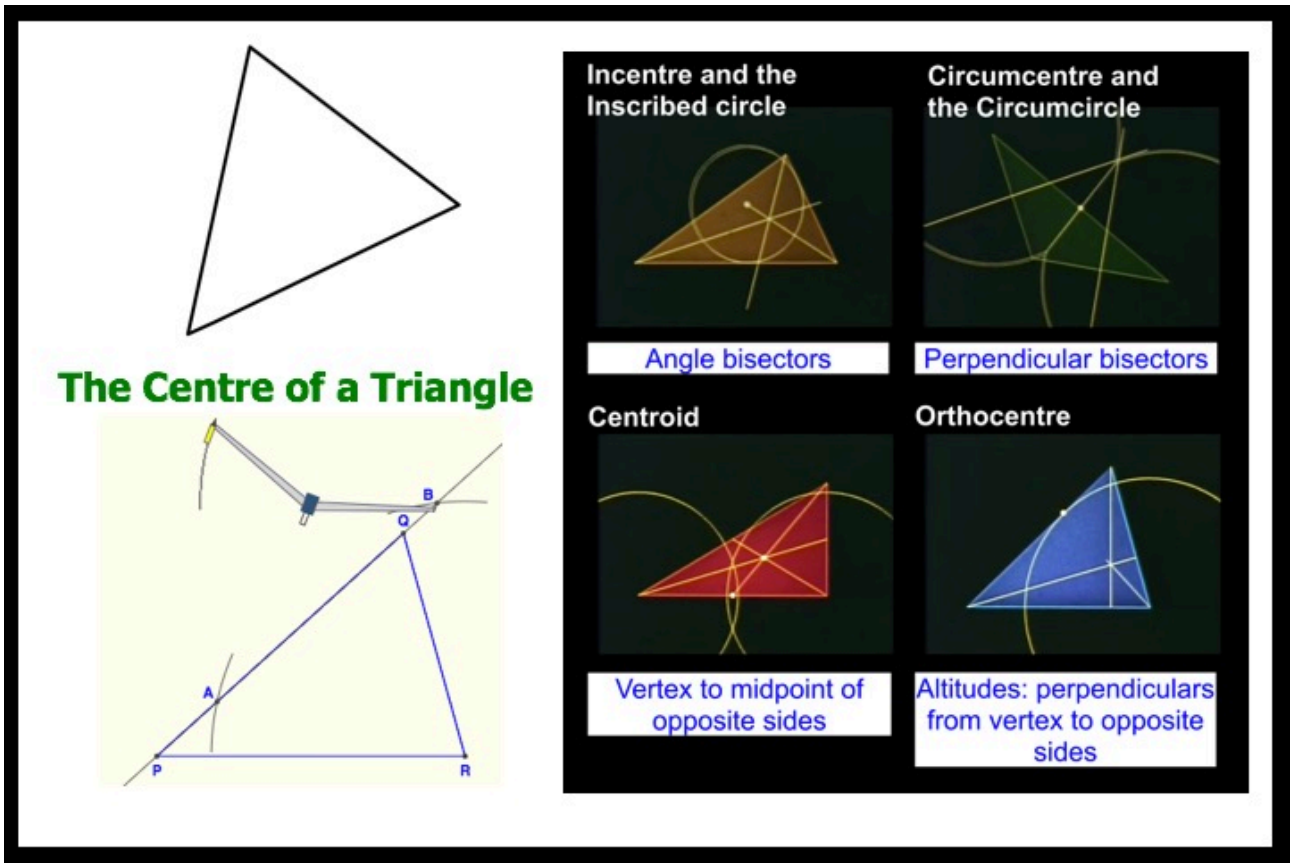
The Centre of a Triangle



A Spire Maths Activity

https://spiremaths.co.uk/coat/

Find the centre of a triangle

A great problem that helps pupils appreciate more about the triangle. Leads into work on constructions.

