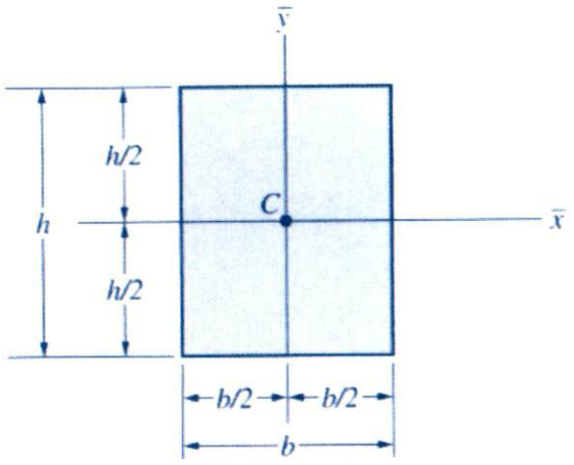
8-1. Refer to Fig. P8-1. Verify that the radii of gyration $\overline{r}_x$ and $\overline{r}_y$, of the rectangle shown with respect to its centroidal axes are $\bar{r}_x = h/\sqrt{12}$ and $\bar{r}_y = b/\sqrt{12}$.

Solution.



From Table 8-1

Moment of Inertia of a Rectangular Area

$$\bar{I}_x = \frac{bh^3}{12} \qquad \text{(about centroidal x-axis)}$$

$$\bar{I}_y = \frac{hb^3}{12} \qquad \text{(about centroidal y-axis)}$$

$$\bar{r}_x = \sqrt{\frac{\bar{I}_x}{A}} = \sqrt{\frac{\frac{bh^3}{12}}{bh}} = \sqrt{\frac{h^2}{12}} = \frac{h}{\sqrt{12}}$$

$$\bar{r}_y = \sqrt{\frac{\bar{I}_y}{A}} = \sqrt{\frac{\frac{hb^3}{12}}{bh}} = \sqrt{\frac{b^2}{12}} = \frac{b}{\sqrt{12}}$$