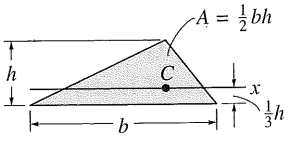
Formula Sheet Moments of Inertia – AE1103 Statics

Only this sheet may be used at the exam!

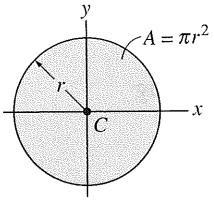
Area Moments of Inertia

Triangle:



$I_x = \frac{1}{36}bh^3$

Circle:

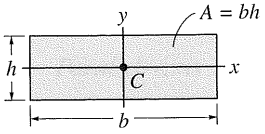


$I_x = \frac{1}{4}\pi r^4$

$I_y = \frac{1}{4}\pi r^4$

$J_C = \pi R^4/2$

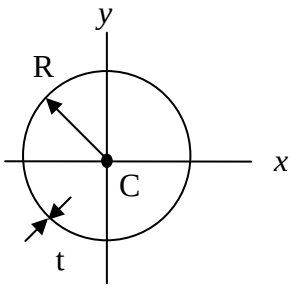
Rectangle:



$I_x = \frac{1}{12}bh^3$

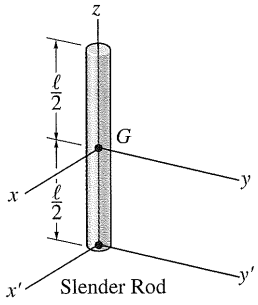
$I_y = \frac{1}{12}hb^3$

Thin-walled ring



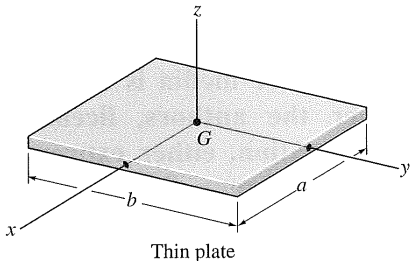
$I_x = \pi R^3 t$;
$I_y = \pi R^3 t$;
$J_C = 2\pi R^3 t$

Mass Moments of Inertia



Slender Rod

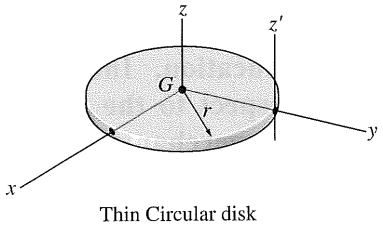
$I_{xx} = I_{yy} = \frac{1}{12}ml^2$



Thin plate

$I_{xx} = \frac{1}{12}mb^2; I_{yy} = \frac{1}{12}ma^2$

$I_{zz} = \frac{1}{12}m\left(a^2 + b^2\right)$



Thin Circular disk

$I_{xx} = I_{yy} = \frac{1}{4}mr^2; I_{zz} = \frac{1}{2}mr^2$