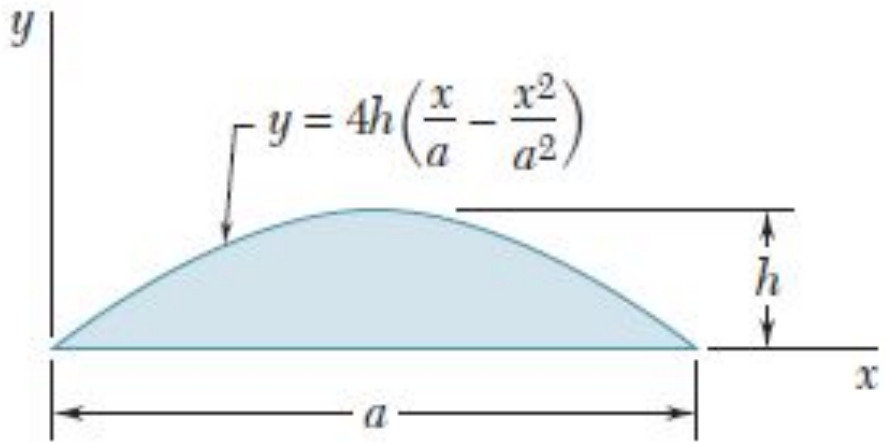
Problem on first and second moments of area

Question 1

Problem on first moment of area

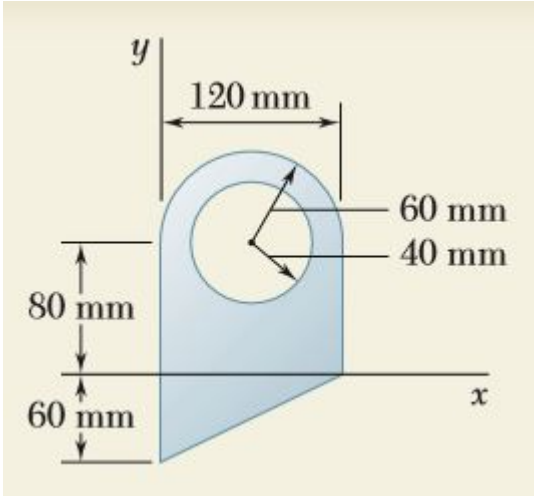
Determine the centroid of the shaded area using the integration method.



Question 2

Problem on first moment of area

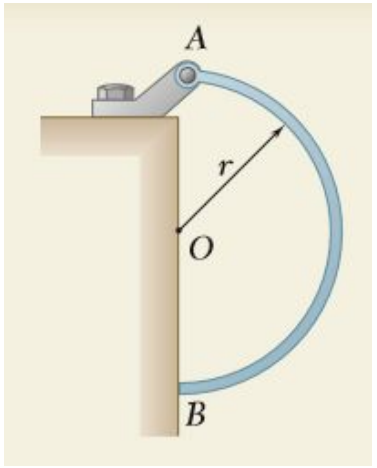
Determine (a) the first moments with respect to the x and y axes, (b) the location of the centroid.



Question 3

Problem on first moment of area

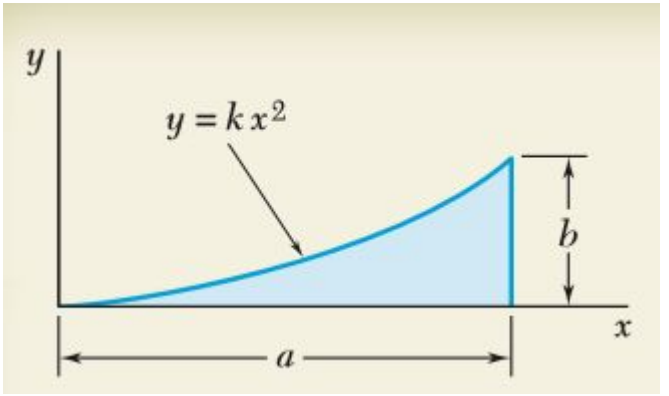
A uniform semicircular rod of weight W and radius r is attached to a pin at A and rests against a frictionless surface at B. Determine the reactions at A and B.



