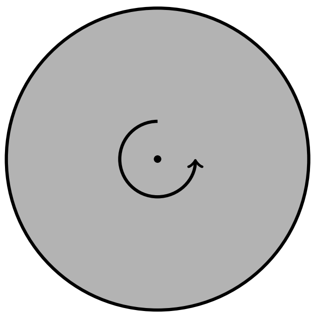
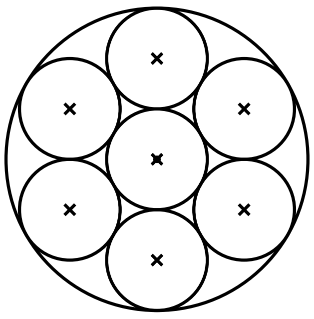
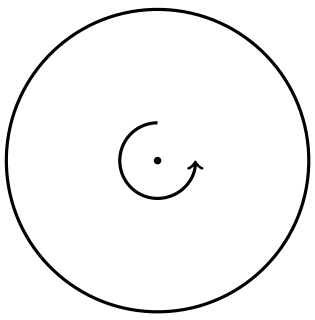
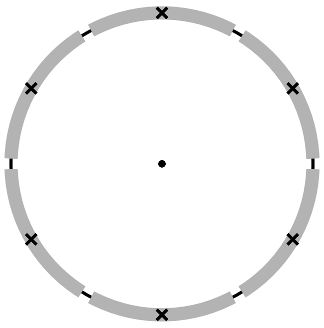
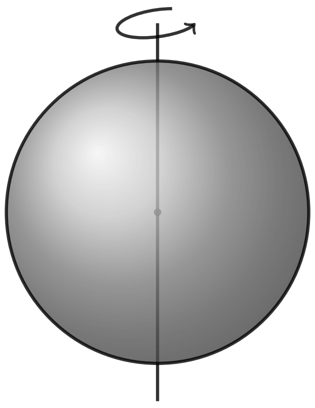
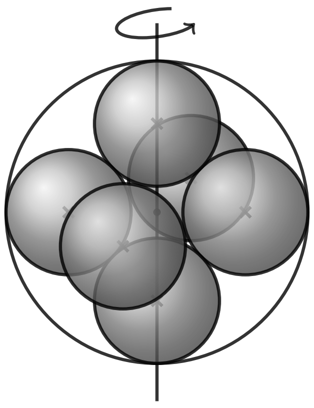
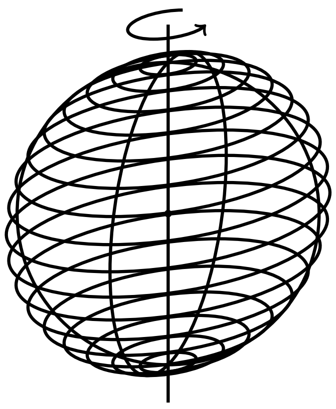
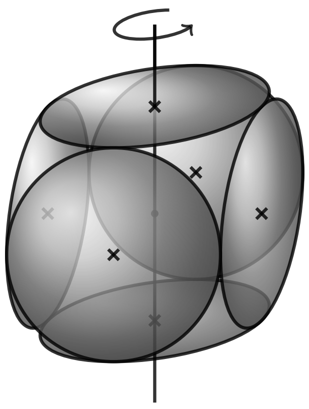
The rotational inertia of a particle of weight M and of distance R from the pivot point is

$$I = MR^2.$$

In general, the rotational inertia of an object is

$$I = \int \rho r^2 \, dV,$$

where ρ is the density and V is the volumn.

Name	Object	Partition	Approximation $\sum_i m_i r_i^2$	Rotational inertia $\int \rho r^2 \, dV$
solid cylinder			$\frac{1}{7}M \cdot \left(\frac{2}{3}R\right)^2 +$	$\int \frac{M}{\pi R^2} \cdot r^2 \, dA =$
hollow cylinder			$\frac{1}{6}M \cdot R^2 +$	$\int \frac{M}{2\pi} \cdot R^2 \, dL =$
solid sphere			$\frac{1}{6}M \cdot \left(\frac{\sqrt{2}}{1+\sqrt{2}}R\right)^2 +$	$\int \frac{M}{\frac{4}{3}\pi R^3} \cdot (r \sin\phi)^2 \, dV =$
hollow sphere			$\frac{1}{6}M \cdot R^2 +$	$\int \frac{M}{4\pi R^2} \cdot (r \sin\phi)^2 \, dA =$