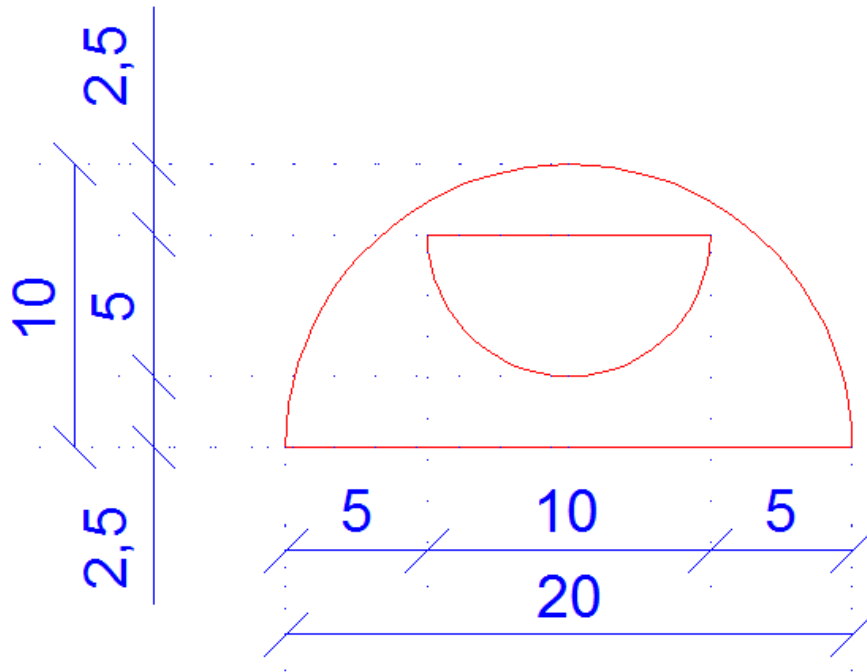


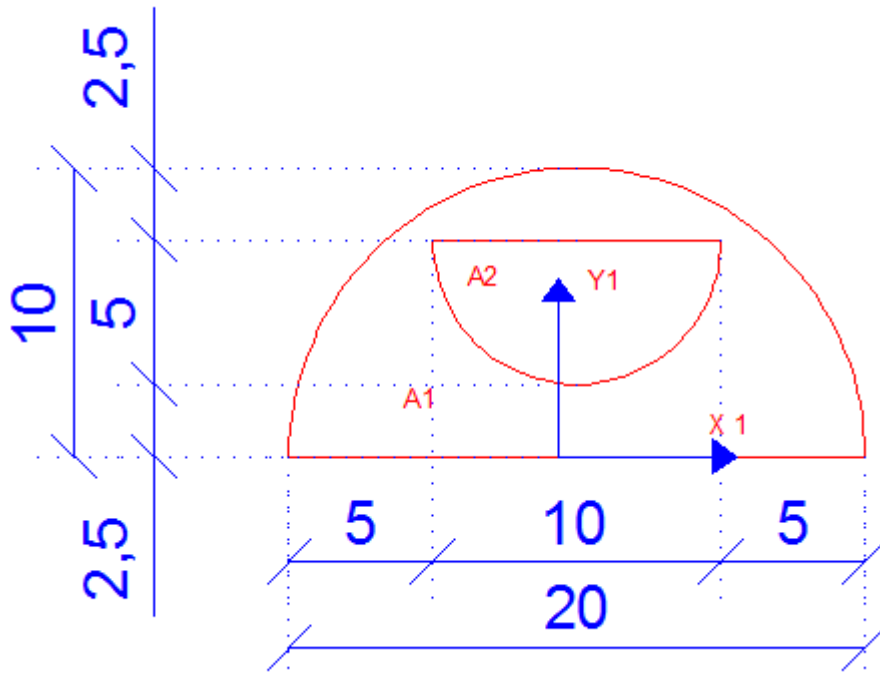
Problem 5

Determine the location of centroid of the given area



SOL.

- 1- Assume x and y axis
- 2- Divide the area to areas with simple shape



3- Find area properties

$$A_1 = \frac{\pi \times 20^2}{8} = 157.159 \text{ cm}^2$$

$$A_2 = \frac{\pi \times 10^2}{8} = 39.540 \text{ cm}^2$$

$$A_t = 157.159 - 39.54 = 117.619 \text{ cm}^2$$

$$y_1 = \frac{2 \times 20}{3\pi} = 4.244 \text{ cm}$$

$$y_2 = 2.5 + 5 - \frac{2 \times 10}{3\pi} = 5.378 \text{ cm}$$

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

$$\bar{y} = \frac{\sum A_i y_i}{\sum A_i} = \frac{157.159 \times 4.244 - 39.54 \times 5.378}{117.619} = 3.863 \text{ cm}$$

