$y = \sqrt{x} \quad \Rightarrow \quad x = y^2$, so the outer radius is $4 - y^2$.

$$V \quad = \int_0^1 \pi \left[(4 - y^2)^2 - (4 - y)^2 \right] dy$$

$$= \pi \int_0^1 \left[(16 - 8y^2 + y^4) - (16 - 8y + y^2) \right] dy$$

$$= \pi \int_0^1 (y^4 - 9y^2 + 8y) \, dy$$

$$= \pi \left[\tfrac{1}{5} y^5 - 3y^3 + 4y^2 \right]_0^1$$

$$= \pi \left(\tfrac{1}{5} - 3 + 4 \right) = \tfrac{6}{5} \pi$$