Steps for constructing a perpendicular bisector

A perpendicular bisector _____ a segment in _____, and forms _____ angle with the segment at the point of intersection.

1. Place the compass point on one end of the line
2. Adjust the compass to just over half the line length
3. Without adjusting the compass width, draw an arc on each side of the line
4. Without changing the compass width, repeat for the other end of the line
5. Draw a straight line between the two arc intersections.
Done. The line is the perpendicular bisector of your original segment.
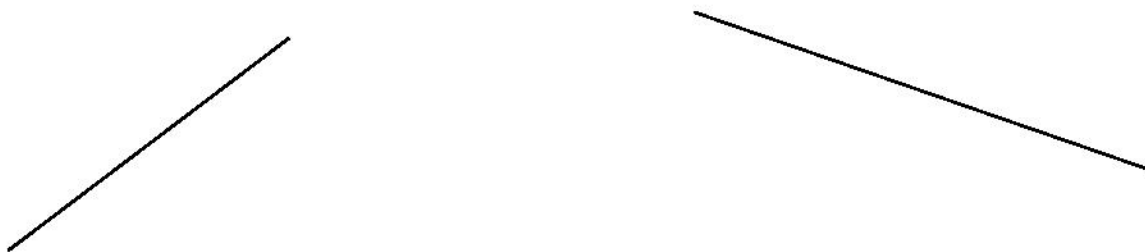
Steps on constructing a perpendicular through a point (R) not on the line

This is not necessarily a bisector; the point could be anywhere in the exterior of the line.

1. Place the compass point on R
2. Adjust compass width to beyond the line
3. Draw two arcs across the line, creating points P and Q
4. From each point P and Q, draw an arc on one side of the line so they cross.
5. Draw a line from R to where the arcs intersect.
Done. The new line is perpendicular to PQ and passes through R
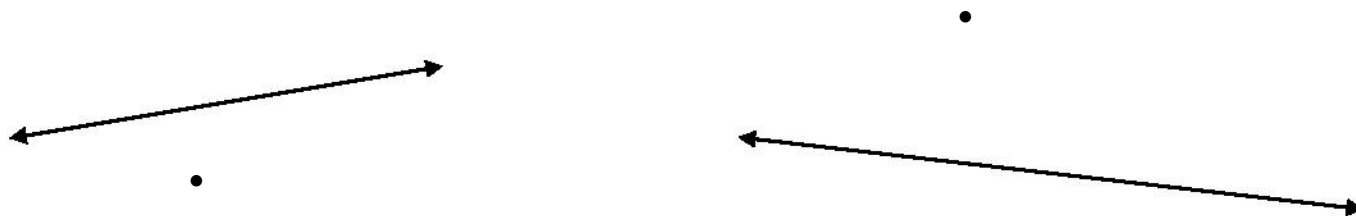
Finding the center of a circle

We start with a given circle.

1. Using a straightedge, draw any two chords of the circle. For greatest accuracy, avoid chords that are nearly parallel.

2. Construct the perpendicular bisector of one of the chords using the method described in Constructing a perpendicular bisector of a line segment.

