

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

وَالْحَمْدُ لِلَّهِ الْمَنَّانِ



IMAM KHOMEINI
INTERNATIONAL UNIVERSITY

دانشگاه بین المللی امام خمینی (ره)

دانشکده فنی و مهندسی

Title: Center of Mass (Chapter 5)

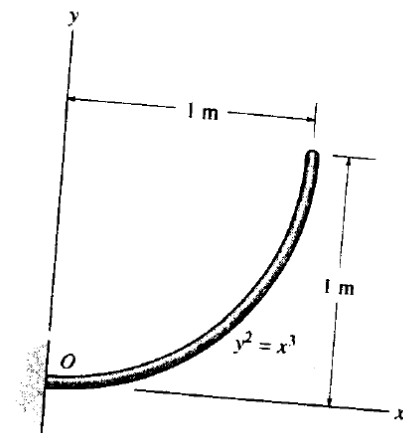
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March 17, 2019

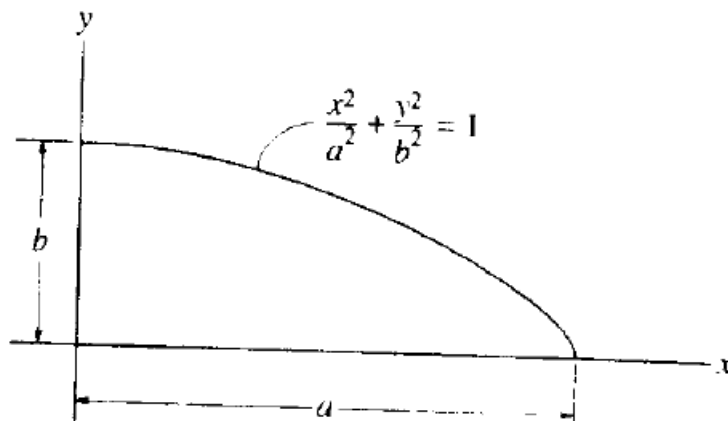
1-

9-1. Determine the distance \bar{x} to the center of mass of the homogeneous rod bent into the shape shown. If the rod has a mass per unit length of 0.5 kg/m , determine the reactions at the fixed support O .



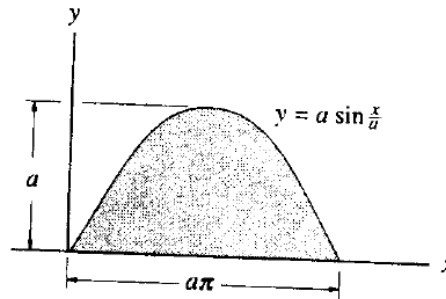
2-

9-17. Locate the centroid of the quarter elliptical area.



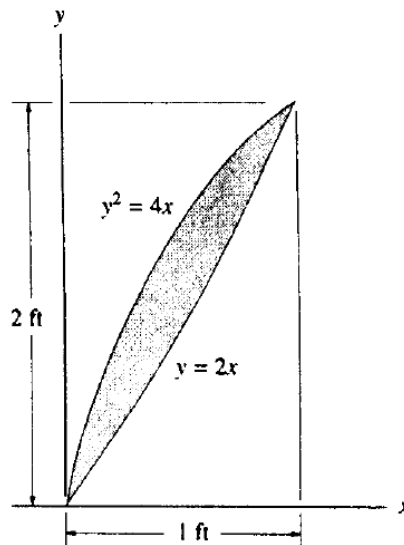
3-

9-18. Locate the centroid (\bar{x}, \bar{y}) of the shaded area.



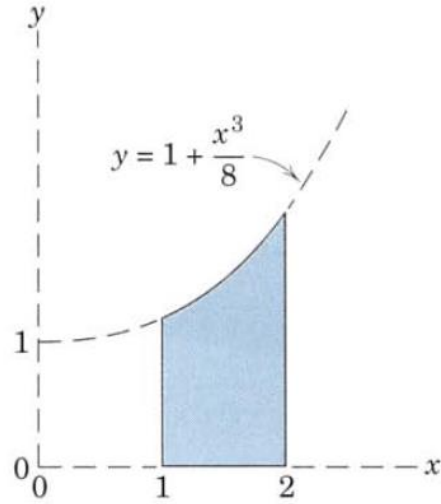
4-

9-23. Locate the centroid \bar{x} of the shaded area.



