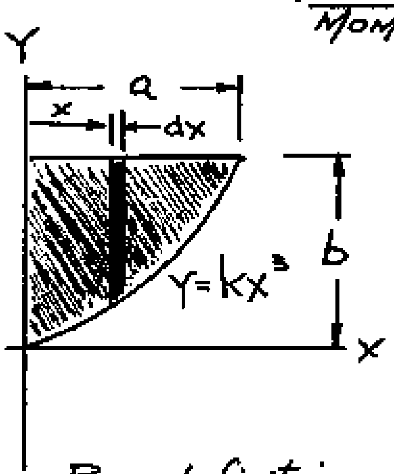


Mom. of INERTIA with respect to Y-AXIS

At max. pt. $x = a$, $y = b$

$\therefore$ for $y = kx^3$

$k = \frac{y}{x^3} = \frac{b}{a^3}$ $\therefore \boxed{y = \frac{b}{a^3}x^3}$

By definition, $dI_y = x^2 dA$
where $dA = (y' - y)dx$
from straight line to curve.

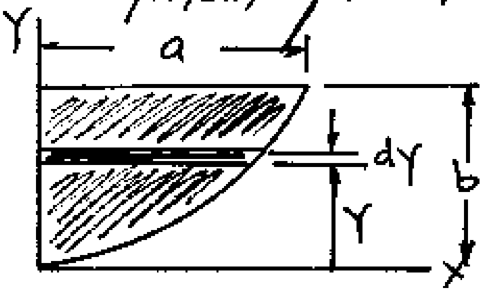
$dI_y = x^2[b - y]dx$ sub. for the function

$= x^2\left[b - \frac{b}{a^3}x^3\right]dx = bx^2\,dx - \frac{bx^5}{a^3}dx$

$I_y = \int dI_y = \int_0^a bx^2 dx - \int_0^a \frac{bx^5}{a^3} dx$

$= b\frac{x^3}{3}\Big]_0^a - \frac{bx^6}{6a^3}\Big]_0^a = \frac{ba^3}{3} - \frac{b\cancel{a^6}^{\,3}}{6\cancel{a^3}} = \frac{ba^3}{6}$

$\therefore$ MOMENT of INERTIA with respect to Y-axis $= \boxed{I_Y = \frac{1}{6}a^3 b}$



Mom. of INERTIA with respect to X-axis

SINCE $y = \frac{b}{a^3}x^3$ $\therefore x = \left[\frac{ya^3}{b}\right]^{1/3}$

By definition, $dI_x = y^2 dA$
where $dA = (x\,dy)$
from straight line to curve.

$dI_x = y^2\left[\frac{a y^{1/3}}{b^{1/3}}\right]dy = \frac{a}{b^{1/3}} y^{(2+\frac{1}{3})}dy = \frac{a}{b^{1/3}} y^{7/3} dy$

$I_x = \int dI_y = \int_0^b \frac{a}{b^{1/3}} y^{7/3} dy = \frac{a}{b^{1/3}}\left[\frac{y^{10/3}}{10/3}\right]_0^b = \frac{3}{10}\frac{a}{b^{1/3}} b^{10/3}$

$= \frac{3}{10} a b^{9/3} = \boxed{\frac{3}{10}ab^3 = I_x}$ = Mom. of INERTIA with respect to X-axis