For this file a flipchart and a PowerPoint can be found at: https://spiremaths.co.uk/coat/
The excellent video Journey to the Centre of a Triangle (1976): https://vimeo.com/10583396

The centres of a triangle

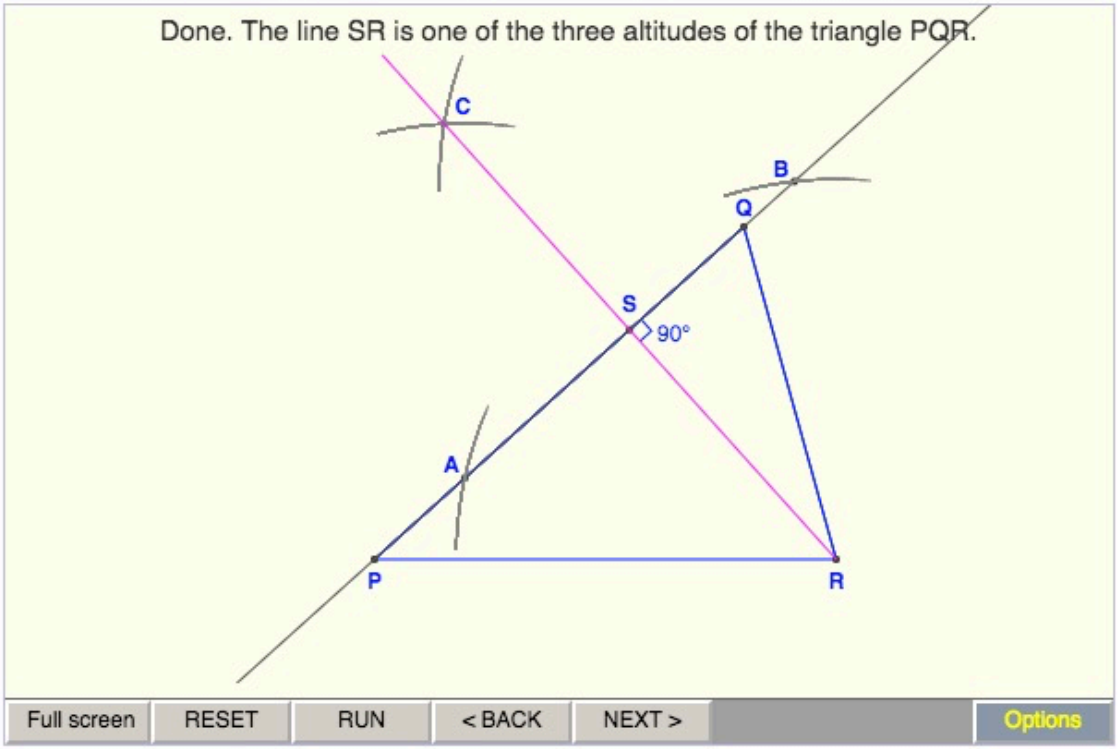
There are four ways that one might try to find the centre of a triangle. Each of constructions is outlined below.

- intersection of the altitudes (line joining each vertex at 90° to opposite side)
- intersection of the angle bisectors
- intersection of medians (line joining each vertex to the midpoint of the opposite side)
- intersection of the perpendicular bisectors

The altitude of a triangle

An animation, set of printable instructions and a proof can be found at the excellent Math Open Reference site:

