All homework is to be completed in LaTeX.

**Book problems:** 4.10.4, 4.10.5, 4.10.6, 4.10.11, 4.10.14, 4.11.1, 4.11.3, 4.11.8

**Problem:** Find the volume of the bead-shaped object obtained by drilling a cylindrical hole of radius $d < 1$ around the $z$-axis out of a ball of radius 1 centered at the origin.