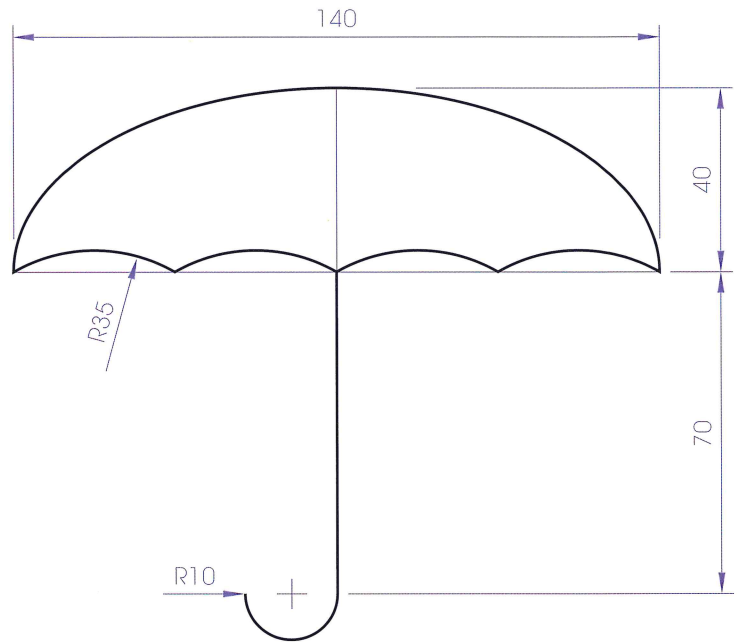


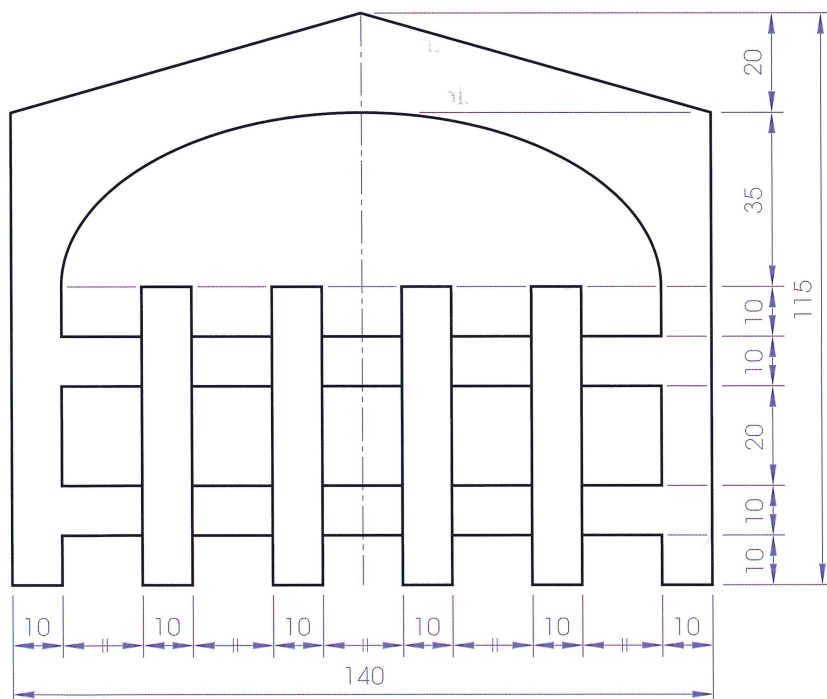
2. A design for an **umbrella** based on a **semi-ellipse** having a **major axis** of 140 mm and a **minor axis** of 80 mm is shown below.

Draw the given design full-size showing clearly how the centres for the four **arcs** are obtained.



3. The figure below is a drawing of an **entrance gateway**. The curve is in the shape of a **semi-ellipse** having a **major axis** of 120 mm and a **minor axis** of 70 mm. The spacings between the 10 mm vertical members are equal.