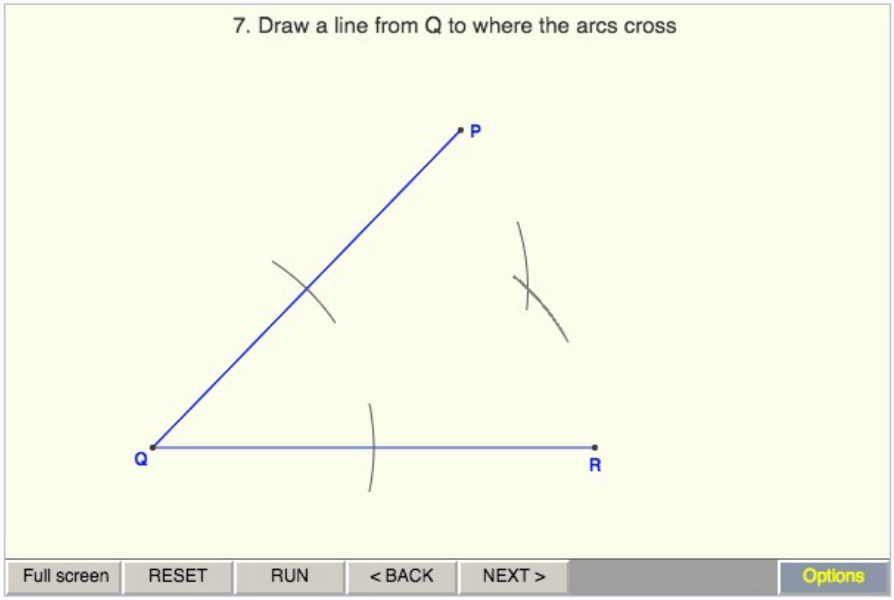
http://www.mathopenref.com/constaltitude.html
http://www.mathopenref.com/constaltitudeobtuse.html for obtuse angled triangle.



The altitudes intersect at the Orthocentre. Proof that all three actually intersect at this point is also found via the link above the diagram.

Bisector of an angle

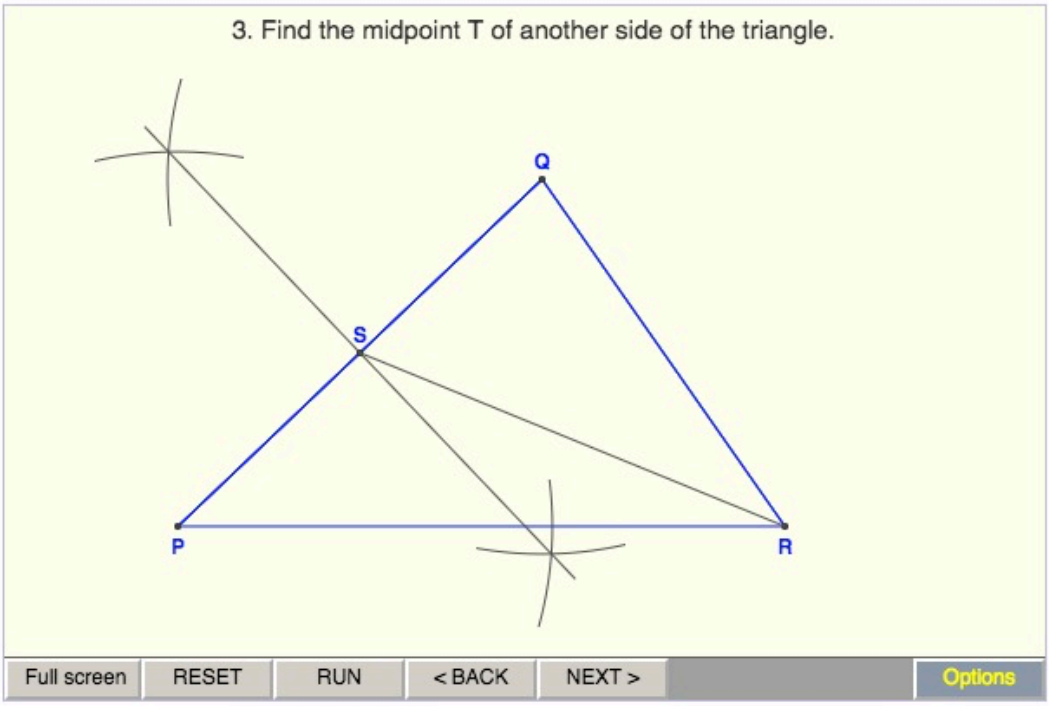
An animation, set of printable instructions and a proof can be found at the excellent Math Open Reference site: http://www.mathopenref.com/constbisectangle.html



The angle bisectors intersect at the Incentre. Proof that all three actually intersect at this point is also found via the link above the diagram. A circle drawn with centre at the Incentre so that each side is a tangent to the circle is called the Incircle. It is the largest circle that can be drawn completely inside the triangle.

