

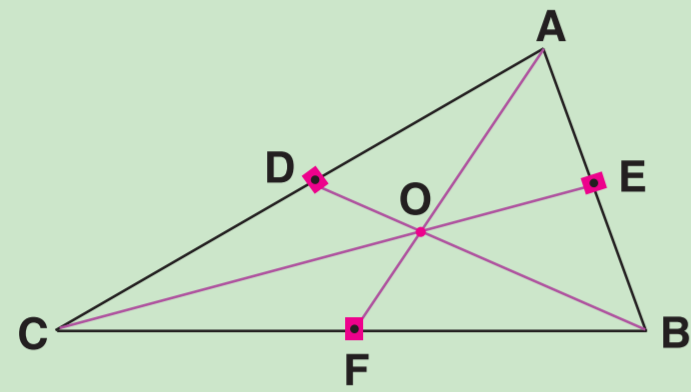
Triangle Centres

A centre of a triangle is a special point in the triangle. Often it is the intersection of three lines sharing a common property such as perpendicular bisectors, angle bisectors, etc.

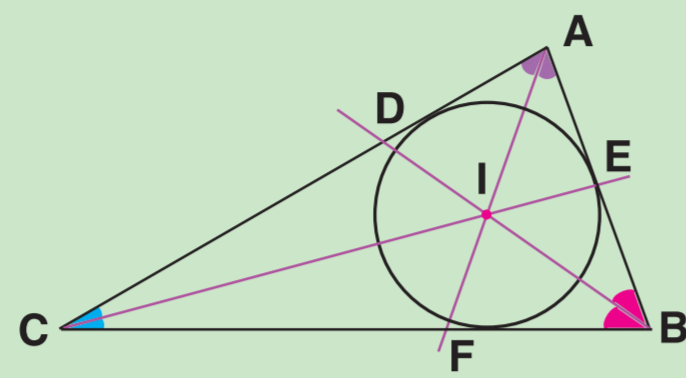


The four commonly known centres are:

