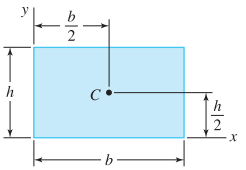
Area Moments of Inertia

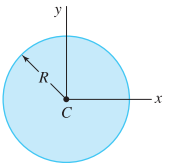
Rectangle



$$\bar{I}_x = \frac{bh^3}{12} \quad \bar{I}_y = \frac{b^3h}{12} \quad \bar{I}_{xy} = 0$$

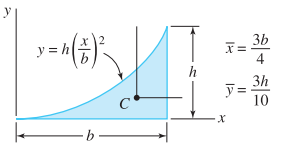
$$I_x = \frac{bh^3}{3} \quad I_y = \frac{b^3h}{3} \quad I_{xy} = \frac{b^2h^2}{4}$$

Circle



$$I_x = I_y = \frac{\pi R^4}{4} \quad I_{xy} = 0$$

Half parabolic complement

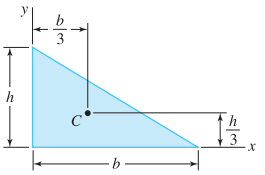


$$\bar{I}_x = \frac{37bh^3}{2100} \quad I_x = \frac{bh^3}{21}$$

$$\bar{I}_y = \frac{b^3h}{80} \quad I_y = \frac{b^3h}{5}$$

$$\bar{I}_{xy} = \frac{b^2h^2}{120} \quad I_{xy} = \frac{b^2h^2}{12}$$

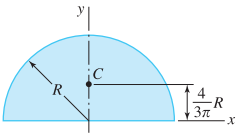
Right triangle



$$\bar{I}_x = \frac{bh^3}{36} \quad \bar{I}_y = \frac{b^3h}{36} \quad \bar{I}_{xy} = -\frac{b^2h^2}{72}$$

$$I_x = \frac{bh^3}{12} \quad I_y = \frac{b^3h}{12} \quad I_{xy} = \frac{b^2h^2}{24}$$

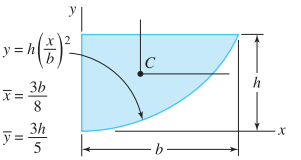
Semicircle



$$\bar{I}_x = 0.1098R^4 \quad \bar{I}_{xy} = 0$$

$$I_x = I_y = \frac{\pi R^4}{8} \quad I_{xy} = 0$$

Half parabola

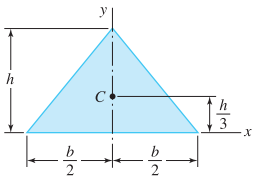


$$\bar{I}_x = \frac{8bh^3}{175} \quad I_x = \frac{2bh^3}{7}$$

$$\bar{I}_y = \frac{19b^3h}{480} \quad I_y = \frac{2b^3h}{15}$$

$$\bar{I}_{xy} = \frac{b^2h^2}{60} \quad I_{xy} = \frac{b^2h^2}{6}$$

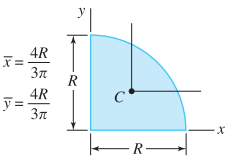
Isosceles triangle



$$\bar{I}_x = \frac{bh^3}{36} \quad \bar{I}_y = \frac{b^3h}{48} \quad \bar{I}_{xy} = 0$$

$$I_x = \frac{bh^3}{12} \quad I_{xy} = 0$$

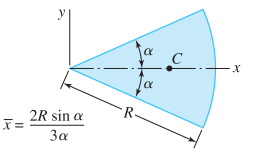
Quarter circle



$$\bar{I}_x = \bar{I}_y = 0.05488R^4 \quad I_x = I_y = \frac{\pi R^4}{16}$$

$$\bar{I}_{xy} = -0.01647R^4 \quad I_{xy} = \frac{\pi R^4}{8}$$

Circular sector

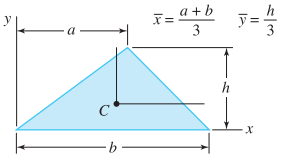


$$I_x = \frac{R^4}{8}(2\alpha - \sin 2\alpha)$$

$$I_y = \frac{R^4}{8}(2\alpha + \sin 2\alpha)$$

$$I_{xy} = 0$$

Triangle

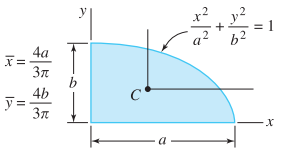


$$\bar{I}_x = \frac{bh^3}{36} \quad I_x = \frac{bh^3}{12}$$

$$\bar{I}_y = \frac{bh}{36}(a^2 - ab + b^2) \quad I_y = \frac{bh}{12}(a^2 + ab + b^2)$$

$$\bar{I}_{xy} = \frac{bh^2}{72}(2a - b) \quad I_{xy} = \frac{bh^2}{24}(2a + b)$$

Quarter ellipse



$$\bar{I}_x = 0.05488ab^3 \quad I_x = \frac{\pi ab^3}{16}$$

$$\bar{I}_y = 0.05488a^3b \quad I_y = \frac{\pi a^3b}{16}$$

$$\bar{I}_{xy} = -0.01647a^2b^2 \quad I_{xy} = \frac{a^2b^2}{8}$$