

Need to calculate the volume bounded by V .

$$V : \{z = x^2 + y^2, x^4 + y^4 = 1, z = 0\}$$

$$x^2 = u, y^2 = v, z = z \quad \Rightarrow J = \frac{1}{4\sqrt{uv}}$$

$$\widehat{V} : \{z = u + v, u^2 + v^2 = 1, z = 0\}$$

$$V = \iint_{D_{uv}} du dv \int_0^{u+v} J dz = \frac{1}{4} \cdot \iint_{D_{uv}} \frac{u+v}{\sqrt{uv}}$$

$$u = r \cos t, \quad v = r \sin t, \quad 0 \leq t \leq 2\pi, \quad 0 \leq r \leq 1, \quad \widehat{J} = r$$

$$V = 0.25 \left(\int_0^{2\pi} \sqrt{\cot t} dt \int_0^1 r dr + \int_0^{2\pi} \sqrt{\tan t} dt \int_0^1 r dr \right) = \text{????}$$

