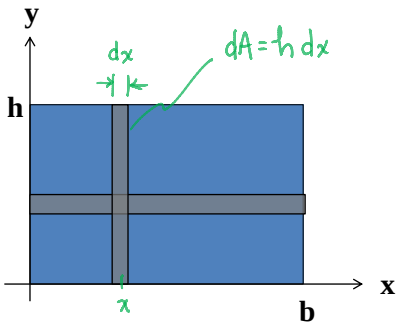
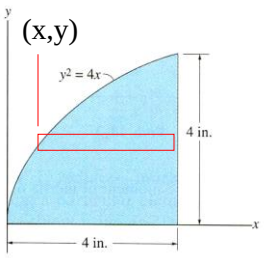
Moment by Integration Example: Find I_x & I_y





EXAMPLE

Given: The shaded area shown in the figure.

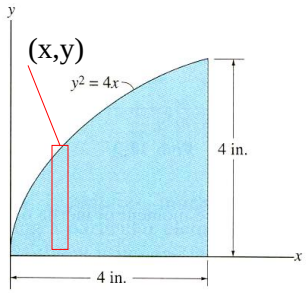
Find: The MoI of the area about the x- and y-axes.

Plan: Follow the steps given earlier.

Solve for Ix

y

EXAMPLE
(continued)

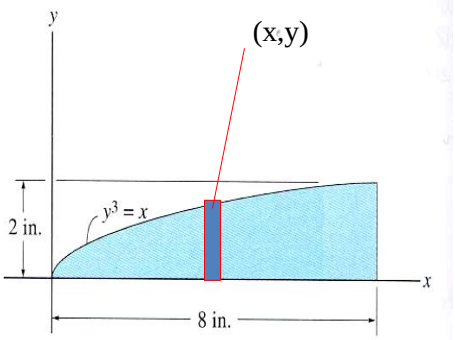


Solve for Iy

Solve for Ix again using vertical strip

GROUP PROBLEM SOLVING

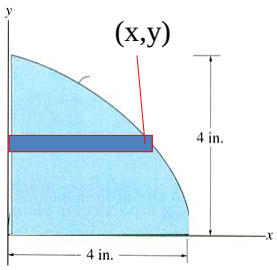
Find: I_x and I_y of the area.



Solve for Ix

Solve for Iy

Summary of MoI calculation

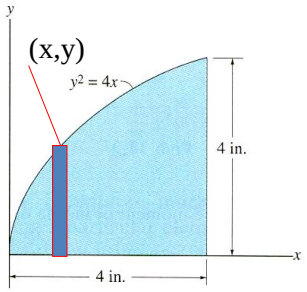


Horizontal Strip

$$I_x = \int y^2 \, dA$$

if base of strip is on y-axis

$$I_y = \int (1/3) \, x^3 \, dy$$



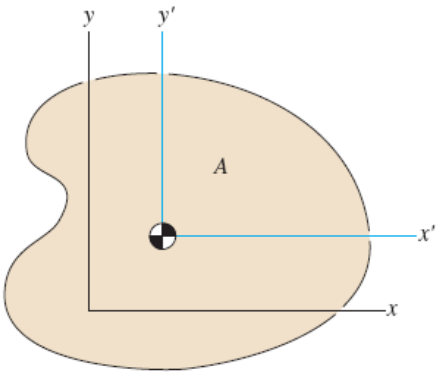
Vertical Strip

$$I_y = \int x^2 \, dA$$

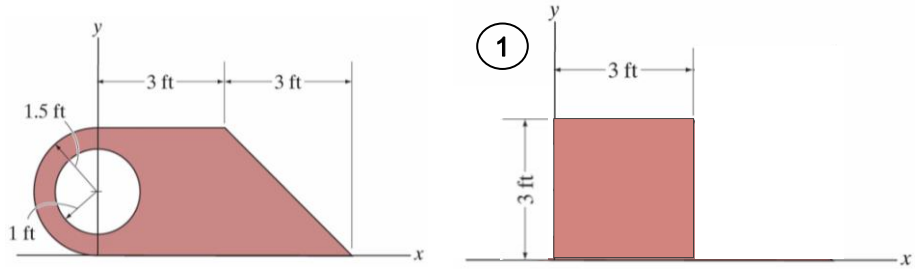
if base of strip is on x-axis

$$I_x = \int (1/3) \, y^3 \, dx$$

Parallel-Axis Theorem



Composite Area Example: Find I_x



#	A_i (ft^2)	$\tilde{y}_i$ (ft)	$\bar{I}_{ix'}$ (ft^4)	I_{ix} (ft^4)
1				
2				
3				
4				