle x$.

Then, $\triangle V \approx 2\pi(2-x)(1-x^2)\triangle x$.

Thus, $V = \displaystyle\int_{-1}^1 2\pi(2-x)(1-x^2) dx =$

(2) Find the volume of the solid generated by revolving the region R <u>about the line $x = -1$</u>.

4. (1) Sketch the region R bounded by $y = 2 + x - x^2$, x-axis, and y-axis in first quadrant.

(2) Find the volume of the solid generated by revolving the region R <u>about the line $y = -1$</u>. (hint : Method of Washers)

(3) Find the volume of the solid generated by revolving the region R <u>about the line $x = 3$</u>. (hint : Method of Shells)