CHAPTER 4:
ISOMETRIC AND OBLIQUE

Objectives:

Students are able:

- To construct isometric objects from two-dimensional orthographic projections.

- To draw isometric object and non-isometric object

- To construct isometric ellipse on different plane

- To determine the best isometric positions

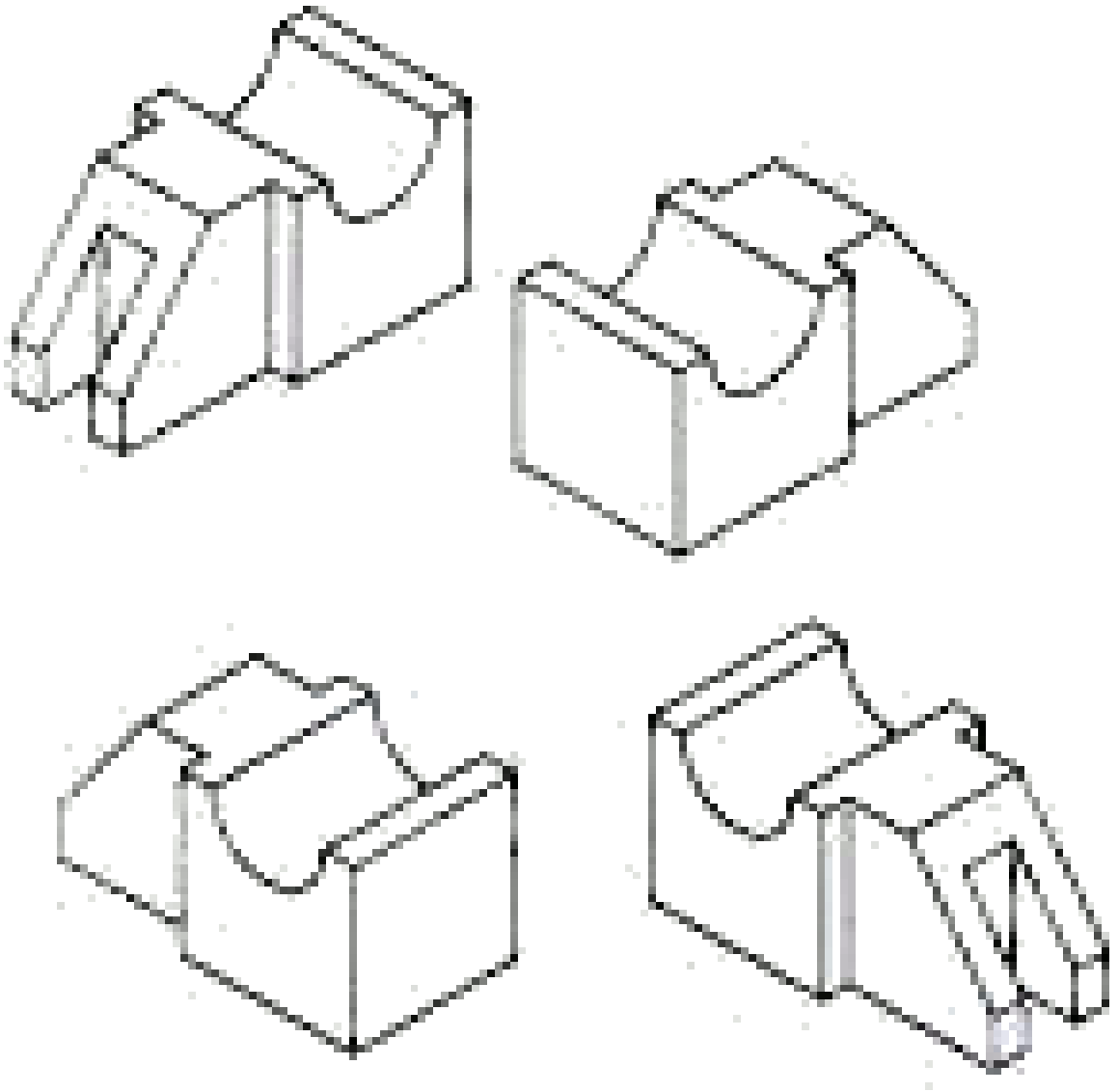
Introduction:

Isometric illustration is the method of depiction ideas which formed in actual 3-D objects.

This method can describe the object shape easily.

This construction could be done based on the objects shape which viewed from certain directions.