Question 4

Problem on first moment of area

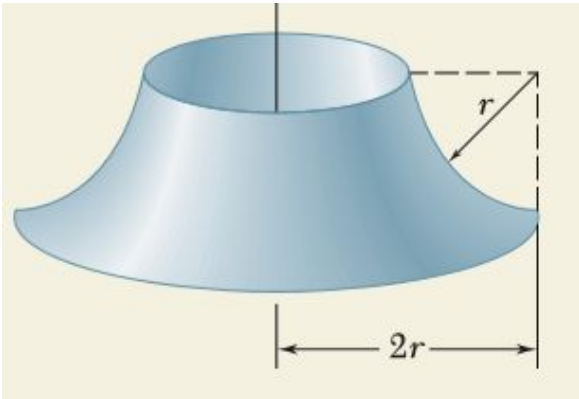
Determine the location of the centroid of a parabolic spandrel.



Question 5

Problem on first moment of area

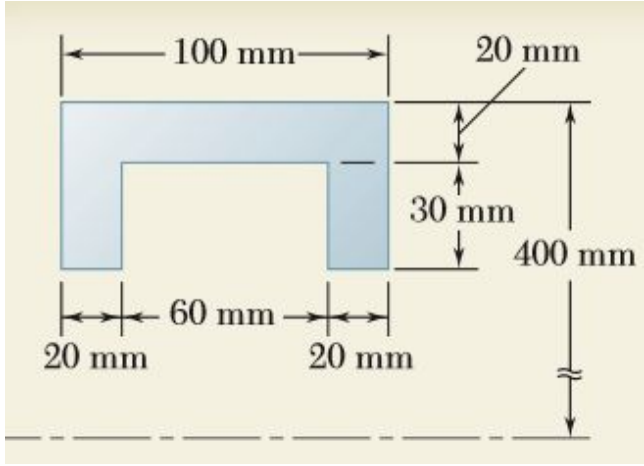
Determine the area of the surface of revolution shown, which is obtained by rotating a quarter-circular arc about a vertical axis.



Question 6

Problem on first moment of area

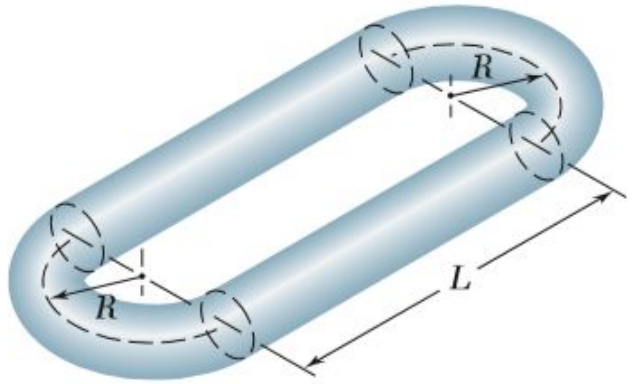
The outside diameter of a pulley is 0.8 m, and the cross section of its rim is as shown. Knowing that the pulley is made of steel and that the density of steel is 7.85×10^3 kg/m^3, determine the mass and the weight of the rim.



Question 7

Problem on first moment of area

Determine the volume and the surface area of the chain link, which is made from a 6-mm-diameter bar, if R = 10 mm and L = 30 mm.

