In[40]:= $Assumptions = Element[R, Reals] && Element[M, Reals] && Element[h, Reals] && R > 0

$$\rho = \frac{M}{\frac{1}{3}\pi * R^2 * h}$$

Out[40]= R ∈ Reals && M ∈ Reals && h ∈ Reals && R > 0

Out[41]= $\frac{3\,M}{h\,\pi\,R^2}$

In[45]:= $$I_{11} = \rho * \int_{-R}^{R}\int_{-\sqrt{R^\wedge 2-x^\wedge 2}}^{\sqrt{R^\wedge 2-x^\wedge 2}}\int_{\frac{h*\sqrt{x^\wedge 2+y^\wedge 2}}{R}}^{h} (y^\wedge 2 + z^\wedge 2)\, dz\, dy\, dx$$

Out[45]= $\frac{3}{20} M \left(4 h^2 + R^2\right)$

In[46]:= $$I_{22} = \rho * \int_{-R}^{R}\int_{-\sqrt{R^\wedge 2-x^\wedge 2}}^{\sqrt{R^\wedge 2-x^\wedge 2}}\int_{\frac{h*\sqrt{x^\wedge 2+y^\wedge 2}}{R}}^{h} (x^\wedge 2 + z^\wedge 2)\, dz\, dy\, dx$$

Out[46]= $\frac{3}{20} M \left(4 h^2 + R^2\right)$

In[47]:= $$I_{33} = \rho * \int_{-R}^{R}\int_{-\sqrt{R^\wedge 2-x^\wedge 2}}^{\sqrt{R^\wedge 2-x^\wedge 2}}\int_{\frac{h*\sqrt{x^\wedge 2+y^\wedge 2}}{R}}^{h} (x^\wedge 2 + y^\wedge 2)\, dz\, dy\, dx$$

Out[47]= $\frac{3\,M\,R^2}{10}$

In[48]:= $$I_{12} = \rho * \int_{-R}^{R}\int_{-\sqrt{R^\wedge 2-x^\wedge 2}}^{\sqrt{R^\wedge 2-x^\wedge 2}}\int_{\frac{h*\sqrt{x^\wedge 2+y^\wedge 2}}{R}}^{h} (-x * y)\, dz\, dy\, dx$$

Out[48]= 0

In[49]:= $$I_{13} = \rho * \int_{-R}^{R}\int_{-\sqrt{R^\wedge 2-x^\wedge 2}}^{\sqrt{R^\wedge 2-x^\wedge 2}}\int_{\frac{h*\sqrt{x^\wedge 2+y^\wedge 2}}{R}}^{h} (-x * z)\, dz\, dy\, dx$$

Out[49]= 0

In[51]:= $$I_{23} = \rho * \int_{-R}^{R}\int_{-\sqrt{R^\wedge 2-x^\wedge 2}}^{\sqrt{R^\wedge 2-x^\wedge 2}}\int_{\frac{h*\sqrt{x^\wedge 2+y^\wedge 2}}{R}}^{h} (-y * z)\, dz\, dy\, dx$$

Out[51]= 0