Finding midpoint of a line segment for the medians

To do this you need to find the Perpendicular Bisector (see below) since this gives you the midpoint of the side as well. Or see:

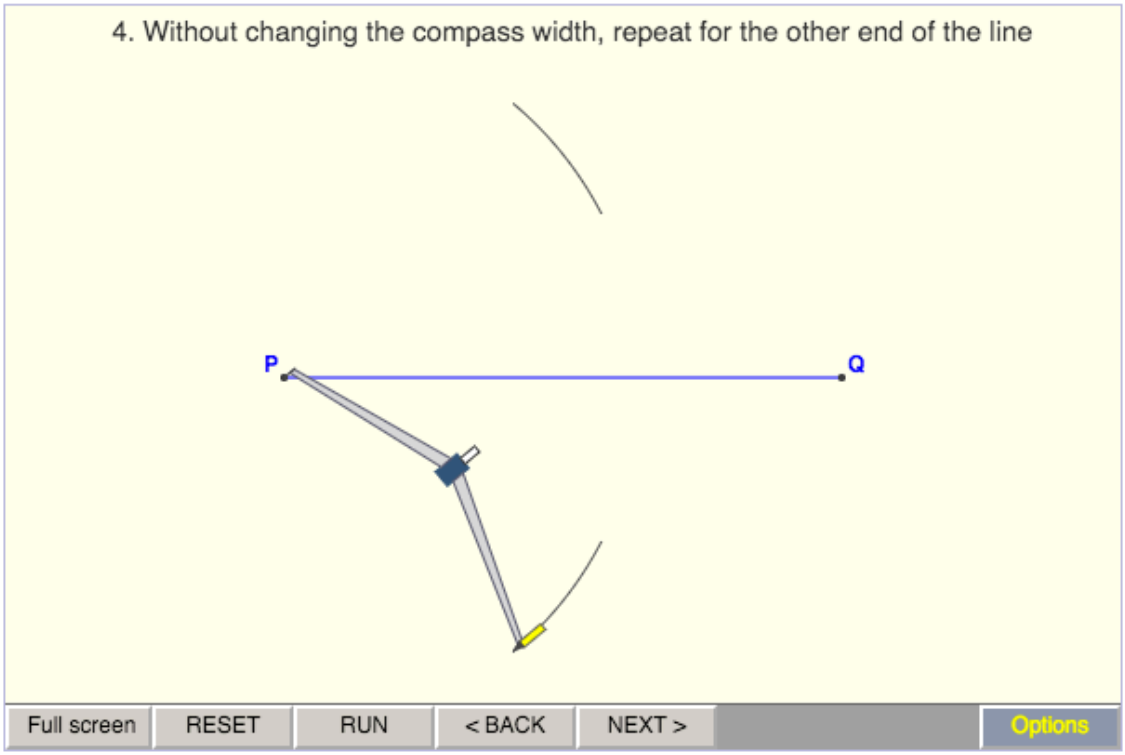


The medians intersect at the Centroid. Proof that all three actually intersect at this point is also found via the link above the diagram.

Perpendicular bisector of a line segment

An animation, set of printable instructions and a proof can be found at the excellent Math Open Reference site:

http://www.mathopenref.com/constbisectline.html
(Diagram shows part of the animation).



The perpendicular bisectors intersect at the Circumcentre. Proof that all three actually intersect at this point is also found via the link above the diagram. A circle drawn with centre at the Cicumcirclecentre so that it passes through each vertex of the triangle is called the Circumcircle. It is the only circle that can be drawn through the three vertices of the triangle.