Isometric object viewed from different direction



Isometric Sketches

Isometric projection is produced using 3 axes:

- vertical axis
- left axis
- right axis

The left and right axes are produced at the angle of 30° to the horizontal lines

Figure below shows the main axis of isometric developed with 30° set square

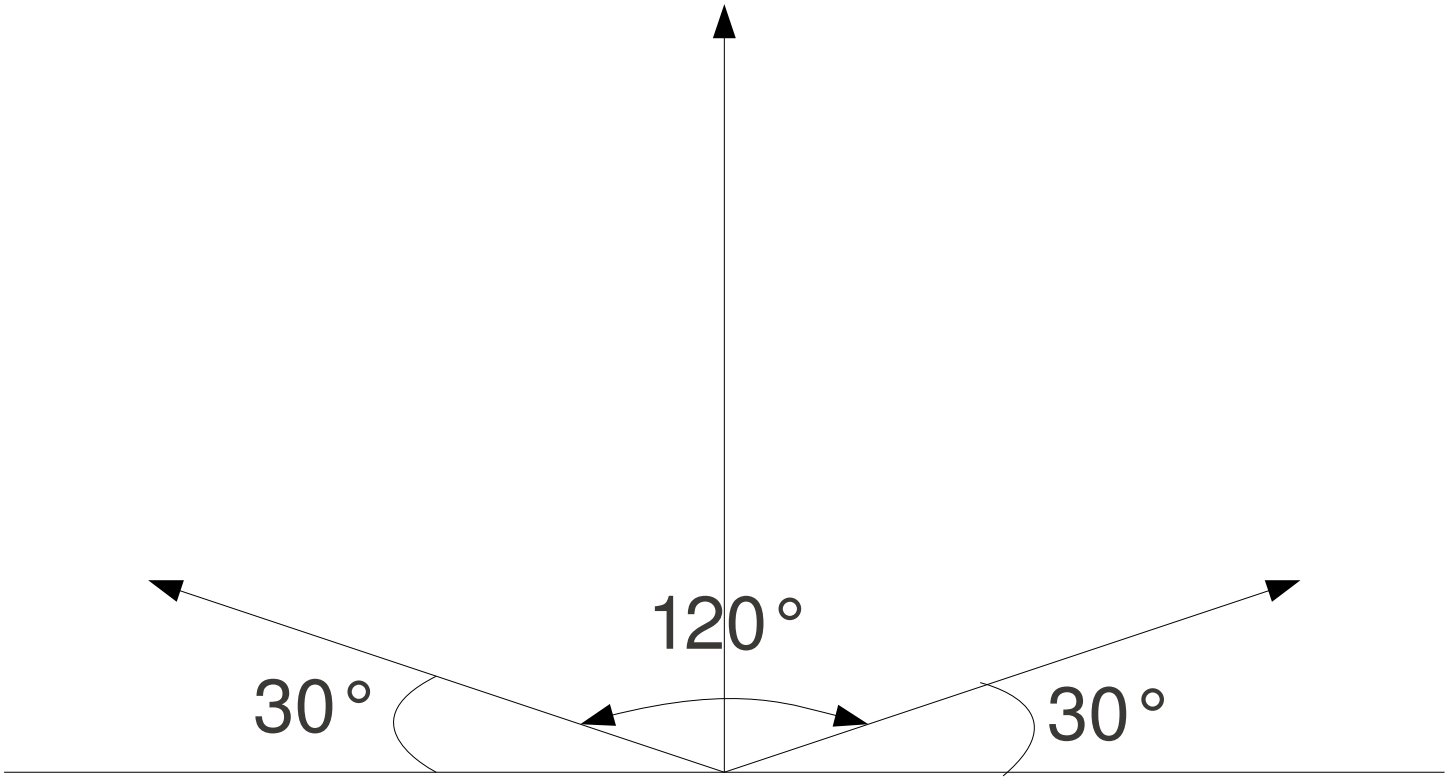
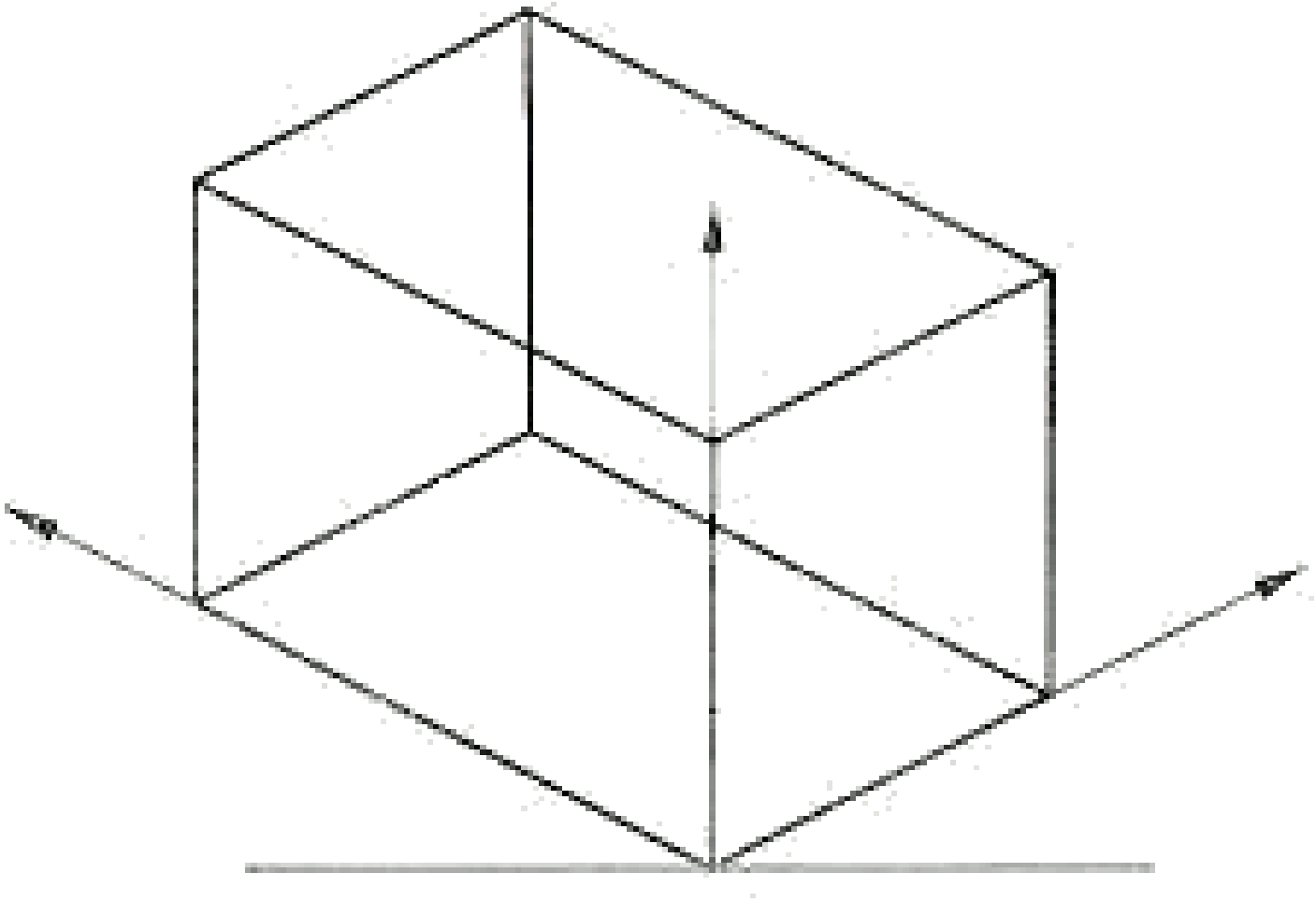
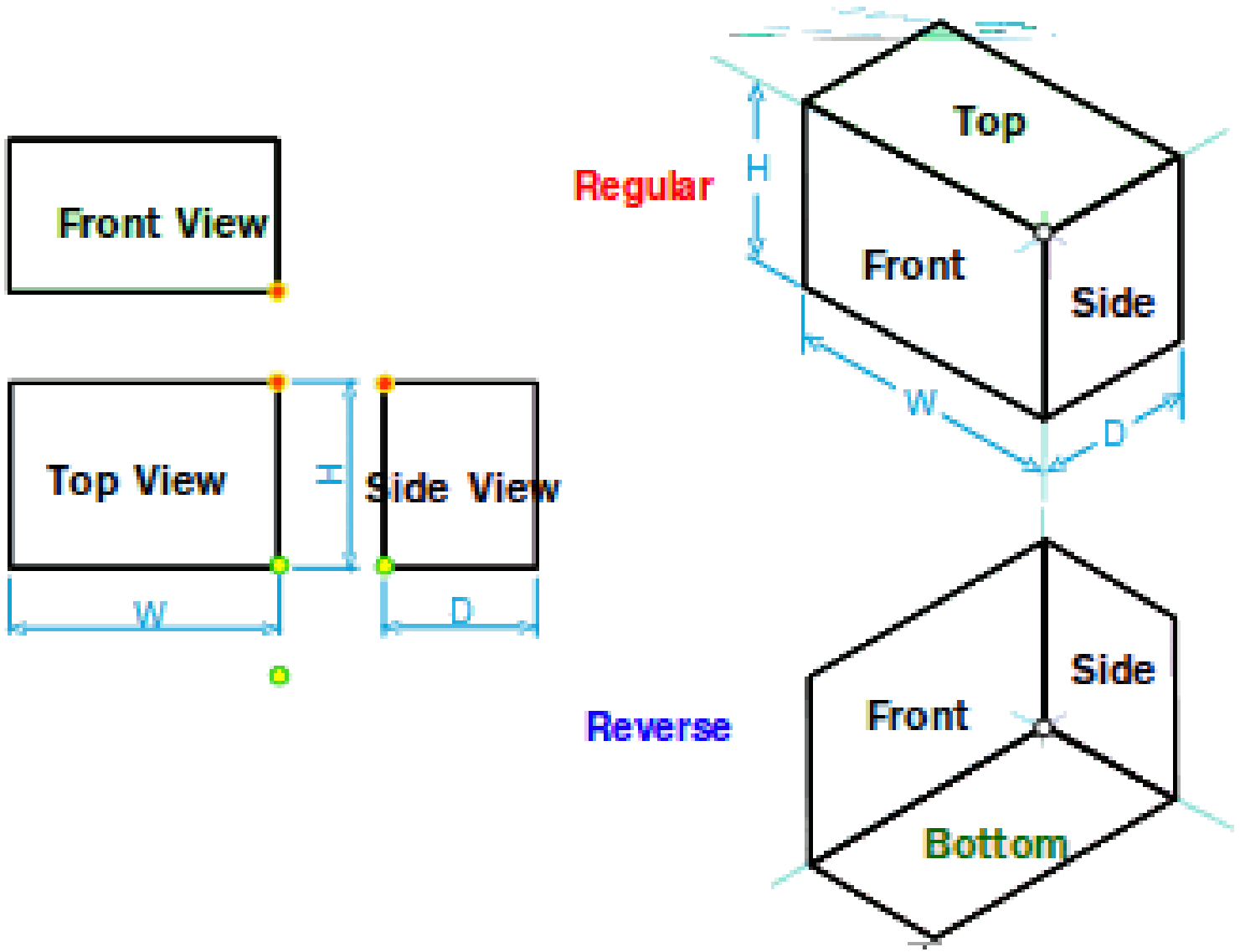


