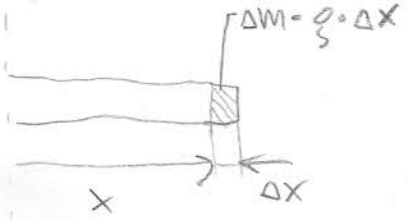

$J(x) = J(x+\Delta x) - J(\Delta x)$

$[\rho] = \frac{kg}{m}$

$J(\Delta x) = \rho \cdot \Delta x \cdot x^2$

$\frac{dJ(x)}{dx} =$

$m = \rho \cdot x$

$J = \int r^2 \cdot dm$

$J(x+\Delta x) - J(x) = \rho \cdot x^2 \cdot \Delta x$

$\frac{dm}{dx} = \rho$

$dm = \rho \cdot dx$

$\frac{dJ}{dx} = \lim_{\Delta x \to 0} \frac{\rho \cdot x^2 \cdot \Delta x}{\Delta x} = \rho \cdot x^2$

$J = \int_0^l \rho \cdot x^2 \cdot dx$

$dJ = \rho \cdot x^2 \cdot dx$

$J = \rho \int_0^l x^2 \cdot dx$

$\int_0^J dJ = \int_0^l \rho \cdot x^2 \cdot dx$

$J = \rho \cdot \left[\frac{x^3}{3}\right]_0^l$

$J - 0 = \rho \cdot \left[\frac{x^3}{3}\right]_0^l$

$J = \rho \cdot l \cdot \frac{l^3}{3} - 0$

$J - 0 = \frac{1}{3}\rho \cdot l^3 - 0$ $\quad \{\rho \cdot l = m\}$

$J = \frac{1}{3} \cdot m \cdot l^2$

$J = \frac{1}{3} \cdot m \cdot l^2$ $\quad m = l \cdot \rho$

$J = J_0 + m \cdot l^2$

$m = \rho \cdot r$

$\frac{dm}{dr} = \rho$

$dm = \rho \cdot dr$

$I = \int r^2 \cdot dm$

$I = \int_0^m r^2 \cdot \frac{1}{\rho} \cdot dr = \rho \int_0^l r^2 \cdot dr$

$I = \rho \cdot \left[\frac{r^3}{3}\right]_0^l = \frac{1}{3} \cdot \rho \cdot l^3$

$I = \frac{1}{3} m \cdot l^2$ $\quad \{\rho \cdot l = m\}$