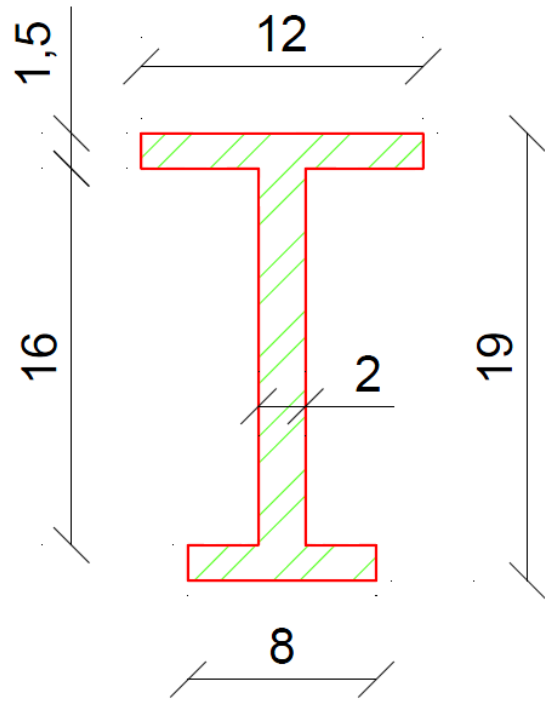


Problem 2

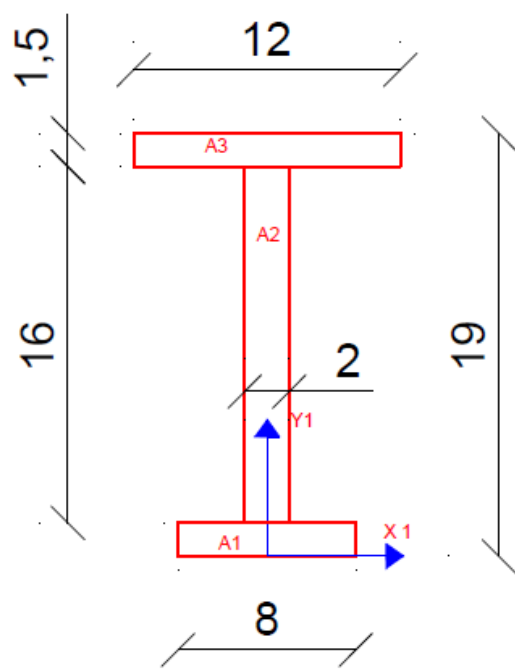
Determine the location of centroid of the given area

SOL.



1- assume x and y axis

2- Divide the area to three areas with simple shape



3- Find area properties

$$A_1 = 1.5 \times 8 = 12 \text{ cm}$$

$$A_2 = 16 \times 2 = 32 \text{ cm}^2$$

$$A_3 = 1.5 \times 12 = 18 \text{ cm}^2$$

$$A_t = 12 + 32 + 18 = 62 \text{ cm}^2$$

$$y_1 = \frac{1.5}{2} = 0.75 \text{ cm}$$

$$y_2 = 1.5 + \frac{16}{2} = 9.5 \text{ cm}$$

$$y_3 = 1.5 + 16 + \frac{1.5}{2} = 18.75 \text{ cm}$$

From the symmetry of the shape about y axis $\Rightarrow \bar{x} = 0$

$$\bar{y} = \frac{\sum A_i y_i}{\sum A_i} = \frac{12 \times 0.75 + 32 \times 9.5 + 18 \times 18.75}{62} = 10.492 \text{ cm}$$

