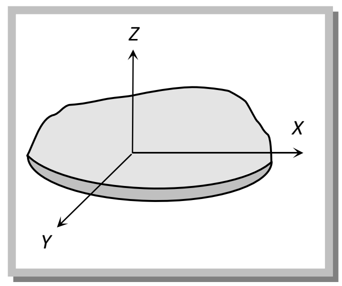
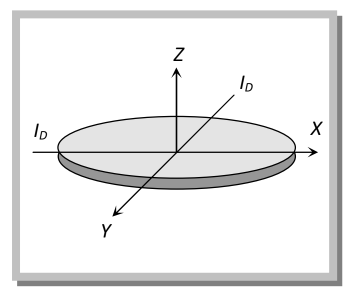
Theorem of Perpendicular Axes.

According to this theorem the sum of moment of inertia of a plane lamina about two mutually perpendicular axes lying in its plane is equal to its moment of inertia about an axis perpendicular to the plane of lamina and passing through the point of intersection of first two axes.

$$I_z = I_x + I_y$$



Example: Moment of inertia of a disc about an axis through its center of mass and perpendicular to its plane is $\frac{1}{2}MR^2$, so if the disc is in x–y plane then by theorem of perpendicular axes



i.e. $I_z = I_x + I_y$

$\Rightarrow \frac{1}{2}MR^2 = 2I_D$ [As ring is symmetrical body so $I_x = I_y = I_D$]

$\Rightarrow I_D = \frac{1}{4}MR^2$

Note: In case of symmetrical two-dimensional bodies as moment of inertia for all axes passing through the center of mass and in the plane of body will be same so the two axes in the plane of body need not be perpendicular to each other.