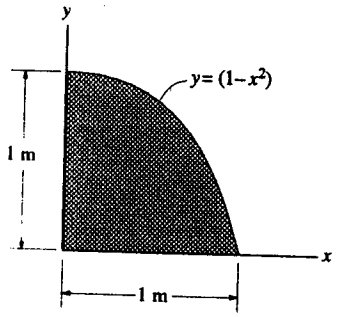
9 Center of Gravity and Centroid

Center of Gravity and Centroid by Integration

9 - 1. Locate the centroid of the parabolic area.



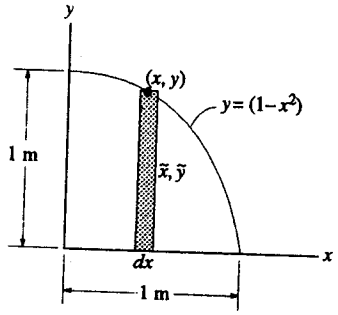
Solution

Using the element of thickness dx as shown express each of the following in terms of x.

$dA =$ _____

$\tilde{x} =$ _____

$\tilde{y} =$ _____

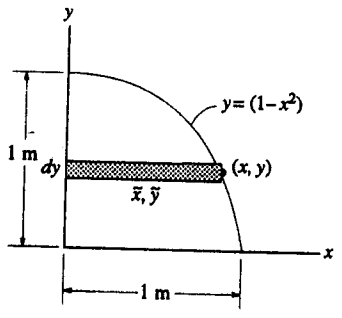


Using the element of thickness dy as shown, express each of the following in terms of y.

$dA =$ _____

$\tilde{x} =$ _____

$\tilde{y} =$ _____

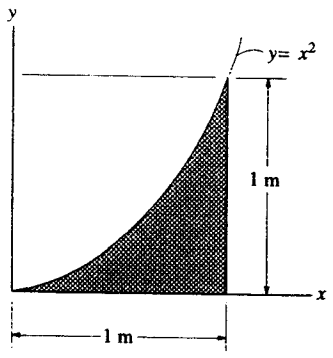


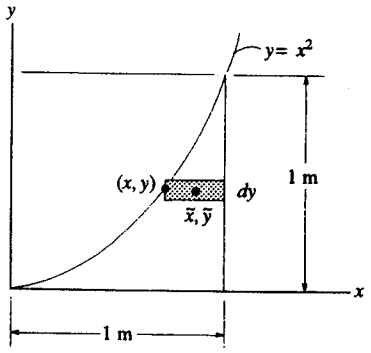
Either set of data can be substituted into the following equations to obtain the solution.

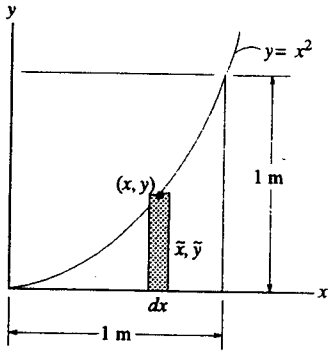
$$\bar{x} = \frac{\int \tilde{x} dA}{\int dA} = \frac{3}{8} \text{ m} \qquad \textbf{Ans.}$$

$$\bar{y} = \frac{\int \tilde{y} dA}{\int dA} = \frac{2}{5} \text{m} \qquad \textbf{Ans.}$$

9 - 2. Locate the centroid of the exparabolic segment of area.







Solution

Using the element of thickness dx as shown express each of the following in terms of x.

$dA =$ _____

$\tilde{x} =$ _____

$\tilde{y} =$ _____

Using the element of thickness dy as shown, express each of the following in terms of y.

$dA =$ _____

$\tilde{x} =$ _____

$\tilde{y} =$ _____

Either set of data can be substituted into the following equations to obtain the solution.

$$\bar{x} = \frac{\int \tilde{x} dA}{\int dA} = \frac{3}{4}\text{m} \qquad \textbf{Ans.}$$

$$\bar{y} = \frac{\int \tilde{y} dA}{\int dA} = \frac{3}{10}\text{m} \qquad \textbf{Ans.}$$