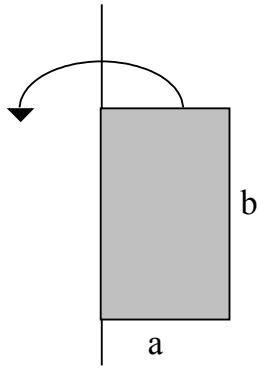


Chapter 10 Problem 51 †



Given

Uniform rectangular plate with mass M and dimensions a and b .

Solution

Find the moment of inertia when rotated about the side of length b .

From the text, the moment of inertia for a flat plate about its central axis is

$$I = \frac{1}{12}Ma^2$$

The new parallel axis is moved a distance of $a/2$ from the center of mass axis. Therefore, by the parallel axis theorem

$$I = I_{cm} + Mh^2 = \frac{1}{12}Ma^2 + M\left(\frac{1}{2}a\right)^2$$

$$I = \frac{1}{12}Ma^2 + \frac{1}{4}Ma^2 = \frac{1}{12}Ma^2 + \frac{3}{12}Ma^2$$

$$I = \frac{4}{12}Ma^2 = \frac{1}{3}Ma^2$$

†Problem from Essential University Physics, Wolfson