Figure shows a box in isometric drawing

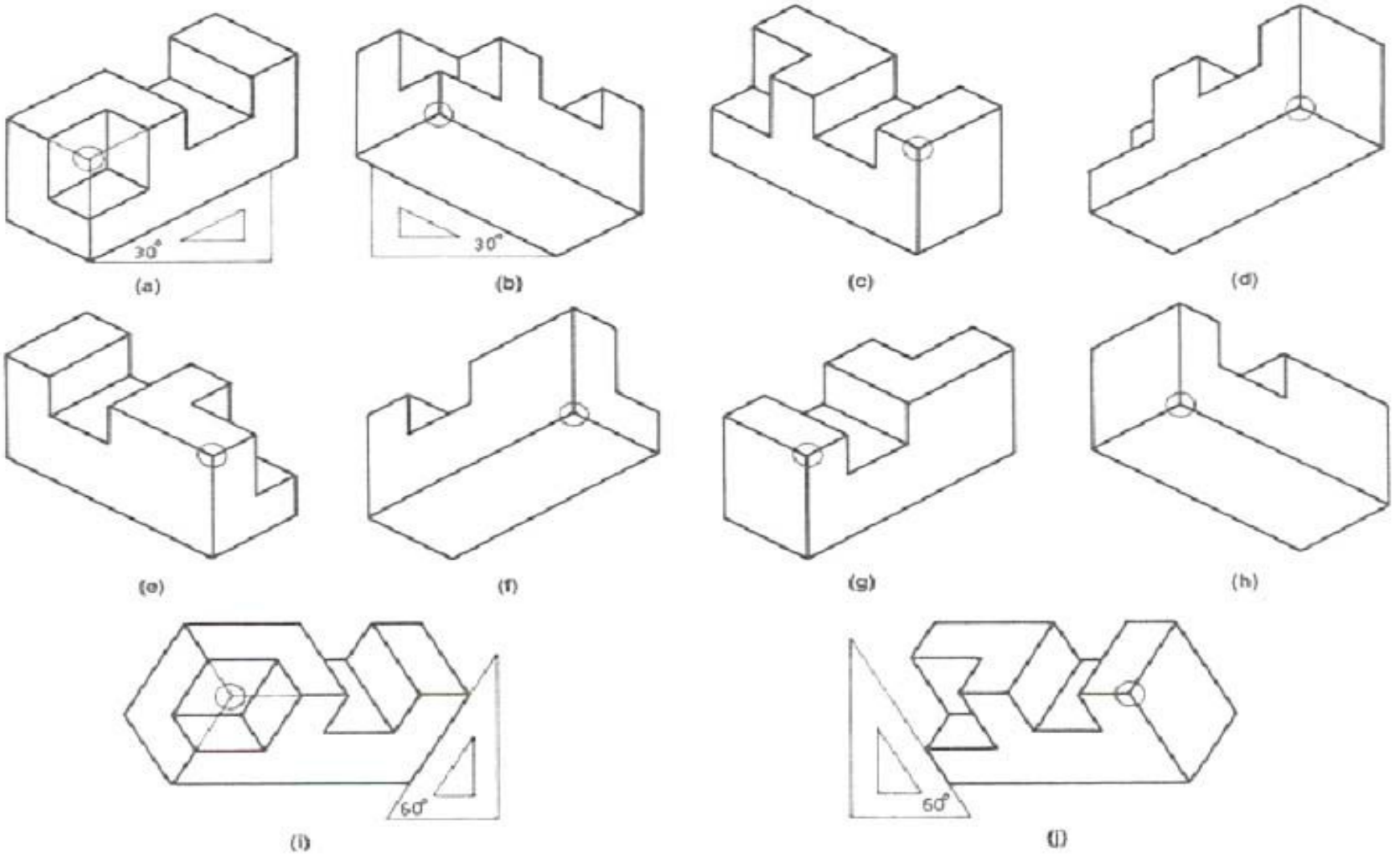


Isometric sketching from multi-view drawing



Selection of Isometric axes

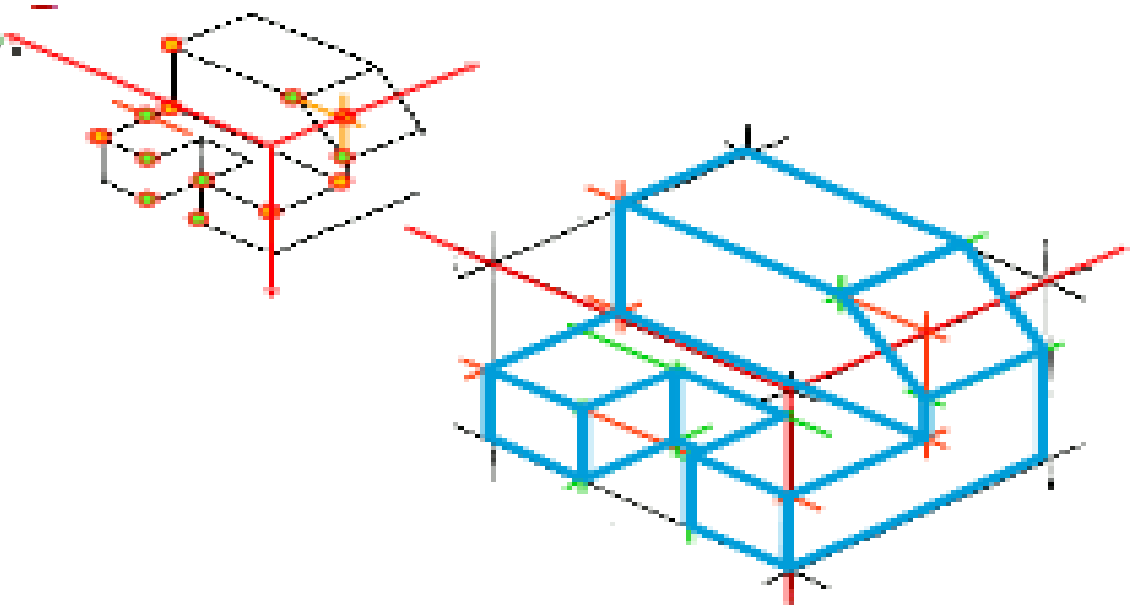
View **(a)** is preferred as it reveals more detail than the others.



