

Geogebra - Centres of a Triangle and the Euler Line.

Here are four well-known centres of a triangle:

Circumcentre: *The centre of a circle which contains all vertices.*

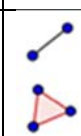
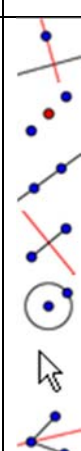

Incentre: *The centre of a circle whose tangents are the sides of the triangle.*

Centroid: *The 'centre of mass' of the triangle*

Orthocentre

These four centres can be found (non-respectively):

- Where all angle bisectors intersect
- Where all altitudes intersect (NB. The altitude of a vertex is its perpendicular distance from the opposite side)
- By joining each vertex to the mid-point of the opposite side and seeing where they intersect.
- Where all the perpendicular bisectors of the three sides intersect.

1.		Open a new GeoGebra window, showing Graphics view only (you may use the 'Geometry' Perspectives shortcut or use view menu and style bar to hide axes).
2.		Create a triangle using either line segments or the polygon tool.
3.		Using a combination of tools, investigate which of the four centres is found using which of the four methods above. Make sure that your centres and two circles move correctly as you move the vertices of the triangle. You may find it useful to hide your construction lines and/or change their colour and style.
4.		Three of the four centres lie in a straight line called the 'Euler Line'. Label all four centres and state which three lie on the Euler Line. Draw the Euler Line using the Line Segment tool. Does the order of the points ever change on the Euler Line?