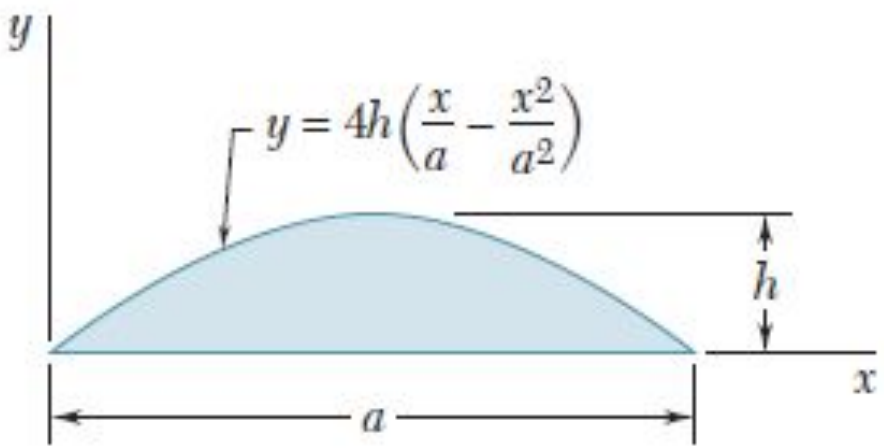


Problem on second moments of area

Question 1

Problem on second moment of area

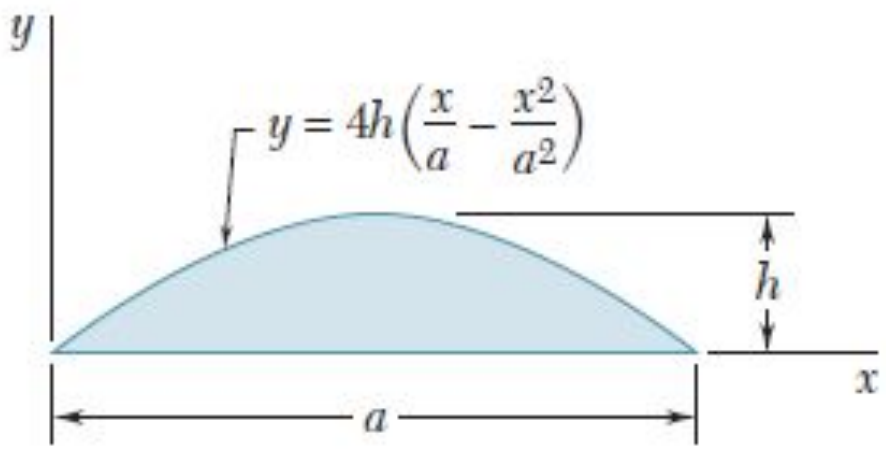
Determine the second moment of area of the shaded region with respect to the x-axis by direct integration method.



Question 1

Problem on second moment of area

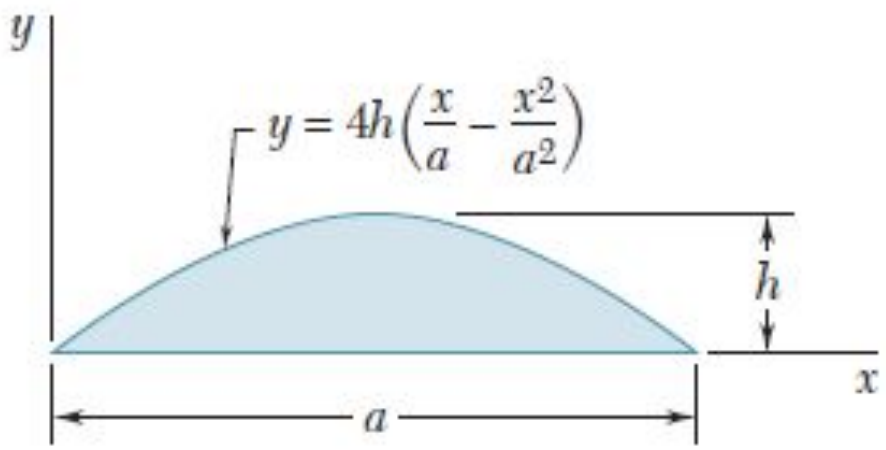
Determine the second moment of area of the shaded region with respect to the x-axis by direct integration method. Where the equation of the curve is given as:



Question 1

Problem on second moment of area

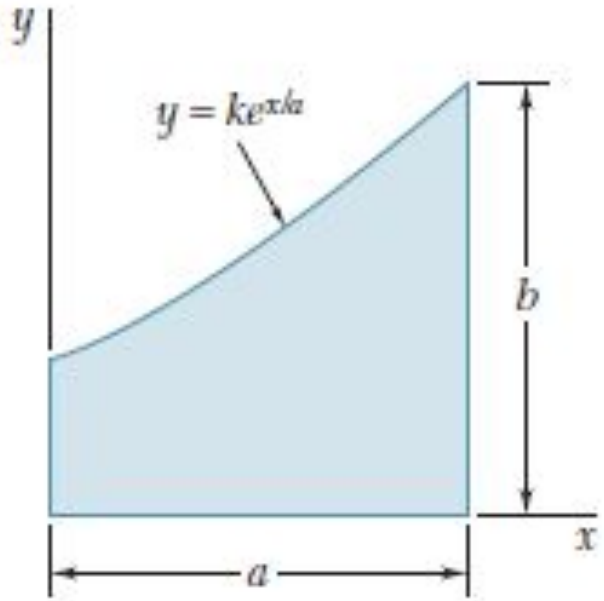
Determine the second moment of area of the shaded region with respect to the x-axis by direct integration method. Where the equation of the curve is given as:



Question 2

Determine the second moment of the area with respect to the x-axis. Where the equation of curve is given as

$$y = ke^{\frac{x}{a}}$$

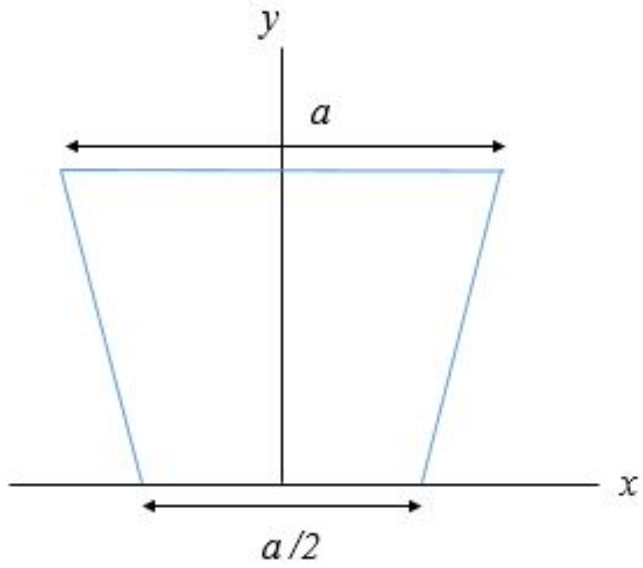


Question 3

Determine the second moment of the area with respect to the x-axis.