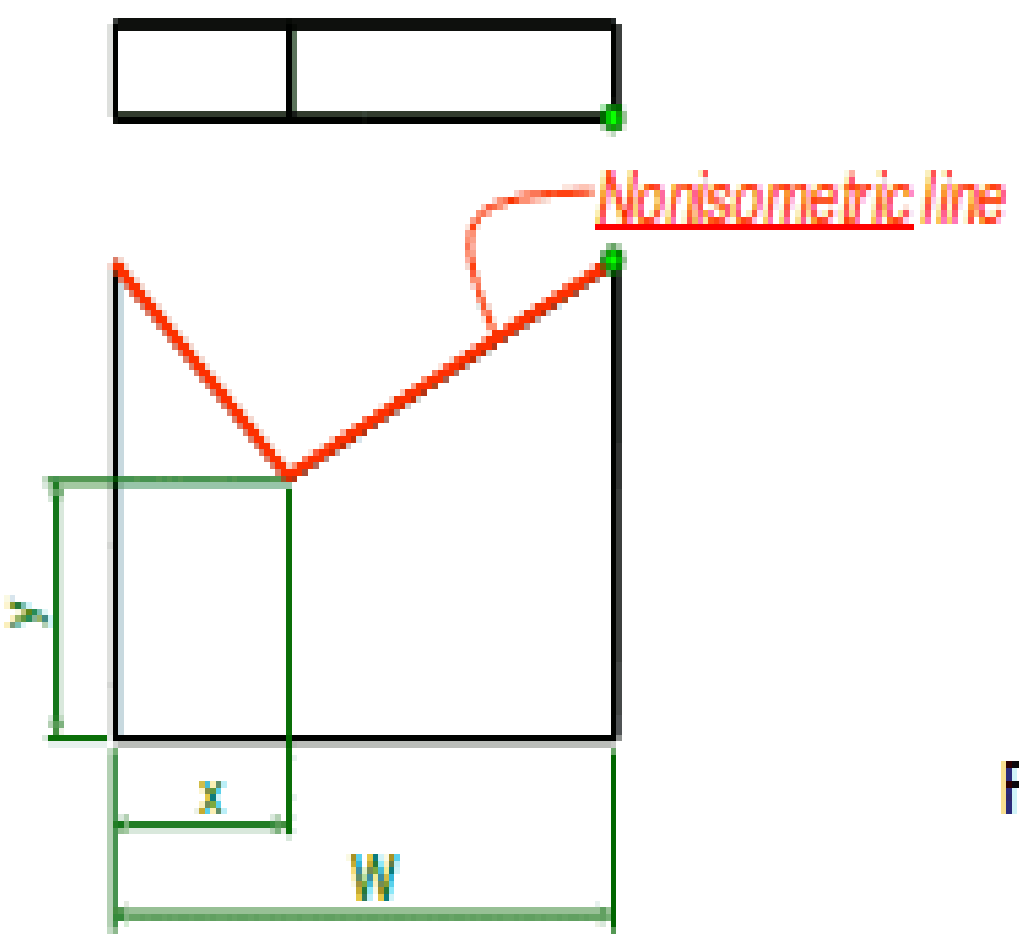
Isometric drawing

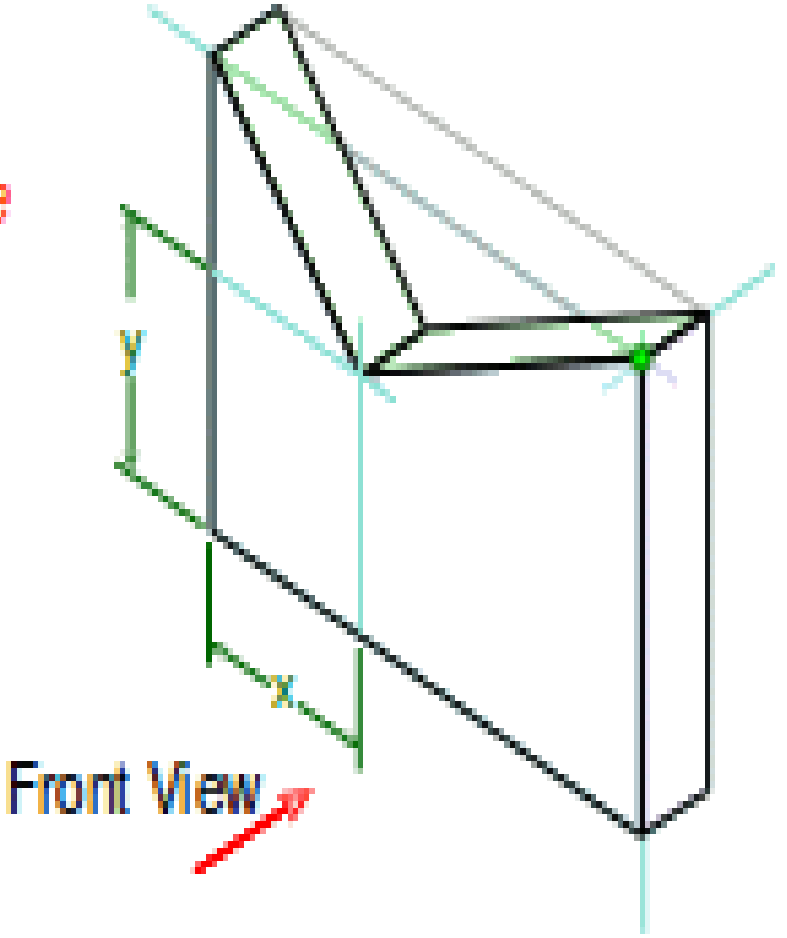
Steps:

