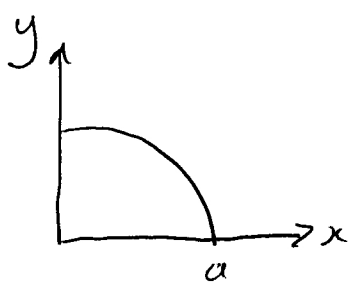


3.

a

$$M(x,y) = xy$$

$$M = \iint m dA = \int_0^a \int_0^{\sqrt{a^2-x^2}} xy \, dy \, dx$$

$$= \int_0^a \left[ \frac{1}{2} xy^2 \right]_0^{\sqrt{a^2-x^2}} dx$$

$$= \frac{1}{2} \int_0^a (a^2x - x^3) dx$$

$$= \frac{1}{2} \left[ \frac{a^2x^2}{2} - \frac{x^4}{4} \right]_0^a = \underline{\underline{\frac{a^4}{8}}}$$

b

$$M = \iint m dA = \int_0^{\pi/2} \int_0^a (\rho \cos \theta)(\rho \sin \theta) \rho \, d\rho \, d\theta$$

$$= \int_0^{\pi/2} \frac{1}{2} \sin(2\theta) \int_0^a \rho^3 \, d\rho$$

$$= \left[ -\frac{1}{4} \cos(2\theta) \right]_0^{\pi/2} \left[ \frac{\rho^4}{4} \right]_0^a$$

$$= \left(-\frac{1}{4}\right)(-1-1) \frac{a^4}{4}$$

$$= \underline{\underline{\frac{a^4}{8}}}$$