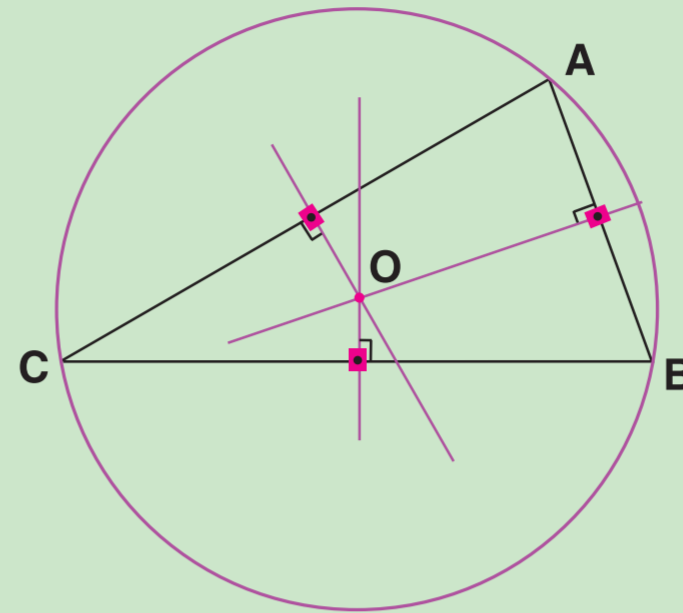
Centroid



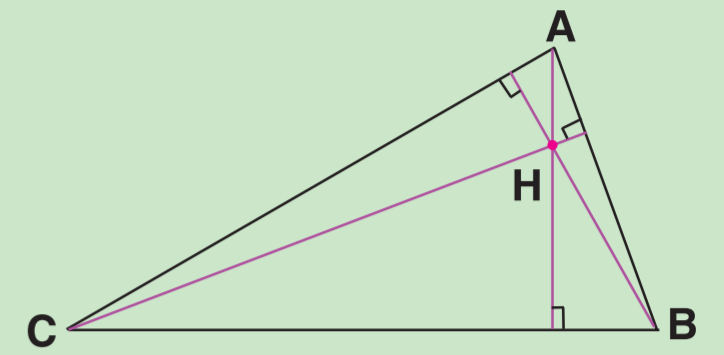
Incentre



Circumcentre



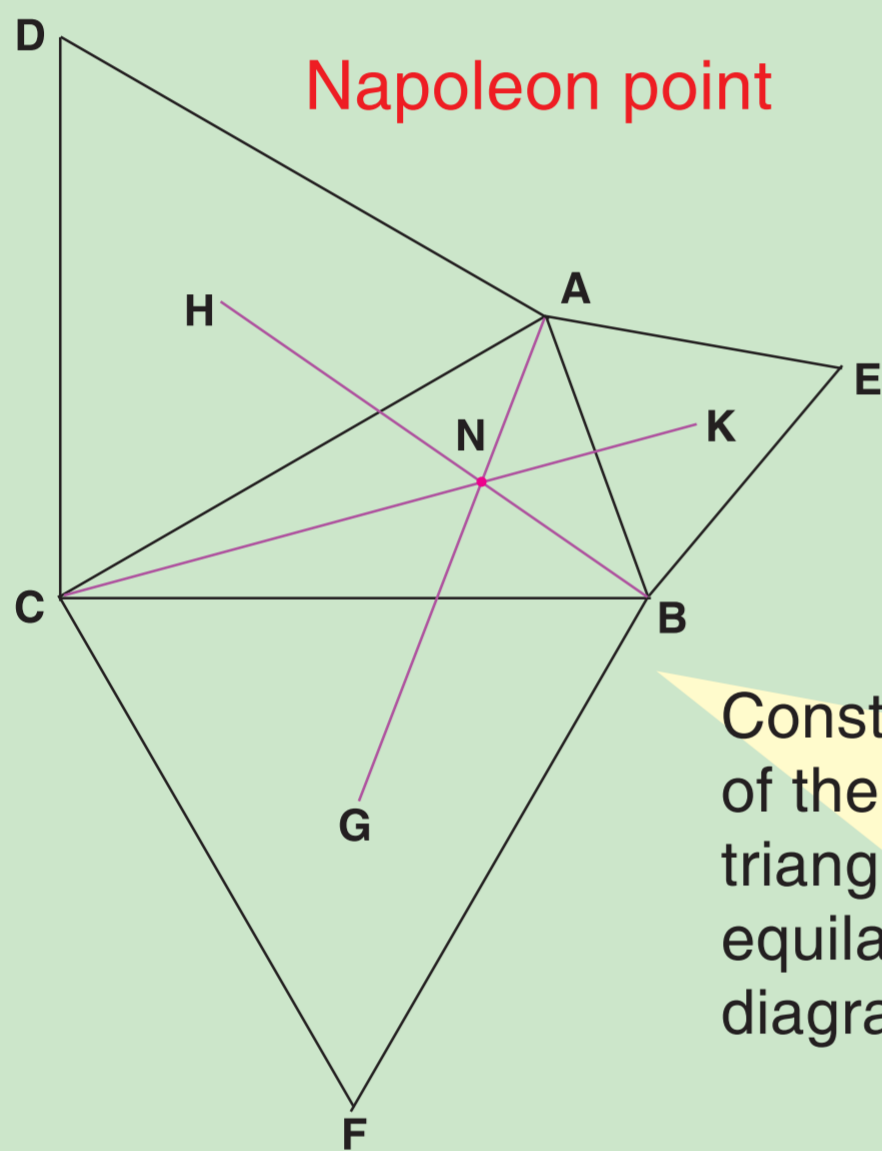
Orthocentre



Note that for an equilateral triangle, these four centres coincide.

