6. (a) The average of a function $f(x, y)$ on a planar region $D$ is given by the formula $f_{\text{ave}} = \frac{1}{\text{Area}(D)} \int \int_D f \, dA$. Find the average distance between a point lying inside a circle of radius 1 and the centre of the circle.

Answer:
(b) Consider the planar region \( D = \{(x, y) \mid x \geq 0, (x - 1)^2 + y^2 \geq 1, x^2 + y^2 \leq 4\} \). Sketch the region \( D \) and describe it in polar coordinates.

(c) Using any method, compute the area of \( D \).

Answer:
7. (a) Find the area of the portion of the cone $z^2 = x^2 + y^2$ lying between the planes $z = 2$ and $z = 3$.

Answer:
(b) Find the centre of mass of a triangular lamina with vertices $(0,0)$, $(1,0)$ and $(0,1)$ and density $\rho(x,y) = x + y$.

Answer: