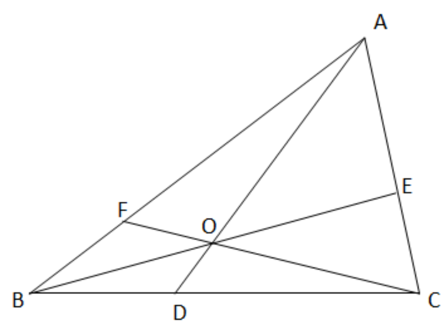
The Concept of Concurrency:

When three or more straight lines pass through a point A, they are said to be concurrent at point A. Here, the point A is called the point of concurrency for all those straight lines. In the case of a triangle, the concept of concurrency can be explained in a different mode. A triangle has naturally got three vertices. Straight lines can be drawn from each vertex to meet the opposite side at any of its points. Such straight lines are geometrically called 'cevians'. If the three cevians drawn from each vertex pass through a common point O, then the point O is said to be the point of concurrency for those three cevians. The following figure will illustrate this concurrency.

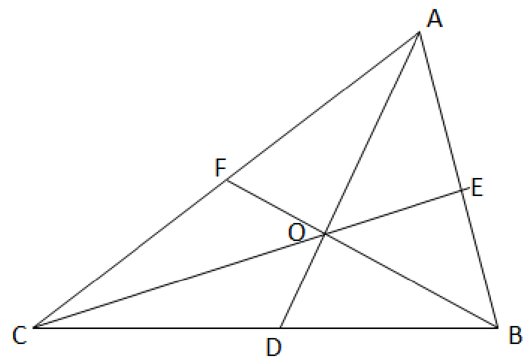


In Δ ABC, AD, BE and CF are cevians drawn from vertices A,B and C respectively meeting the opposite sides, BC, CA and AB at D,E and F respectively. These cevians are passing through a common point O. This point O is, therefore, the point of concurrency of the cevians AD, BE and CF. For any triangle, infinite number of points of concurrency each pertaining to a separate combination of three cevians can be identified.

Some popular 'points of concurrency' in a Triangle:

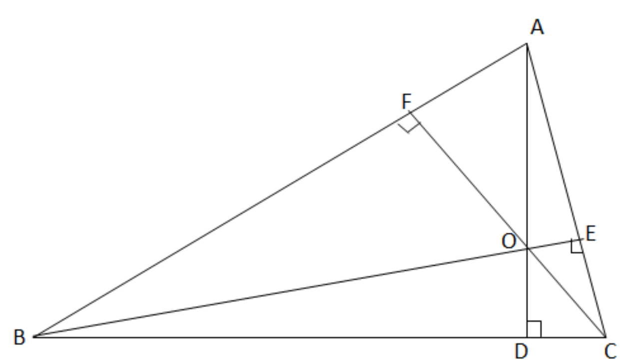
The following are some of the popularly known points of concurrency for a triangle.

a) The Centroid : The Centroid of a triangle is the point of concurrency of its three medians. (The median is the straight line joining a vertex of a triangle and the midpoint of the opposite side of the triangle.)



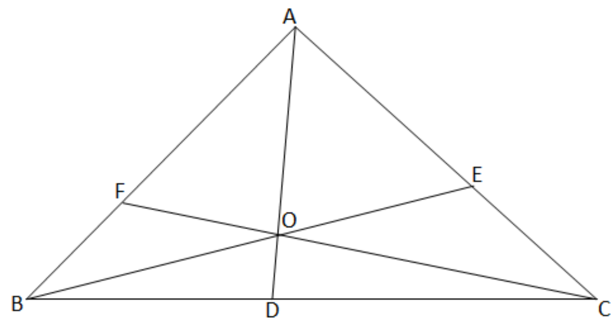
In the above figure, AD, BE and CF are the medians of the Δ ABC and O is the Centroid of the Δ ABC.

b) The Orthocentre: The Orthocentre of a triangle is the point of concurrency of its three altitudes. (The altitude is the perpendicular line drawn from the vertex of a triangle to its opposite side.)



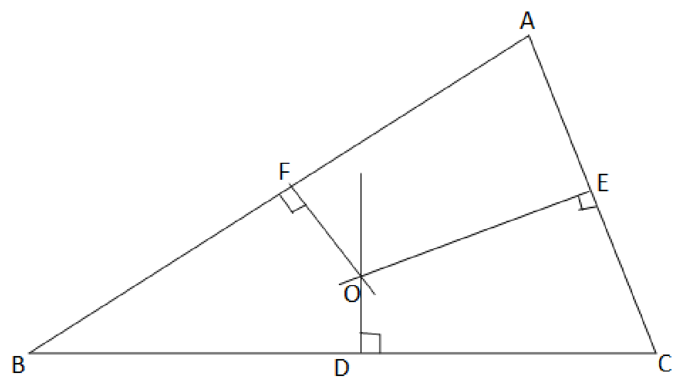
In the above figure, AD, BE and CF are the altitudes of the Δ ABC and O is the Orthocentre of the Δ ABC.

b) **The In-centre**: The In-Centre of a triangle is the point of concurrency of the bisectors of its three internal vertex angles.



In the above figure, AD, BE and CF are the internal angle-bisectors of the Δ ABC and O is the In-centre of the Δ ABC.

d) **The Circumcentre:** The Circumcentre of a triangle is the point of concurrency of the perpendicular bisectors of its three sides.



In the above figure, D,E and F are the midpoints of the sides of the Δ ABC and DO, EO and FO are the perpendicular bisectors of the sides, BC, CA and AB respectively and O is the Circumcentre of the Δ ABC.

The above points of concurrency are the special and popular ones in the study of any triangle, in the normal geometrical practice. These points of concurrency have their own special properties which can be found dealt at length in various contemporary geometrical works.