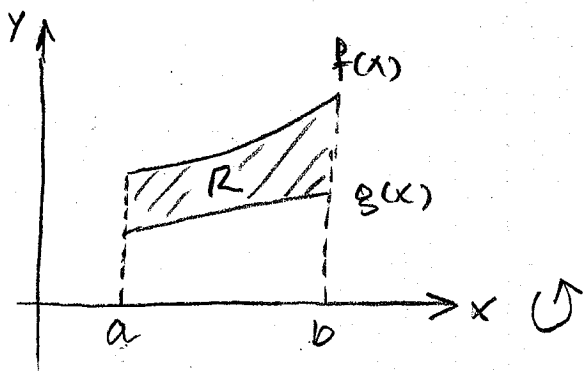


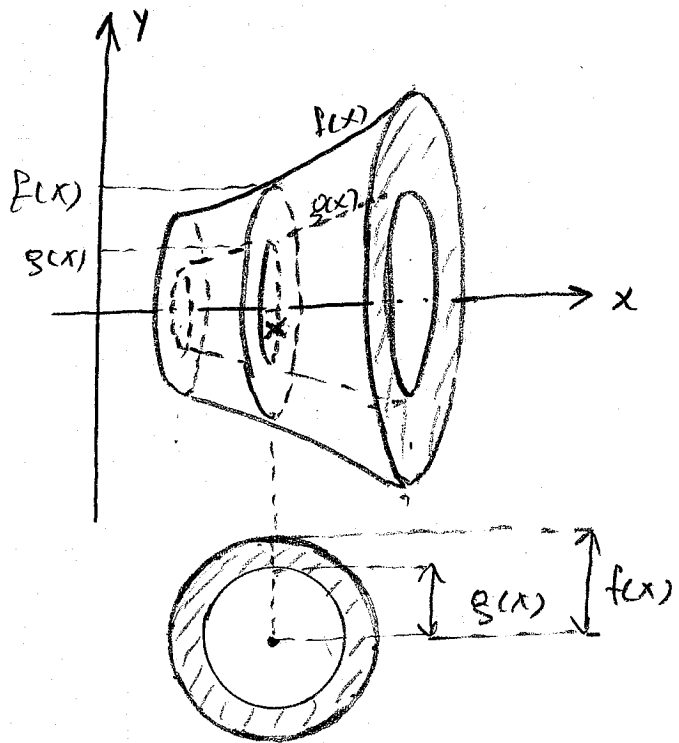
SOLIDS OF REVOLUTION, METHOD OF WASHERS.

Let f and g be continuous and non-negative on $[a, b]$ and $f(x) > g(x)$ for all x in $[a, b]$

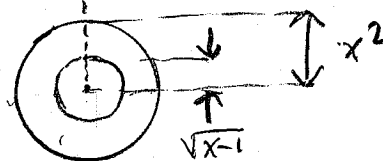
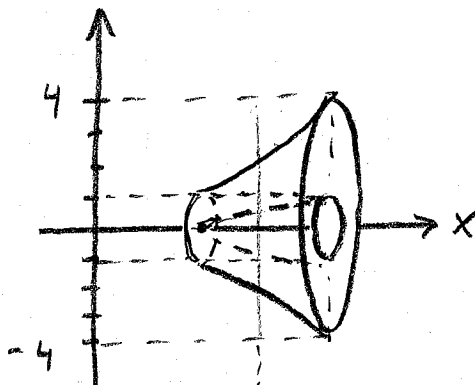
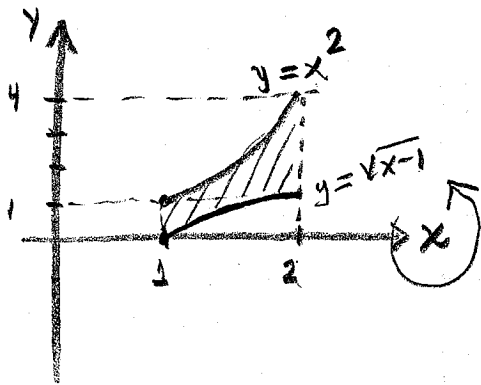
Area of washer = Outer Area - Inner Area

$$A(x) = \pi r_o^2 - \pi r_i^2 = \pi [f(x)]^2 - \pi [g(x)]^2$$

$$V = \pi \int_a^b ([f(x)]^2 - [g(x)]^2) dx$$



Example Find the volume of the solid generated when the region enclosed by $y = x^2$, $y = \sqrt{x-1}$, $x = 1$ and $x = 2$ is revolved around the x -axis



$$A(x) = \pi (x^2)^2 - \pi (\sqrt{x-1})^2$$

$$V = \pi \int_1^2 [x^4 - (x-1)] dx$$

$$= \pi \left[\frac{x^5}{5} - \frac{x^2}{2} + x \right]_1^2 = \pi \left[\frac{2^5}{5} - \frac{2^2}{2} + 2 - \left(\frac{1}{5} - \frac{1}{2} + 1 \right) \right]$$

$$= \frac{57\pi}{10}$$