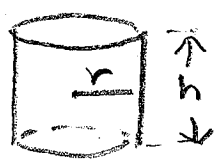
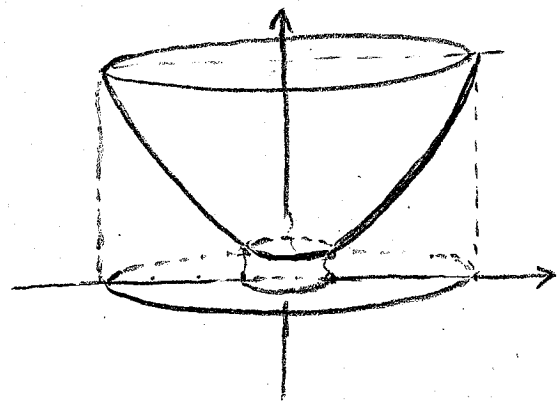
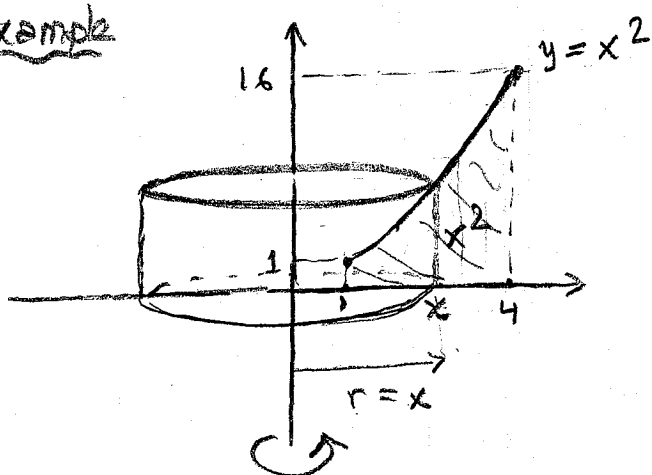


SOLIDS OF REVOLUTION. METHOD OF SHELLS

Example

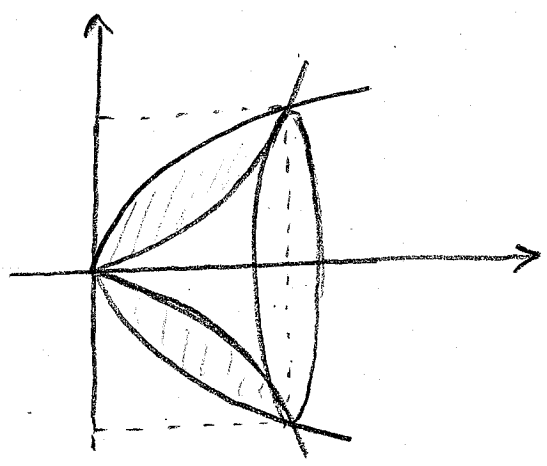
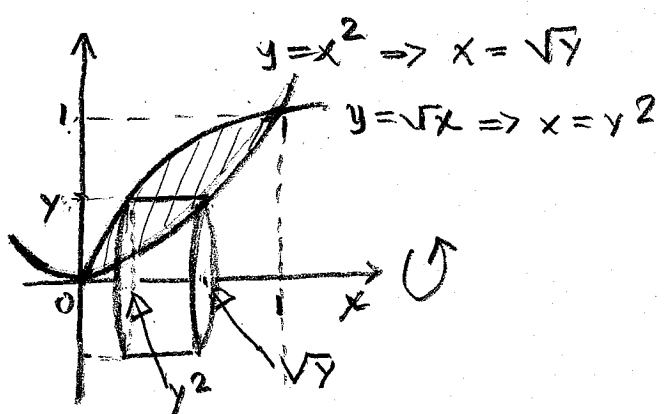


$$A(x) = 2\pi r \cdot h = 2\pi x \cdot x^2 = 2\pi x^3$$

$$V = \int_1^4 A(x) dx = \int_1^4 2\pi x^3 dx$$

$$= 2\pi \frac{x^4}{4} \Big|_1^4 = 2\pi \left( \frac{4^4}{4} - \frac{1^4}{4} \right) = \frac{255\pi}{2}$$

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



$$r = y \quad h = \sqrt{y} - y^2$$

$$A(y) = 2\pi r h = 2\pi y (\sqrt{y} - y^2) \Rightarrow V = \int_0^1 2\pi y (\sqrt{y} - y^2) dy$$