5-

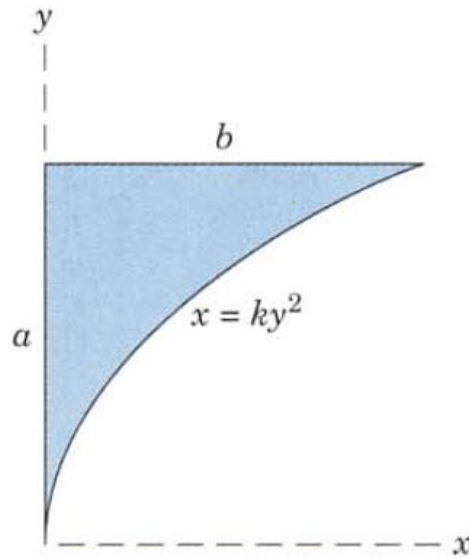
5/6 Determine the x - and y -coordinates of the centroid of the shaded area.



6-

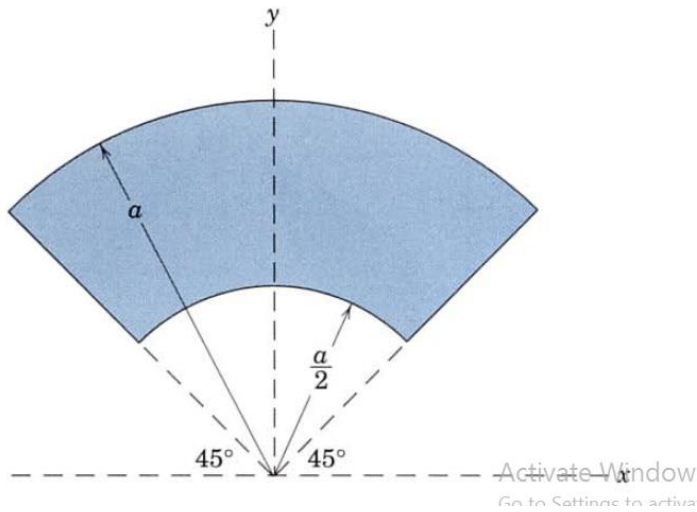
5/9 Determine the coordinates of the centroid of the shaded area.

Ans. $\bar{x} = \frac{3}{10}b, \bar{y} = \frac{3}{4}a$



7-

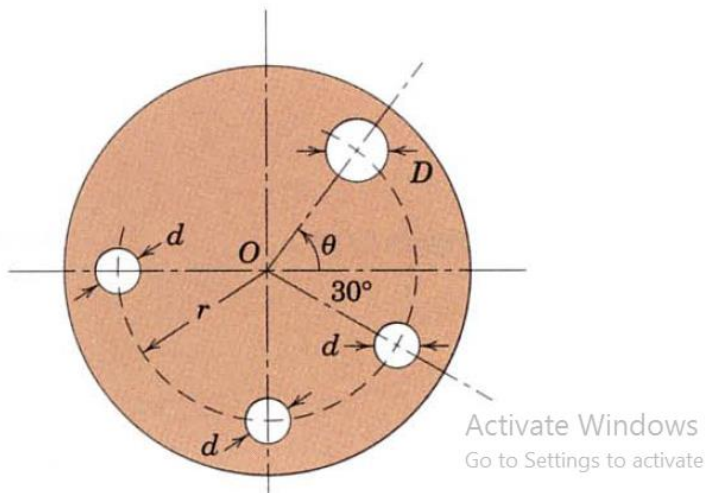
5/20 Determine the y -coordinate of the centroid of the shaded area.



8-

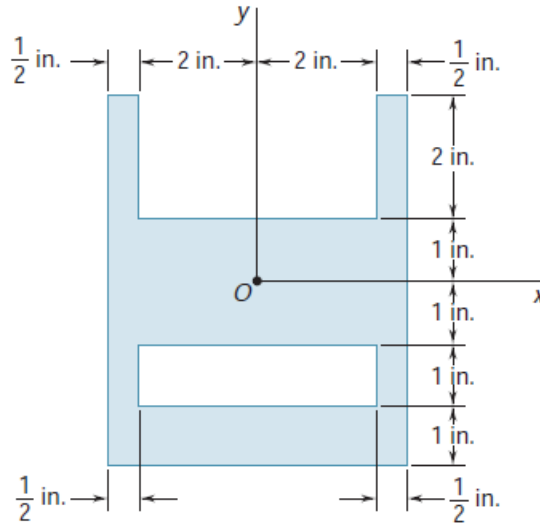
The circular disk rotates about an axis through its center O and has three holes of diameter d positioned as shown. A fourth hole is to be drilled in the disk at the same radius r so that the disk will be in balance (mass center at O). Determine the required diameter D of the new hole and its angular position.

Ans. $D = 1.227d, \theta = 84.9^\circ$



9-

9.31 and 9.32 Determine the moment of inertia and the radius of gyration of the shaded area with respect to the x axis.



10-

9.19 Determine the moment of inertia and the radius of gyration of the shaded area shown with respect to the x axis.