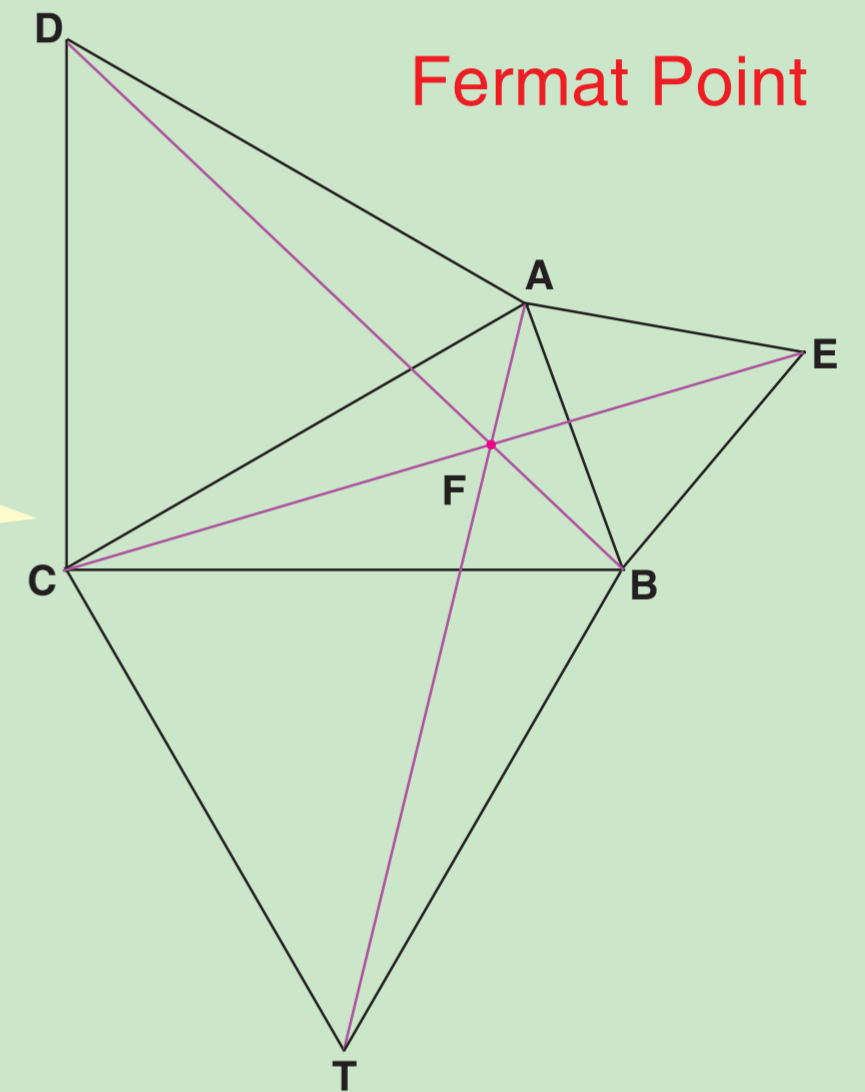
Here are a few more centres:

Napoleon point



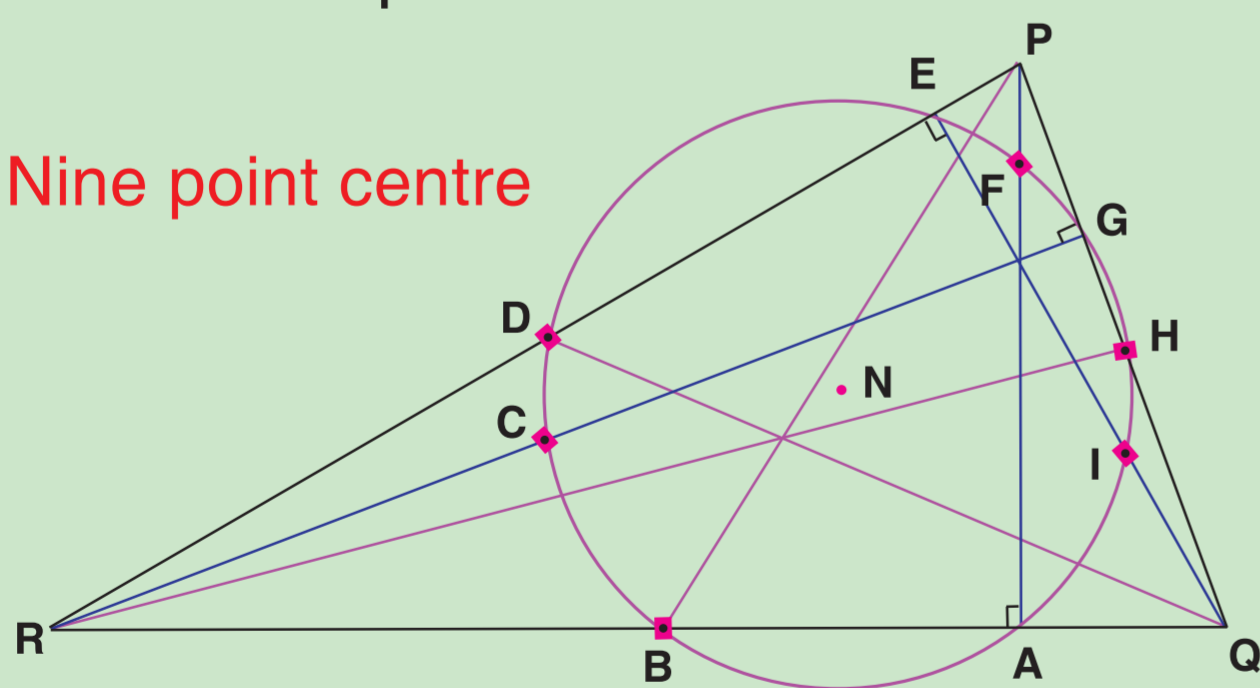
Construct equilateral triangles on each side of the triangle. Join each vertex of the triangle to the outer vertex of the opposite equilateral triangle. The point 'F' in the diagram is **Fermat point**.

