1. Including a sketch, describe the \textit{parallel-axis theorem} for mass moment of inertia of a body.

2. A thin spherical shell of mean radius $r$ and total mass $m$ is shown. Using integration, determine \(a\) its moment of inertia $I_x$ about the $x$ axis that passes through its center of mass, \(b\) its radius of gyration $k_x$.

---

1. \textbf{Sketch:} The \textit{parallel-axis theorem} for mass moment of inertia of a body states that the moment of inertia $I$ of a body of mass $m$ about any given axis is equal to the moment of inertia $\bar{I}$ of the body about a central axis parallel to the given axis plus the product $md^2$, where $d$ is the distance between those two axes; i.e.,

$$I = \bar{I} + md^2 \quad (2)$$

2. \textbf{Sketch and calculus:} \(I_x = \frac{2}{3}mr^2 \quad (1)

\(k_x = (2/3)^{1/2}r = 0.816r \quad (1)\)