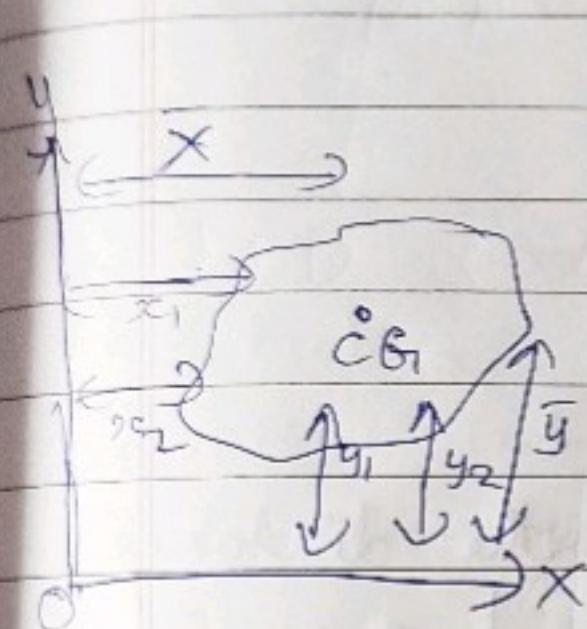# Varignons Theorem(1st moment of area)

A. Using method of moments (First moment of area).

→ Moment of Total area 'A' about y-axis = Algebric sum of moment of elemental ~~dA~~ "dA" about the same axis. (Varignon's Theorem).

$$\bar{x} = \frac{\sum a_i x_i}{A}$$

$$\Rightarrow A\bar{x} = a_1 x_1 + a_2 x_2 + a_3 x_3 + \cdots$$

$$\bar{y} = \frac{\sum a_i y_i}{A}$$

$$\Rightarrow A\bar{y} = a_1 y_1 + a_2 y_2 + a_3 y_3 + \cdots$$

⇒ It is an axis w.r.t which for an elementary area on one side of the axis, there is a corresponding elementary area on the other side of the axis (the first moment of these elementary areas about the axis balance each other.).

⇒ If an area has an axis of symmetry, then the centroid must lie on that axis.

⇒ If an area has 2 axes of symmetry, then the centroid must lie at the point of intersection of these axes.