

$$\int_0^{\pi/4} \int_0^{\sqrt{2}} 19 (r \cos \theta + r \sin \theta) r \, dr \, d\theta = 19 \int_0^{\pi/4} (\cos \theta + \sin \theta) \, d\theta \int_0^{\sqrt{2}} r^2 \, dr = 19 [\sin \theta - \cos \theta]_0^{\pi/4} \left[\frac{1}{3} r^3 \right]_0^{\sqrt{2}}$$

$$= 19 \left[\frac{\sqrt{2}}{2} - \frac{\sqrt{2}}{2} - 0 + 1 \right] \cdot \frac{1}{3} (2\sqrt{2} - 0) = \frac{38}{3} \sqrt{2}$$

