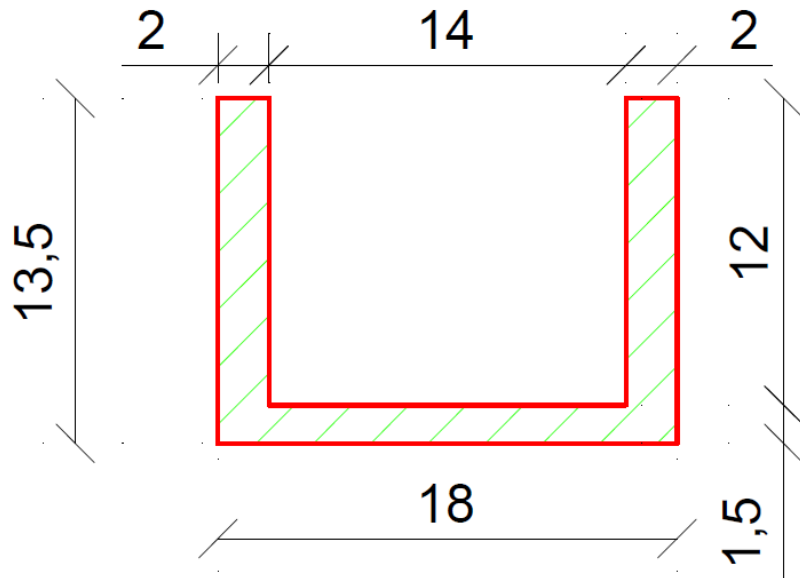


Problem 1

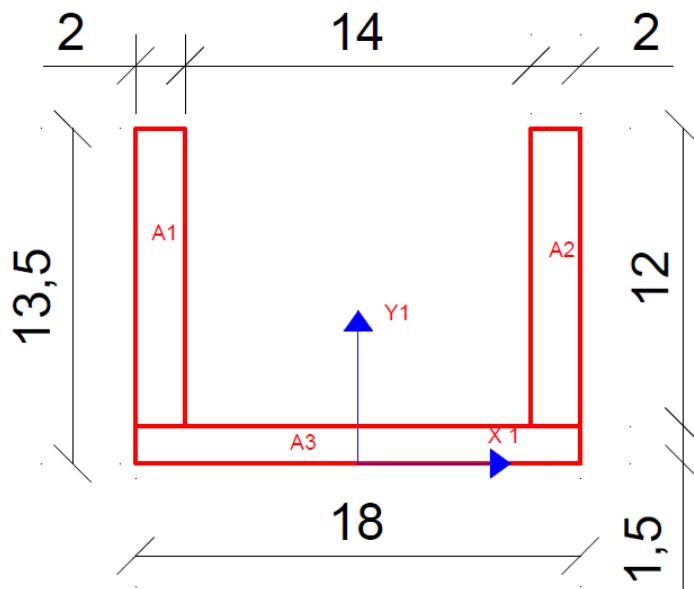
Determine the location of centroid of the given area



SOL.

1- assume x and y axis

2- Divide the area to three areas with simple shape



3- Find area properties

$$A_1 = A_2 = 12 \times 2 = 24 \text{ cm}^2$$

$$A_3 = 1.5 \times 18 = 27 \text{ cm}^2$$

$$A_t = 2 \times 24 + 27 = 75 \text{ cm}^2$$

$$y_1 = y_2 = 1.5 + \frac{12}{2} = 7.5 \text{ cm}$$

$$y_3 = \frac{1.5}{2} = 0.75 \text{ cm}$$

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

$$\bar{y} = \frac{\sum A_i y_i}{\sum A_i} = \frac{24 \times 7.5 \times 2 + 27 \times 0.75}{75} = 5.07 \text{ cm}$$

