Applicando il cambiamento di variabile:

$$\iint_T xy\,dx\,dy = \iint_K \rho\cos\vartheta\,\rho\sin\vartheta \cdot \underbrace{\rho}_{|J(\Phi)|}\,d\rho\,d\vartheta = \iint_K \rho^3 \cos\vartheta\sin\vartheta\,d\rho\,d\vartheta =$$

$\sin 2\vartheta = 2\sin\vartheta\cos\vartheta$

$$= \frac{1}{2}\iint_K \rho^3 \sin(2\vartheta)\,d\rho\,d\vartheta = \frac{1}{4}\iint_K \rho^3\, 2\sin(2\vartheta)\,d\rho\,d\vartheta =$$

$$= +\frac{1}{4}\int_0^1 d\rho \int_{\frac{7}{4}\pi}^{2\pi} \rho^3\, 2\sin(2\vartheta)\,d\vartheta = -\frac{1}{4}\left[\int_0^1 \rho^3 \left[\cos(2\vartheta)\right]_{\frac{7}{4}\pi}^{2\pi} d\rho\right] =$$

$$= -\frac{1}{4}\int_0^1 \rho^3 \Big(\underbrace{\cos(4\pi)}_{1} - \underbrace{\cos\left(\frac{7}{2}\pi\right)}_{0}\Big)\,d\rho = -\frac{1}{4}\int_0^1 \rho^3\,d\rho = -\frac{1}{4}\left[\frac{\rho^4}{4}\Big|_0^1\right] =$$

$$= -\frac{1}{16}$$

EX3 foglio A parte 2