



Mass Moment of Inertia Formulas

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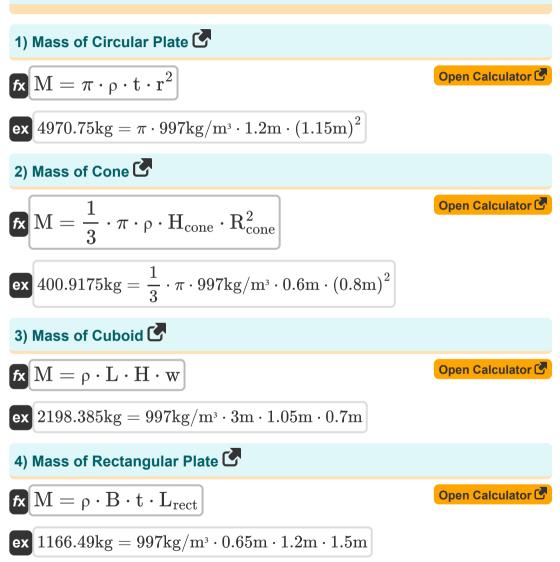
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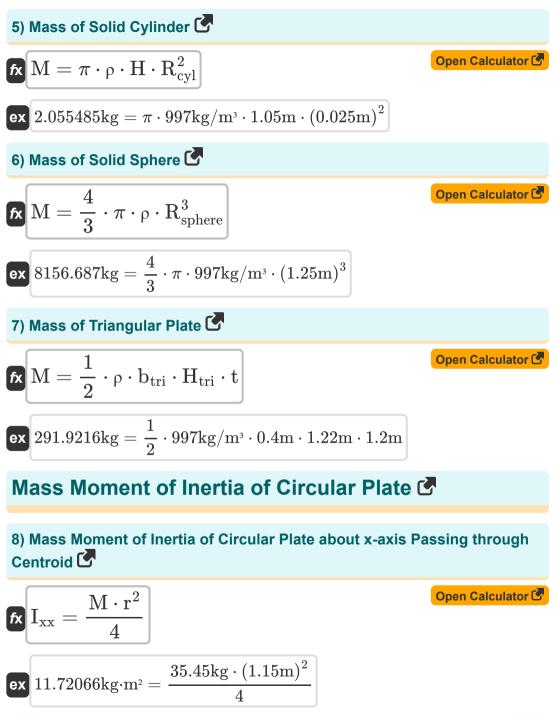


List of 29 Mass Moment of Inertia Formulas

Mass Moment of Inertia 🕑

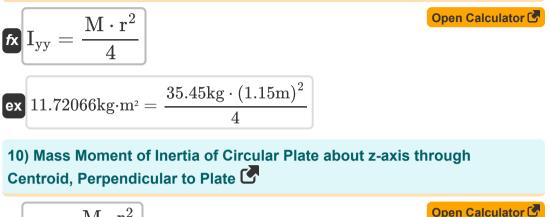


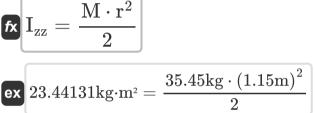






9) Mass Moment of Inertia of Circular Plate about y-axis Passing through Centroid





Mass Moment of Inertia of Cone 🕑

11) Mass Moment of Inertia of Cone about x-axis Passing through Centroid, Perpendicular to Base

fx
$$\mathrm{I_{xx}} = rac{3}{10} \cdot \mathrm{M} \cdot \mathrm{R_{cone}^2}$$

ex
$$6.8064 \text{kg} \cdot \text{m}^2 = rac{3}{10} \cdot 35.45 \text{kg} \cdot (0.8 \text{m})^2$$



12) Mass Moment of Inertia of Cone about y-axis Perpendicular to Height, Passing through Apex Point

fx
$$\mathrm{I_{yy}} = rac{3}{20} \cdot \mathrm{M} \cdot \left(\mathrm{R_{cone}^2} + 4 \cdot \mathrm{H_{cone}^2}
ight)$$

ex
$$11.0604 \mathrm{kg} \cdot \mathrm{m}^2 = rac{3}{20} \cdot 35.45 \mathrm{kg} \cdot \left(\left(0.8 \mathrm{m}
ight)^2 + 4 \cdot \left(0.6 \mathrm{m}
ight)^2
ight)$$