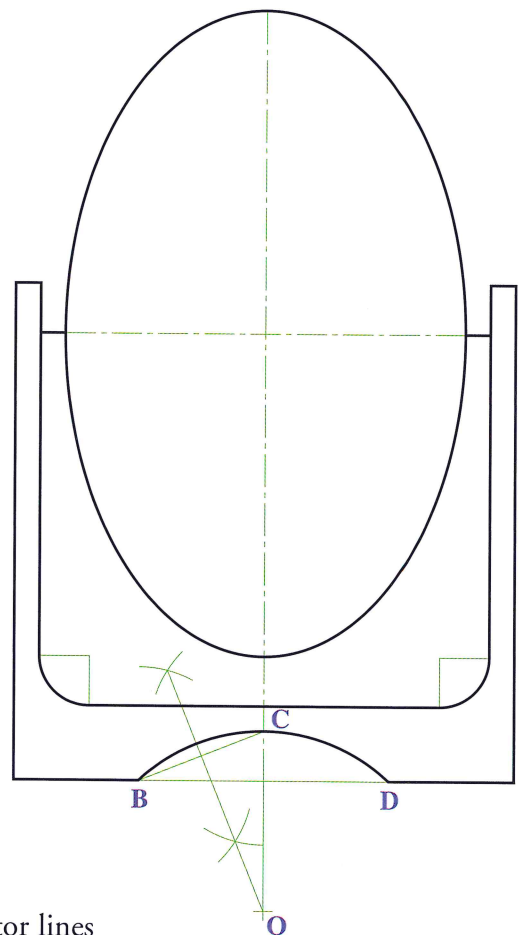
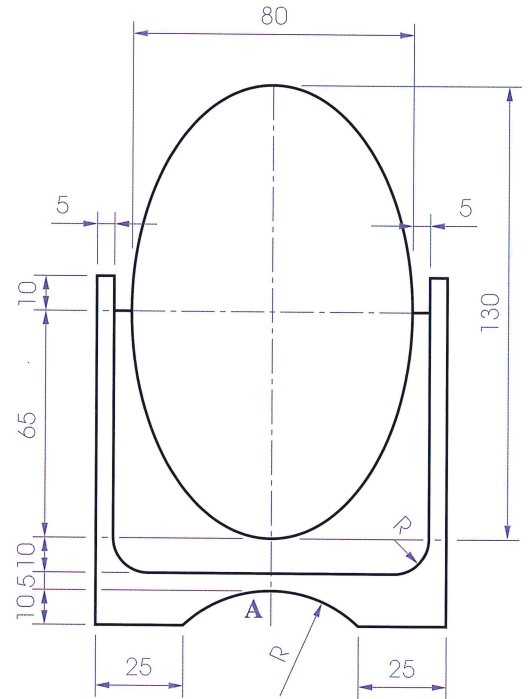
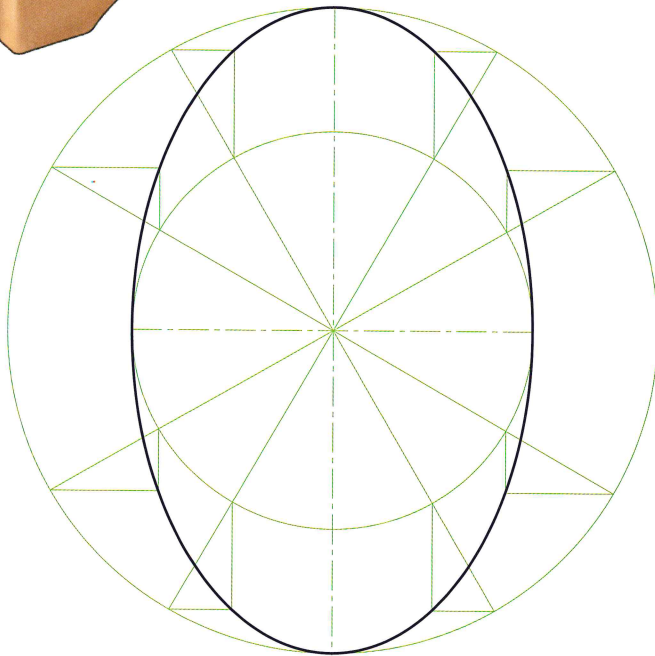
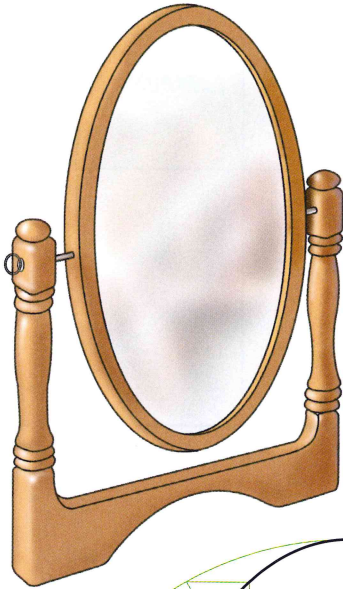
Draw this diagram full-size, showing clearly all construction lines.



**Example**

A design for a **bedroom mirror** based on an **ellipse** is shown.

Draw full-size the given design showing clearly how the centre for arc A is obtained.

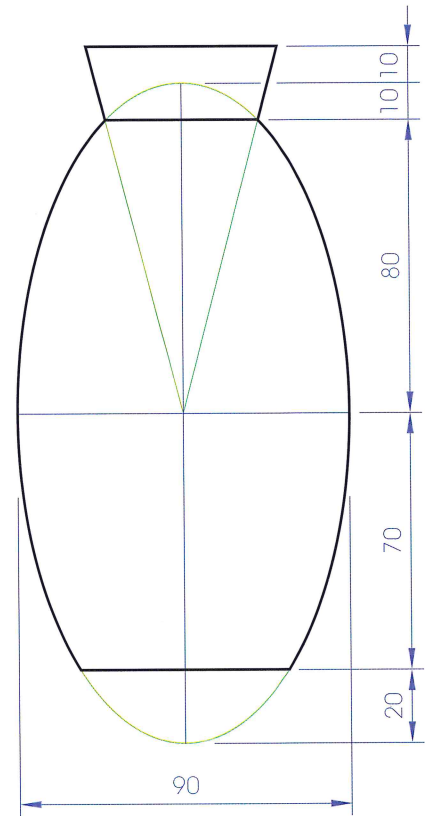


1. Draw the **major axis** of length 130 mm and the **minor axis** of length 80 mm.
2. Draw the major and minor auxiliary circles and divide these into equal sectors as shown.
3. Draw a series of horizontal lines from the points where the sector lines cut the outer circle, and a series of vertical lines from the points where the sector lines cross the inner circle. The intersections give points on the ellipse. Draw the ellipse.
4. Draw the outline of the stand. The centre O of the arc A is obtained by finding the point of intersection of the perpendicular bisectors of the two chords BC and BD.

### Exercises

1. The figure across shows a drawing of a **shower gel bottle**. The outline of the bottle is in the shape of a portion of an **ellipse** having a **major axis** of 180 mm and a **minor axis** of 90 mm.

- Draw this figure showing all construction lines clearly.
- Using your freehand drawing skills, sketch a suitable design for a label for the bottle.



2. The figure below shows a view of a **lamp**. The lampshade is in the form of a **semi-ellipse** having a **major axis** of 140 mm and a **minor axis** of 80 mm. The curve ABC is an **arc** of a circle.

Reproduce the drawing of the lamp showing clearly all construction lines.