1. Positioning object.
2. Select isometric axis.
3. Sketch enclosing box @ guide box.
4. Add details i.e. Transfer the distance of object and draw the construction lines.
5. Darken visible lines.



Isometric drawing: object has inclined surfaces



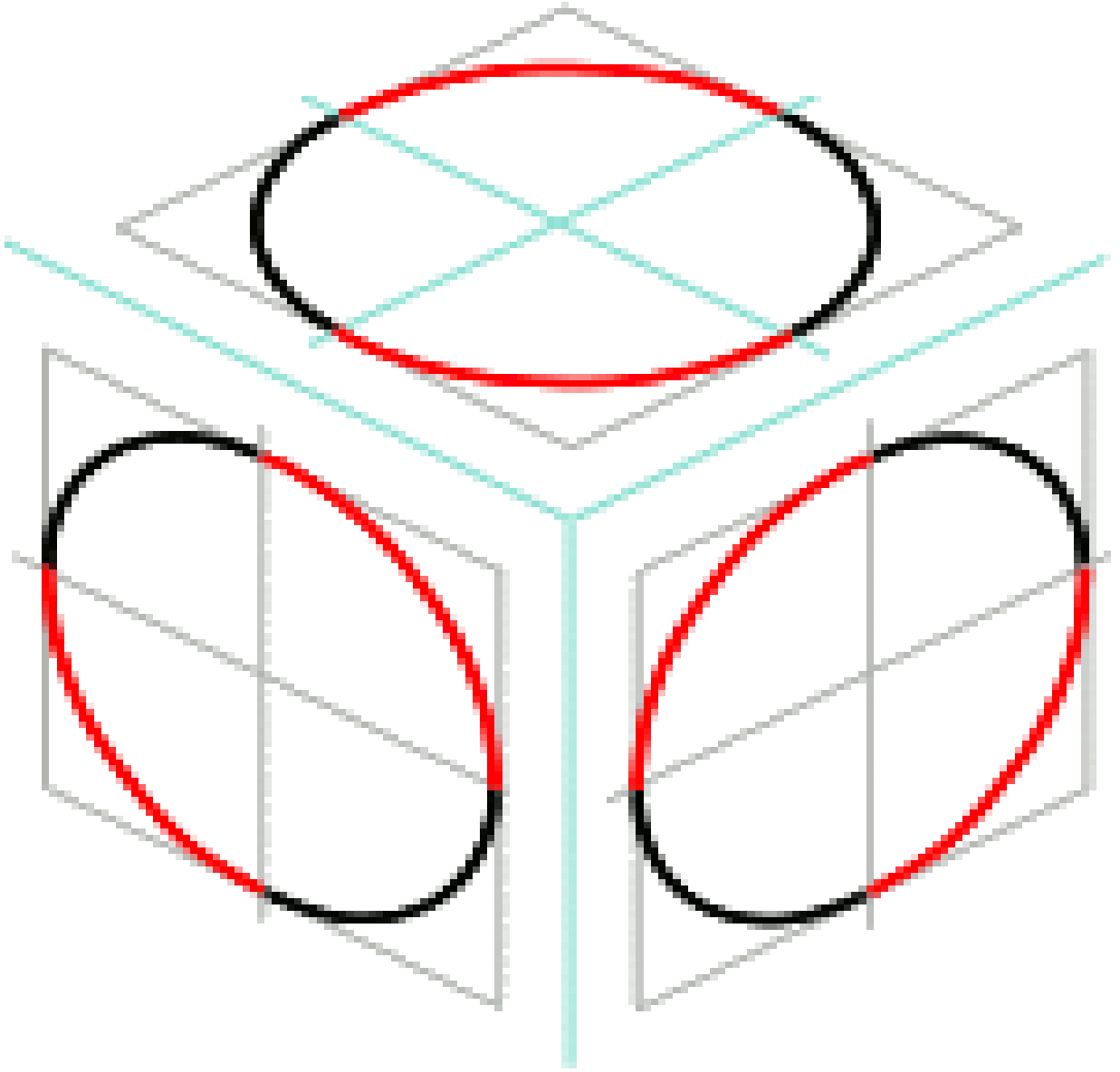


Drawing of Circles and Arcs

In isometric drawing, a circle appears as an ellipse.

