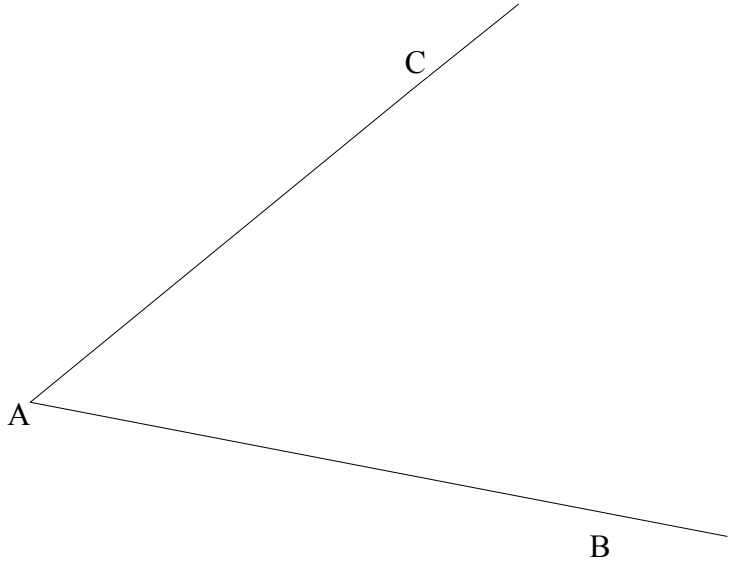
Some common loci

A locus (plural loci) is a set of points which follow a certain rule. The set of all the points usually forms a line or curve. These loci can be constructed using a ruler and compass.

1) Locus of points which are equidistant (the same distance) **from two lines AB and AC.**
The locus is the **bisector** of the angle BAC. (ie it cuts angle BAC in half)

Method: (Keep the compass open the same distance throughout.)
1) Place the compass point on A, draw an arc crossing both AB and AC Label the crossing points X and Y
2) Place the compass point on X and draw an arc inside the angle.
3) Place the compass point on Y and draw an arc, making sure it crosses the arc drawn in step 2. Label the point where the arcs cross Z
4) Draw the line AZ. This is the required locus.
[Note: although only the line AZ is the "answer", **do not delete** the other things you have drawn – they are the "working" which shows how you drew the answer.]



A possible example would be: AB and AC are two boundary fences of a field. It is required to lay a cable across the field so that it is equidistant from the two fences. Show the path of the cable.

2) Locus of points which are equidistant from two given points A and B

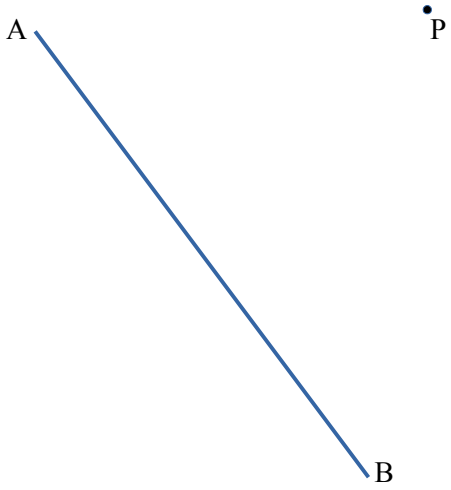
The locus is the perpendicular bisector of the line joining AB.

Method: (Keep the compass open the same distance throughout.)
1) Place the compass point on A, open the compass to over half of the distance AB, and draw an arc.
2) Place the compass point on B, and draw an arc crossing the arc already drawn on two places. Label the crossing points X and Y.
3) Draw a line joining points X and Y. This is the required locus.

A possible example would be:
Lucy Locus has two admirers, Adam and Brian, who are standing in the park. She wishes to cross the park, but knows that if she goes closer to A than B she will encourage A (which she does not wish to do) while if she goes closer to B, she will encourage him (which she also does not wish to do). Draw the path she should take across the park.
[adapted from "Vicious Circles and other Savage Shapes" by Kjartan Poskitt]

3) The perpendicular from a point P to a line AB

Method:
1) Place the compass point on P, and draw an arc which crosses the line AB in two points. Label these points X and Y
2) Place the compass point on X, and draw an arc on the other side of the line from P.
3) Place the compass point on Y, and draw an arc crossing the arc already drawn. Label the crossing point Z
4) Draw a line joining points P and Z. This is the required locus.

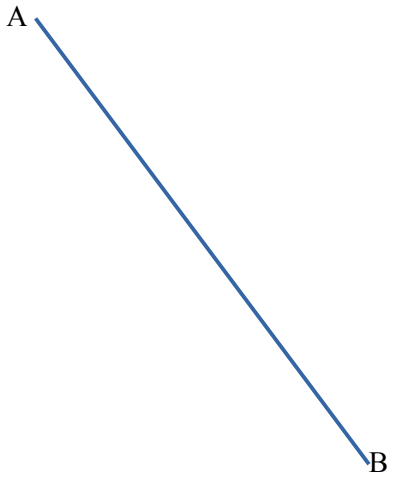


A possible example:
AB is the edge of the sea. Pete is at point P on a very stony beach and wishes to get to the sea by as short a route as possible. What route should he take?

4) Constructing an angle of 60°

Method:

1) Place the compass point on A, and draw a (fairly large) arc which crosses the line AB. Label this crossing point X.
2) Place the compass point on X, and draw an arc which cross the arc already drawn. Label this crossing point Y.
3) Draw a line joining P and Y. Now angle XPY is 60°.



By bisecting this angle it is possible to construct angles of 30°, etc.