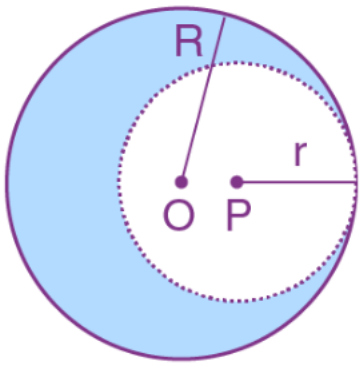
Question 1) A circular plate of uniform thickness has a diameter of 56 cm. A circular portion of diameter 42 cm is removed from one edge of the plate as shown in the figure. Find the position of the centre of mass of the remaining portion

Solution:



Let σ be the mass per unit area of the uniform plate

Mass of the whole disc = σ x πR^2

Mass of the portion removed = σ x πr^2

R = 28 cm, r = 21 cm, OP = 7 cm

Position of the centre of mass

$$x = \frac{m_1 x_1 - m_2 x_2}{m_1 - m_2}$$

$$x = \frac{\sigma \times \pi R^{2(0)} - \sigma \times \pi r^2 \times 7}{\sigma \pi R^2 - \sigma \pi r^2}$$

$$x = \frac{-(21)^2 \times 7}{(28)^2 - (21)^2} = -9cm$$

The centre of mass lies at a distance of 9 cm from the origin towards left