Fermat Point

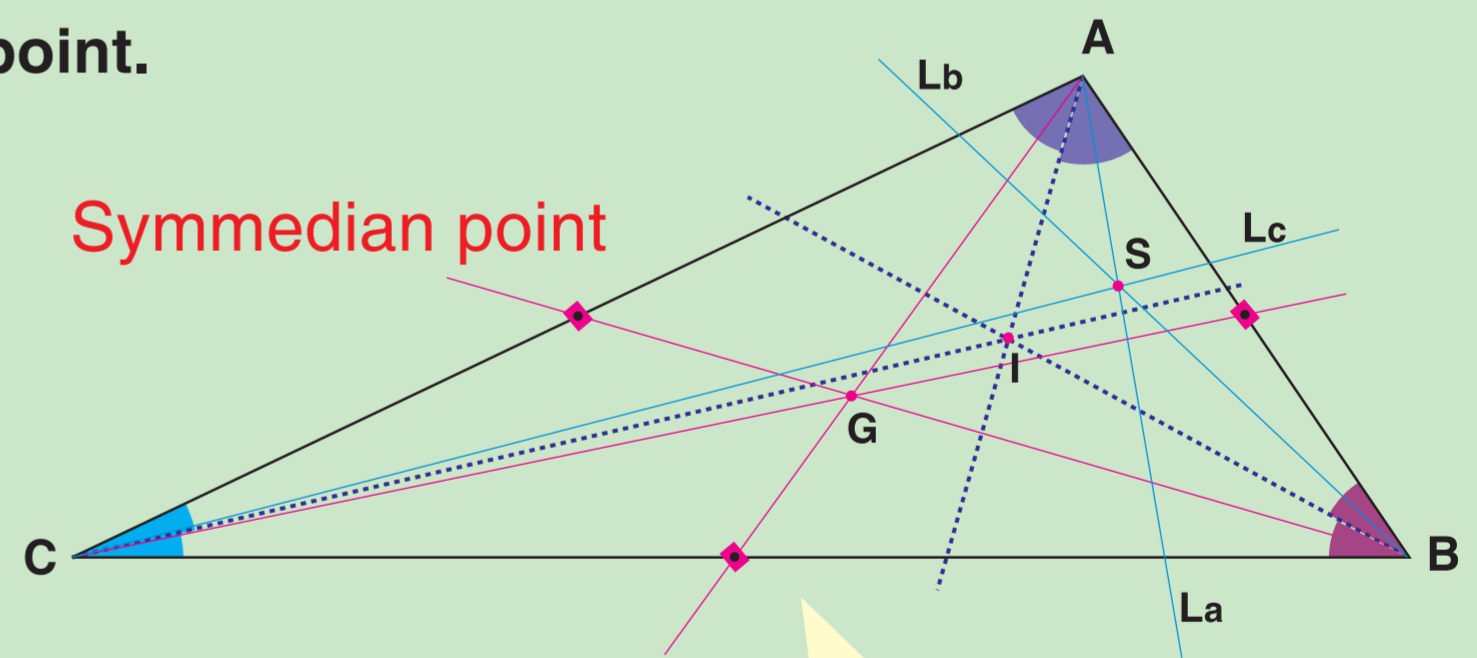


Construct equilateral triangles on each side of the triangle. Join each vertex of the triangle to the centre of the opposite equilateral triangle. The point 'N' in the diagram is the **Napoleon point**.

Nine point centre



Symmedian point

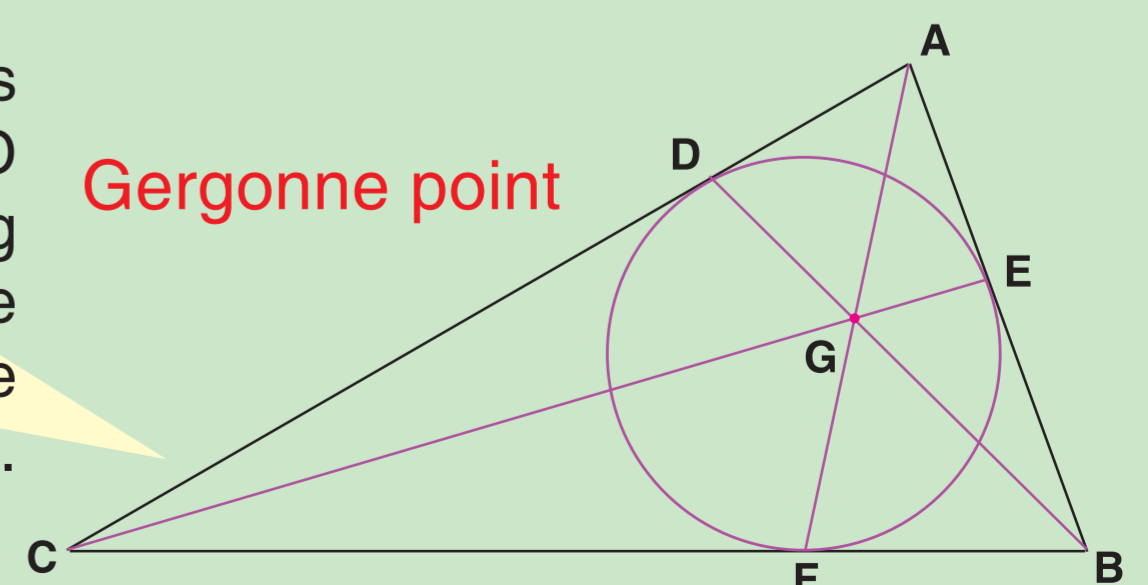


We know that the medians of the triangle intersect at a point called centroid (G). If we reflect the medians about the angle bisectors, then the reflected lines, called Symmedian lines (L_a , L_b & L_c) also intersect at a point, called the **Symmedian point (S)**.

There are nine points in any triangle which lie on the same circle: midpoints of the three sides, feet of the altitudes on the sides, mid-points of the segments from each vertex to the orthocenter. The centre of this circle is called as **Nine-point centre (N)**.

The incircle of $\triangle ABC$ touches the triangle at points E, D and F. The lines joining these points to the opposite vertices meet at the **Gergonne point (G)**.

Gergonne point



There are several hundred triangle centres that have now been identified.