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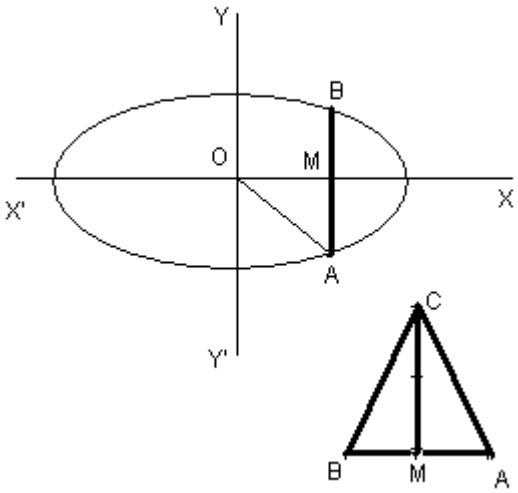
Problem: Find the volume of a solid whose base is the circle $x^2 + y^2 = 36$, and every section perpendicular to a fixed diameter of the base is an isosceles triangle whose altitude is equal to the length of its base.

Solution: Without loss of generality, we assume that the fixed diameter is the Y-axis. Consider a typical slice of the solid ABC, which is at a distance OM = x from the origin with base as AB and altitude CM of thickness dx.

The radius of the base circle is OA = 6, AB=CM = 2y where $y=\sqrt{OA^2 - OM^2} = \sqrt{36 - x^2}$.



Volume of the typical slice =

(Area of cross section) * (thickness)

= ((1/2)*AB*CM) * dx

= (1/2) (2y)(2y) dx = 2 y^2 dx = 2(36-x^2) dx

Volume of the solid = $2\int_0^6 2(36 - x^2)dx$

$$= 4\left[36x - \frac{x^3}{3}\right]_0^6 = 4\left[216 - \frac{216}{3}\right] = 576$$