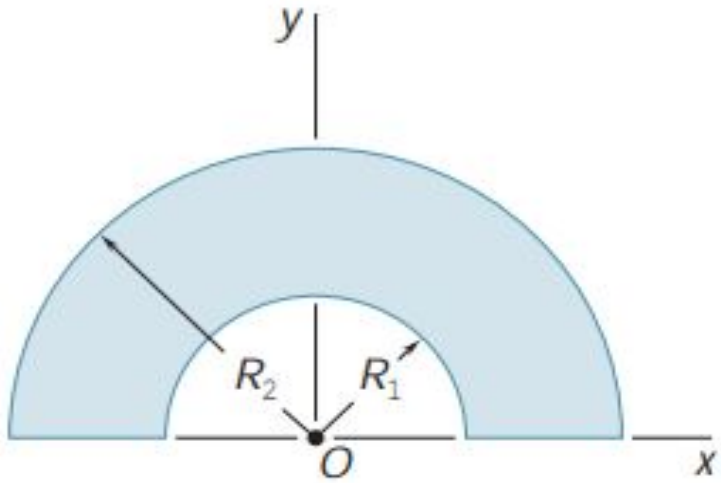
Where,

$$y = 2x - a$$



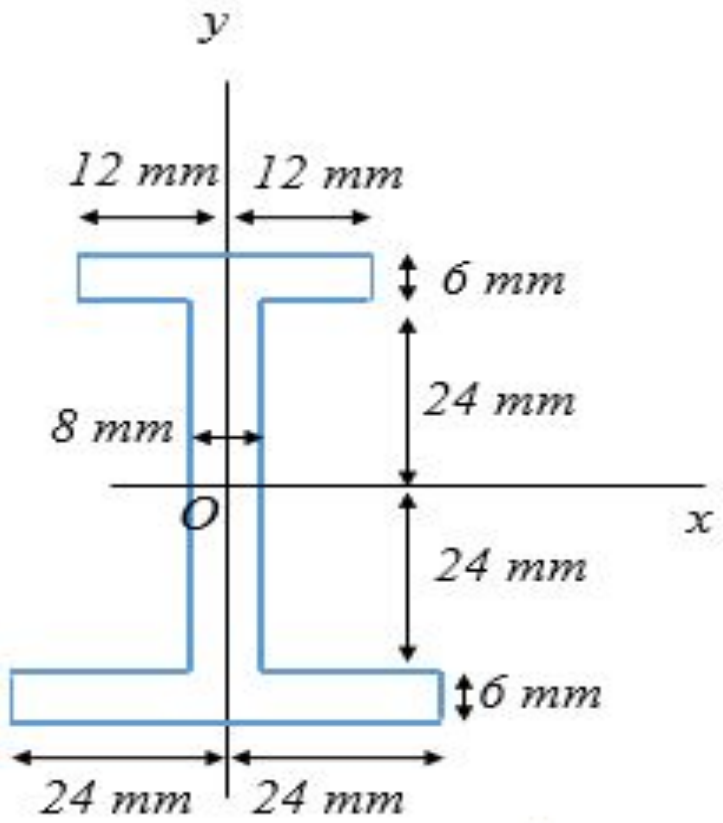
Question 4

Determine by direct integration the polar moment of inertia of the semiannular area shown with respect to point O.



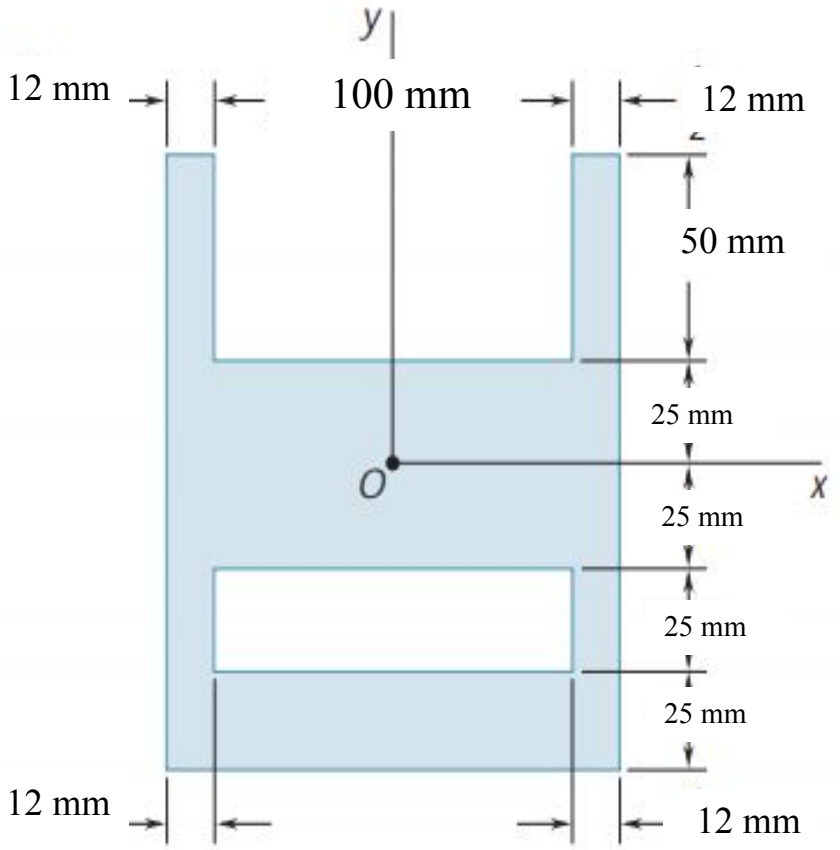
Question 5

For the following figure determine the second moment of area wrt x-axis.



Question 6

For the following figure determine the second moment of area wrt x-axis



Question 7

Determine the moments of inertia (or second moment of area) of the area shown wrt centroidal axes respectively parallel and perpendicular to AB