Mass Moment of Inertia of Cuboid 🕑

13) Mass Moment of Inertia of Cuboid about x-axis Passing through Centroid, Parallel to Length

fx
$$\mathrm{I_{xx}} = rac{\mathrm{M}}{\mathrm{12}} \cdot \left(\mathrm{w}^2 + \mathrm{H}^2
ight)$$

Open Calculator 🗹

Open Calculator

$$\mathbf{x} \ 4.70451 \text{kg} \cdot \text{m}^2 = \frac{35.45 \text{kg}}{12} \cdot \left(\left(0.7 \text{m} \right)^2 + \left(1.05 \text{m} \right)^2 \right)$$

14) Mass Moment of Inertia of Cuboid about y-axis Passing through Centroid

fx
$$\mathrm{I_{yy}} = rac{\mathrm{M}}{\mathrm{12}} \cdot \left(\mathrm{L}^2 + \mathrm{w}^2
ight)$$

$$= 28.03504 \text{kg} \cdot \text{m}^2 = \frac{35.45 \text{kg}}{12} \cdot \left((3\text{m})^2 + (0.7\text{m})^2 \right)$$



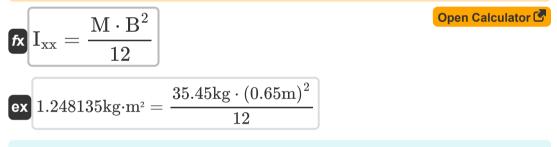
15) Mass Moment of Inertia of Cuboid about z-axis Passing through Centroid

$$\int \mathbf{K} \mathbf{I}_{\mathrm{zz}} = rac{\mathrm{M}}{\mathrm{12}} \cdot \left(\mathrm{L}^2 + \mathrm{H}^2
ight)$$
 Open Calculator C

ex
$$29.84447 \mathrm{kg} \cdot \mathrm{m}^2 = rac{35.45 \mathrm{kg}}{12} \cdot \left((3 \mathrm{m})^2 + (1.05 \mathrm{m})^2
ight)$$

Mass Moment of Inertia of Rectangular Plate 🕑

16) Mass Moment of Inertia of Rectangular Plate about x-axis through Centroid, Parallel to Length



17) Mass Moment of Inertia of Rectangular Plate about y-axis through Centroid, Parallel to Breadth

fx
$$I_{yy} = \frac{M \cdot L_{rect}^2}{12}$$

ex $6.646875 kg \cdot m^2 = \frac{35.45 kg \cdot (1.5m)^2}{12}$



18) Mass Moment of Inertia of Rectangular Plate about z-axis through Centroid, Perpendicular to Plate

fx
$$I_{zz} = rac{M}{12} \cdot \left(L_{rect}^2 + B^2
ight)$$
 Open Calculator I

ex 7.89501kg·m² =
$$\frac{35.45 \text{kg}}{12} \cdot ((1.5 \text{m})^2 + (0.65 \text{m})^2)$$

Mass Moment of Inertia of Rod 🕑

19) Mass Moment of Inertia of Rod about y-axis Passing through Centroid, Perpendicular to Length of Rod

$$fx I_{yy} = \frac{M \cdot L_{rod}^2}{12}$$

$$fx I_{1.81667kg \cdot m^2} = \frac{35.45kg \cdot (2m)^2}{12}$$

$$fx I_{rod}$$

20) Mass Moment of Inertia of Rod about z-axis Passing through Centroid, Perpendicular to Length of Rod

fx
$$I_{zz} = \frac{M \cdot L_{rod}^2}{12}$$

ex $11.81667 \text{kg} \cdot \text{m}^2 = \frac{35.45 \text{kg} \cdot (2\text{m})^2}{12}$



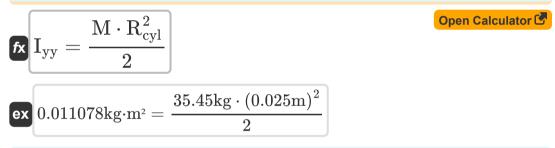
Mass Moment of Inertia of Solid Cylinder 🕑

21) Mass Moment of Inertia of Solid Cylinder about x-axis through Centroid, Perpendicular to Length

fx
$$\mathrm{I_{xx}} = rac{\mathrm{M}}{\mathrm{12}} \cdot \left(3 \cdot \mathrm{R_{cyl}^2} + \mathrm{H_{cyl}^2}
ight)$$

$$\mathbf{x} \left[0.041284 \mathrm{kg} \cdot \mathrm{m}^2 = rac{35.45 \mathrm{kg}}{12} \cdot \left(3 \cdot (0.025 \mathrm{m})^2 + (0.11 \mathrm{m})^2
ight)
ight.$$

