

MATHS OF CHURCHES, MOSQUES, SYNAGOGUES AND TEMPLES:

Constructing arches and windows

Use plain paper for these constructions if possible. Use only:

- sharp pencil (definitely no pens!)
- a ruler for all straight lines
- compasses for all curves

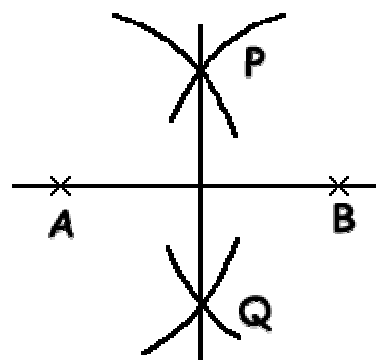
If you want to accentuate detail with charcoal or colour to create an attractive image, do each construction twice, so that you have the accurate version side-by-side with the enhanced version. For the enhanced version, do construction lines which won't be part of the finished shape very lightly rather than using an eraser.

Accurate constructions

Perpendicular bisector

This creates two lines at right-angles, and also finds the mid-point of a line.

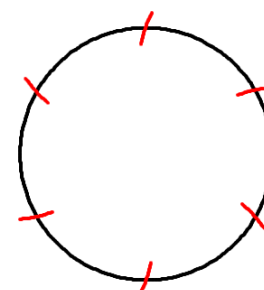
1. Draw a straight line and mark two points on it (A, B).
2. With your compasses set to a distance less than AB but more than half the distance between them, put the point on A and draw arcs above and below the line (P and Q).
3. Repeat, with the point of the compasses on B.
4. You should have two sets of intersecting arcs. Join them with a straight line.



AB and PQ should be at right-angles to each other, with their intersection at the mid-point of both.

6-point circle

1. Draw a circle, and mark one point on it.
2. Keeping your compasses set to **exactly the same radius**, put the point of your compasses on the mark, and mark where your pencil cuts the circle on either side.
3. Repeat for your new points until you have 6 equally spaced points around your circle.



Bisection of an angle

1. Draw the two lines that define your angle, OA and OB.
2. Putting your compass point on O, draw circular arcs to cross OA and OB at C and D (exact distance from O doesn't matter).
3. Put the compass point on C and draw a circular arc in the middle of OA and OB.
4. Keeping your compasses set to **exactly the same radius**, repeat from D, so that you have two intersecting arcs, P.
5. Draw a line from O through P. Check that angles AOP and BOP are the same.
6. This line bisects the angle AOB - measure AOP and POB to check that this correct.

