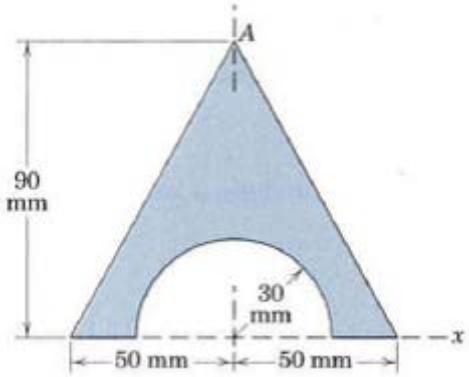
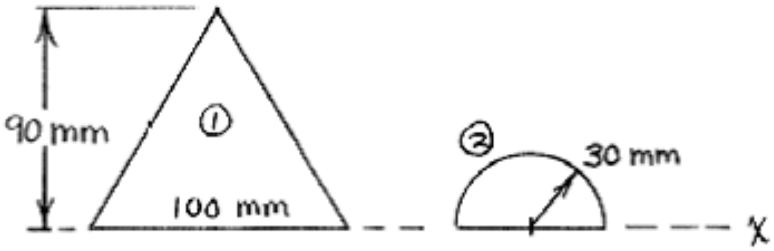
Problem 6

Calculate the moment of inertia of the shaded area about the .x-axis



Solution



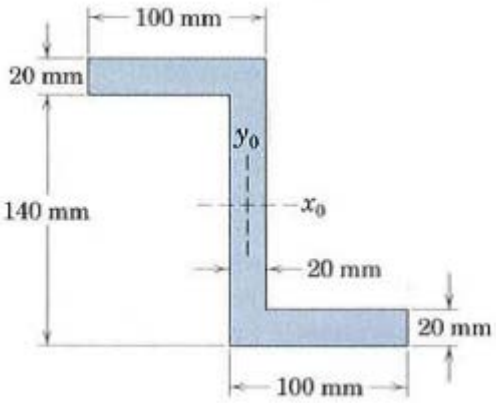
$$I_{x_1} = \frac{1}{12}(100)(90^3) = 6.08(10^6)\ mm^4$$

$$I_{x_2} = -\frac{\pi(30^4)}{8} = -0.318(10^6)\ mm^4$$

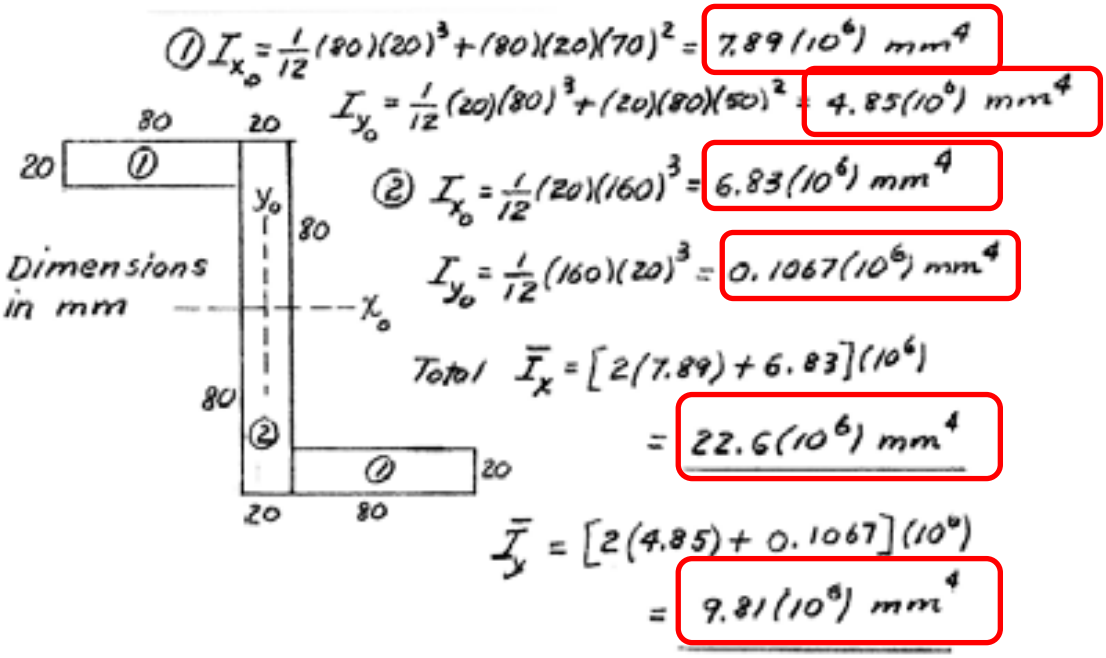
$$\text{So } I_x = (6.08 - 0.318)10^6 = 5.76(10^6)\ mm^4$$

Problem 7

Determine the moments of inertia of the Z-section about its centroidal x_o- and y_o·axes.

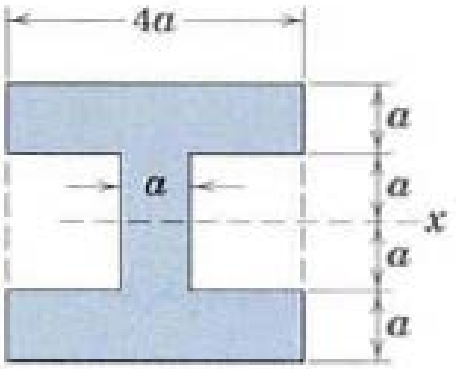


Solution

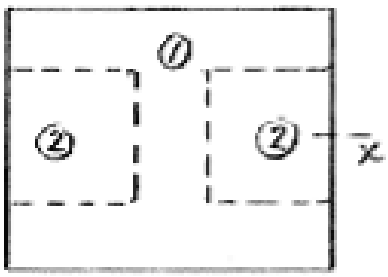


Problem 8

Determine the moment of inertia of the shaded area about the .x-axis



Solution



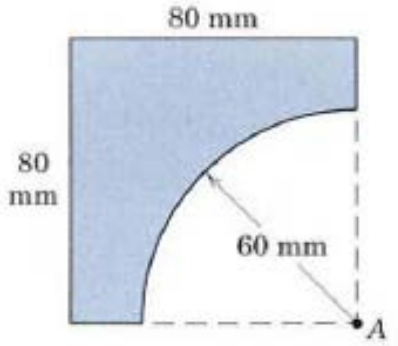
$$I_{①} = \frac{1}{12}(4a)(4a)^3 = \frac{64}{3}a^4$$

$$I_{②} = -\frac{1}{12}(3a)(2a)^3 = -2a^4$$

$$Total = \left(\frac{64}{3} - \frac{6}{3}\right)a^4 = \frac{58}{3}a^4$$

Problem 9

Determine the polar radius of gyration about point *A* for the shaded area shown



Solution