

Finding a Centroid

Mechanical Engineering

The composite-area method: split, locate, weight, sum, divide.

Works for any shape you can cut into standard pieces.

1

Split into standard shapes

Rectangles, triangles, circles. A hole counts as negative area.

2

Set one axis system

One origin for the whole figure, usually a flat outer edge.

3

Tabulate area and position

Each piece: its area, and its own centroid from that origin.

4

Take the first moments

Multiply each area by its own centroid distance.

5

Divide by the total area

Centroid = $\Sigma Ax \div \Sigma A$ in x, and $\Sigma Ay \div \Sigma A$ in y.

The centroid is geometry only. It coincides with the centre of mass just when the density is uniform.