3. Repeat for the other chord.

4. The point where the two lines intersect is the center C of the circle.
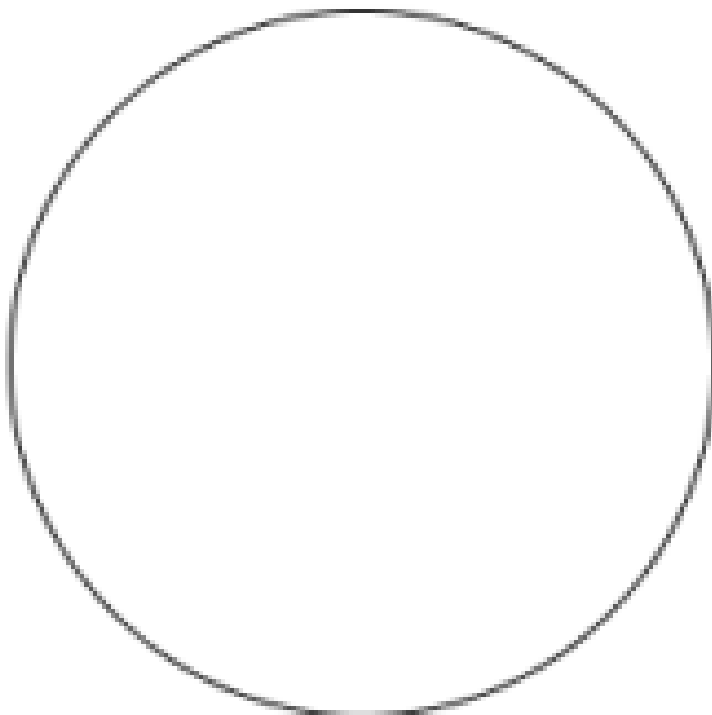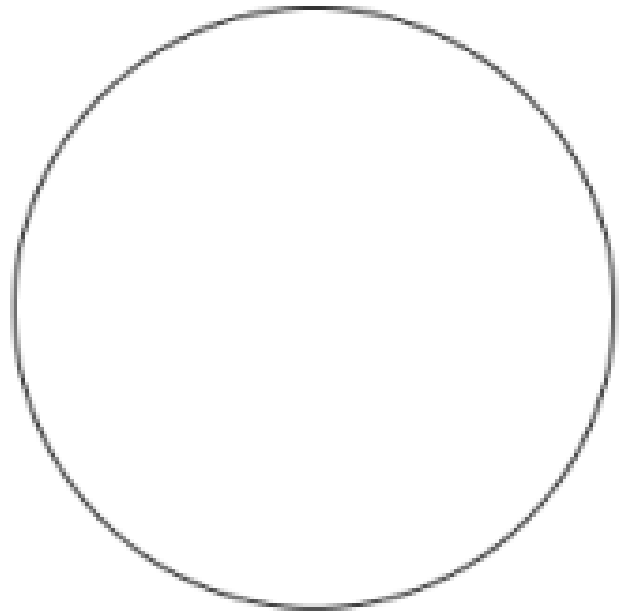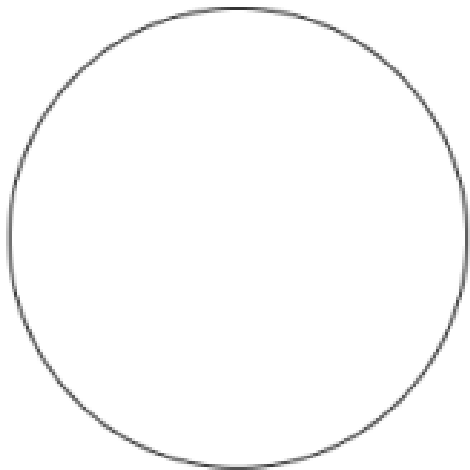
Steps to constructing a perpendicular through the given point (K) to the given line
The point could be anywhere on the line. It does not have to be the midpoint.

Step 1. With the compass on K, set it to a medium width
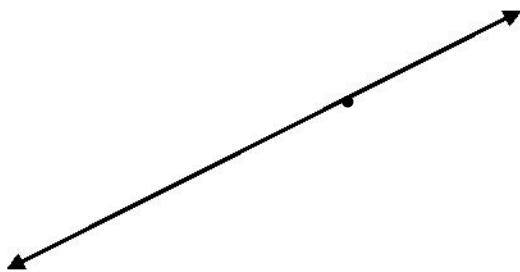2. Draw an arc on each side of K using that compass width, creating points P and Q.
3. With the compass on P, set its width to about half way between K and Q
4. Draw an arc on one side of the line.
5. Without changing the width, repeat from point Q, creating point R
6. Draw a line from K to R.
Done. The line KR is perpendicular to PQ at K

Steps to constructing a 45° angle (hint: construct a perpendicular bisector, then bisect)
1. Draw the line PQ, to be one leg of the angle
2. Set the compass on P and the width to just over half PQ
3. From P and Q, draw intersecting arcs above and below PQ
4. Draw a straight line between the two arc intersections.
5. From the midpoint of PQ, set the compass width to P.
6. Draw an arc across the perpendicular creating point C
7. Draw the line PR through the point C
Done. The angle RPQ has a measure of 45 degrees

Steps to constructing a 90º angle

Start with a ray with endpoint C. The right angle will have C as its vertex.

1.   Mark a point D somewhere above the line and in from the end.
2. Set the compasses on point D and set their width to the endpoint C.
3. Draw an arc that crosses the given line and extends over and above the endpoint C. (If you prefer, draw a complete circle.)
4. Draw a diameter through D from the point where the arc crosses the given line, creating points B and A.
5. Draw a line from C to the endpoint A of the diameter line.
6. Done. The angle ACB is a right angle (90 deg).