1 Moment of Inertia of a Hollow Sphere

Find the moment of inertia of a uniform thin-walled hollow sphere of radius R and total mass M as it rotates about an axis through the center of the sphere. Getting started: The figure below uses the x-axis as the axis of rotation. $I = \int_{x=-R}^{R} y^2 \, \mathrm{d}m = \int_{x=-R}^{R} y^2 \, (\sigma \, 2\pi y \, \mathrm{d}s)$ where σ is the mass per unit area for the sphere, and $\mathrm{d}s = \sqrt{\mathrm{d}x^2 + \mathrm{d}y^2}$.