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Example: 07:

Given region R: $y=\sqrt{x}$ and $y=x$.

$\therefore x=y$.

$\Rightarrow y^2=x$

$\Rightarrow x=y^2$

$\therefore x=y^2$

For the interval, set

$\sqrt{x}=x$

$\Rightarrow x=x^2$

$\Rightarrow x^2-x=0$

$\Rightarrow x(x-1)=0$.

Now,

$x=0$

Or,

$x-1=0$

$\Rightarrow x=1$

∴ Interval $I = [0, 1]$

∴ The volume of the solid :

$$\pi \int_0^1 \left[(y)^2 - (y^2)^2\right] dy.$$

$$= \pi \int_0^1 (y^2 - y^4)\, dy$$

$$= \pi \int_0^1 y^2\, dy - \pi \int_0^1 y^4\, dy.$$

$$= \pi \left[\frac{y^3}{3} - \frac{y^5}{5}\right]_0^1$$

$$= \pi \left[\left[\frac{(1)^3}{3} - \frac{(1)^5}{5}\right] - \left[\frac{(0)^3}{3} - \frac{(0)^5}{5}\right]\right]$$

$$= \pi \left[\frac{1}{3} - \frac{1}{5} - 0 + 0\right]$$

$$= \pi \left[\frac{5-3}{15}\right] = \pi \left[\frac{2}{15}\right] = \frac{2\pi}{15}$$

(Ans).