22) Mass Moment of Inertia of Solid Cylinder about y-axis through Centroid, Parallel to Length



23) Mass Moment of Inertia of Solid Cylinder about z-axis through Centroid, Perpendicular to Length





Mass Moment of Inertia of Solid Sphere 🕑

24) Mass Moment of Inertia of Solid Sphere about x-axis Passing through Centroid

fx
$$\mathbf{I}_{\mathrm{xx}} = rac{2}{5} \cdot \mathrm{M} \cdot \mathrm{R}^2_{\mathrm{sphere}}$$

е

$$imes 22.15625 ext{kg} \cdot ext{m}^2 = rac{2}{5} \cdot 35.45 ext{kg} \cdot \left(1.25 ext{m}
ight)^2$$

25) Mass Moment of Inertia of Solid Sphere about y-axis Passing through Centroid

fx
$$\mathrm{I_{yy}} = rac{2}{5} \cdot \mathrm{M} \cdot \mathrm{R_{sphere}^2}$$

ex
$$22.15625 \mathrm{kg} \cdot \mathrm{m}^2 = rac{2}{5} \cdot 35.45 \mathrm{kg} \cdot (1.25 \mathrm{m})^2$$

26) Mass Moment of Inertia of Solid Sphere about z-axis Passing through Centroid

fx
$$\mathrm{I_{zz}} = rac{2}{5} \cdot \mathrm{M} \cdot \mathrm{R_{sphere}^2}$$

ex
$$22.15625 \mathrm{kg} \cdot \mathrm{m}^2 = rac{2}{5} \cdot 35.45 \mathrm{kg} \cdot (1.25 \mathrm{m})^2$$



Open Calculator

Mass Moment of Inertia of Triangular Plate 🕑

27) Mass Moment of Inertia of Triangular Plate about x-axis Passing through Centroid, Parallel to Base

fx
$$I_{xx} = \frac{M \cdot H_{tri}^2}{18}$$

ex $2.931321 \text{kg} \cdot \text{m}^2 = \frac{35.45 \text{kg} \cdot (1.22 \text{m})^2}{12}$

28) Mass Moment of Inertia of Triangular Plate about y-axis Passing through Centroid, Parallel to Height

18

$$fx I_{yy} = \frac{M \cdot b_{tri}^2}{24}$$
Open Calculator (*)
$$0.236333 \text{kg} \cdot \text{m}^2 = \frac{35.45 \text{kg} \cdot (0.4 \text{m})^2}{24}$$

24



Variables Used

- **B** Breadth of Rectangular Section (*Meter*)
- **b**tri Base of Triangle (Meter)
- H Height (Meter)
- Hcone Height of Cone (Meter)
- H_{cvl} Cylinder Height (Meter)
- H_{tri} Height of Triangle (Meter)
- IXX Mass Moment of Inertia about X-axis (Kilogram Square Meter)
- Ivv Mass Moment of Inertia about Y-axis (Kilogram Square Meter)
- Izz Mass Moment of Inertia about Z-axis (Kilogram Square Meter)
- L Length (Meter)
- Lrect Length of Rectangular Section (Meter)
- Lrod Length of Rod (Meter)
- M Mass (Kilogram)
- **r** Radius (Meter)
- Rcone Radius of Cone (Meter)
- Rcvl Cylinder Radius (Meter)
- Rsphere Radius of Sphere (Meter)
- **t** Thickness (Meter)
- W Width (Meter)
- **p** Density (Kilogram per Cubic Meter)



Constants, Functions, Measurements used

- Constant: pi, 3.14159265358979323846264338327950288 Archimedes' constant
- Measurement: Length in Meter (m) Length Unit Conversion
- Measurement: Weight in Kilogram (kg) Weight Unit Conversion
- Measurement: Density in Kilogram per Cubic Meter (kg/m³) Density Unit Conversion
- Measurement: Moment of Inertia in Kilogram Square Meter (kg⋅m²) Moment of Inertia Unit Conversion ☑

Check other formula lists

- Area Moment of Inertia
 Formulas
- Mass Moment of Inertia
 Formulas

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