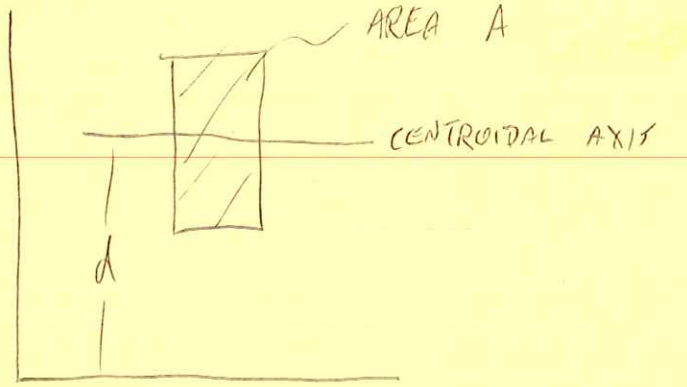
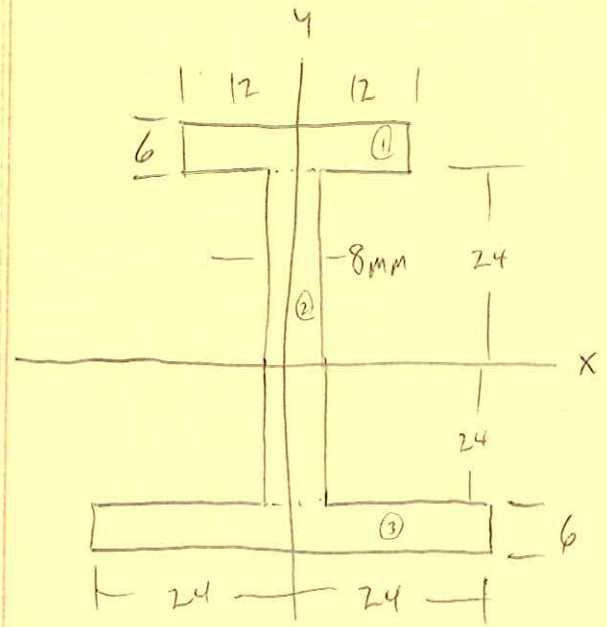
TO DO THIS, WE NEED THE PARALLEL-AXIS THEORUM.



$$I = \bar{I} + Ad^2$$

↘ MOMENT OF INERTIA ABOUT THE CENTROIDAL AXIS

EXAMPLE PROB. 9.31



Given: Schematic

FIND MOMENT OF INERTIA W.R.T. X AXIS

PROB. 9.31

$$I_x = (I_x)_1 + (I_x)_2 + (I_x)_3$$

FOR AREA 1

$$\bar{I} = \frac{1}{12} b h^3 \qquad \text{TABLE p. 484 \& 485}$$

$$(I_x)_1 = \frac{1}{12} b h^3 + (bh) d^2$$

$$= \frac{1}{12}(24\,\text{mm})(6\,\text{mm})^3 + (24\,\text{mm})(6\,\text{mm})(24+3\,\text{mm})^2$$

$$(I_x)_1 = 1.05 \times 10^5\ \text{mm}^4$$

FOR AREA 2:

$$(I_x)_2 = \frac{1}{12} b h^3$$

$$= \frac{1}{12}(8\,\text{mm})(48\,\text{mm})^3$$

$$(I_x)_2 = 7.37 \times 10^4\ \text{mm}^4$$

FOR AREA 3:

$$(I_x)_3 = \bar{I}_3 + Ad^2$$

$$= \frac{1}{12} b h^3 + bhd^2$$

$$= \frac{1}{12}(48)(6)^3 + (48)(6)(24+3)^2$$

PROB. 9.31

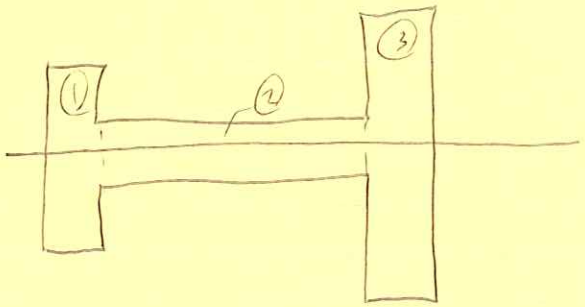
$(I_x)_3 = 2.11 \times 10^5 \text{ mm}^4$

$I_x = 3.89 \times 10^5 \text{ mm}^4$

HOMEWORK #8

PROBS. 9.50, 9.51, 9.54, 9.115, 9.127

IN-CLASS HOMEWORK: PROB. 9.33



$(I_y) = (I_y)_1 + (I_y)_2 + (I_y)_3$

$(I_y)_1 = \frac{1}{12} bh^3 = \frac{1}{12}(6)(24)^3 = 6912 \text{ mm}^4$

$(I_y)_2 = \frac{1}{12}(48)(8)^3 = 2048 \text{ mm}^4$

$(I_y)_3 = \frac{1}{12}(6)(48)^3 = 5.53 \times 10^4 \text{ mm}^4$

$I_y = 6.42 \times 10^4 \text{ mm}^4$