

Centroids Encyclopedia Article

Centroids

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Contents

Centroids Encyclopedia Article.....	1
Contents.....	2
Centroids.....	3

Centroids

The centroid, also called the **center of mass**, is one of the ways of defining the geometric center of a planar figure or a solid. If the planar figure was cut out of stiff paper, the centroid would be the point at which you could balance the object on a pin. The centroid of a solid is not as easy to visualize, but its coordinates also provide a center of balance. It is the point at which there is an equal amount of the figure in each direction, for as many degrees of freedom as are allowed.

To calculate each coordinate centroid, one takes the integral of the density function multiplied by the coordinate over the entire **area** or **volume** in consideration, divided by the total "mass" of the shape. For figures that consist of discrete points rather than a continuous **geometry**, the integral may be replaced by a sum over the individual points with mass weighting for each, divided by the sum of the masses. For equal masses at all points, the centroid is simply the average position of the figure. The centroid also is the point at which the total travel from all vertices of the figure is minimized. The centroid of a **triangle** is the point at which medians (lines from a vertex to the opposite **midpoint**) meet; they always meet at one point, although it is not always within the triangle. The centroid of a uniform quadrilateral is found at the point where the bimedians (lines joining opposite midpoints) intersect. Other geometric figures have well-defined **median** positions, but these are more complex calculations and are used far less often.