Sketching steps:

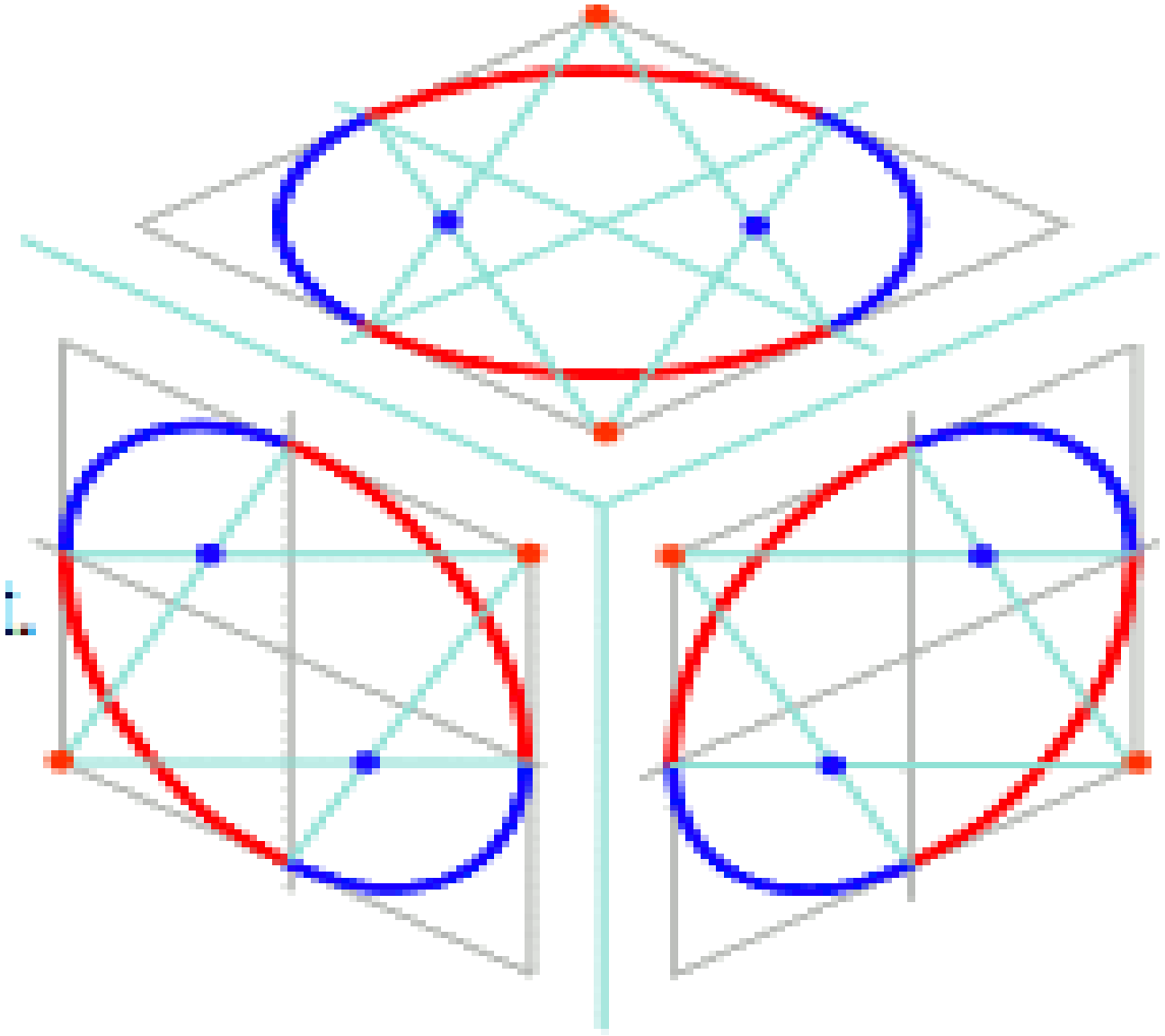
1. Locate the center of an ellipse
2. Construct an isometric square
3. Sketch arcs that connect the tangent points.



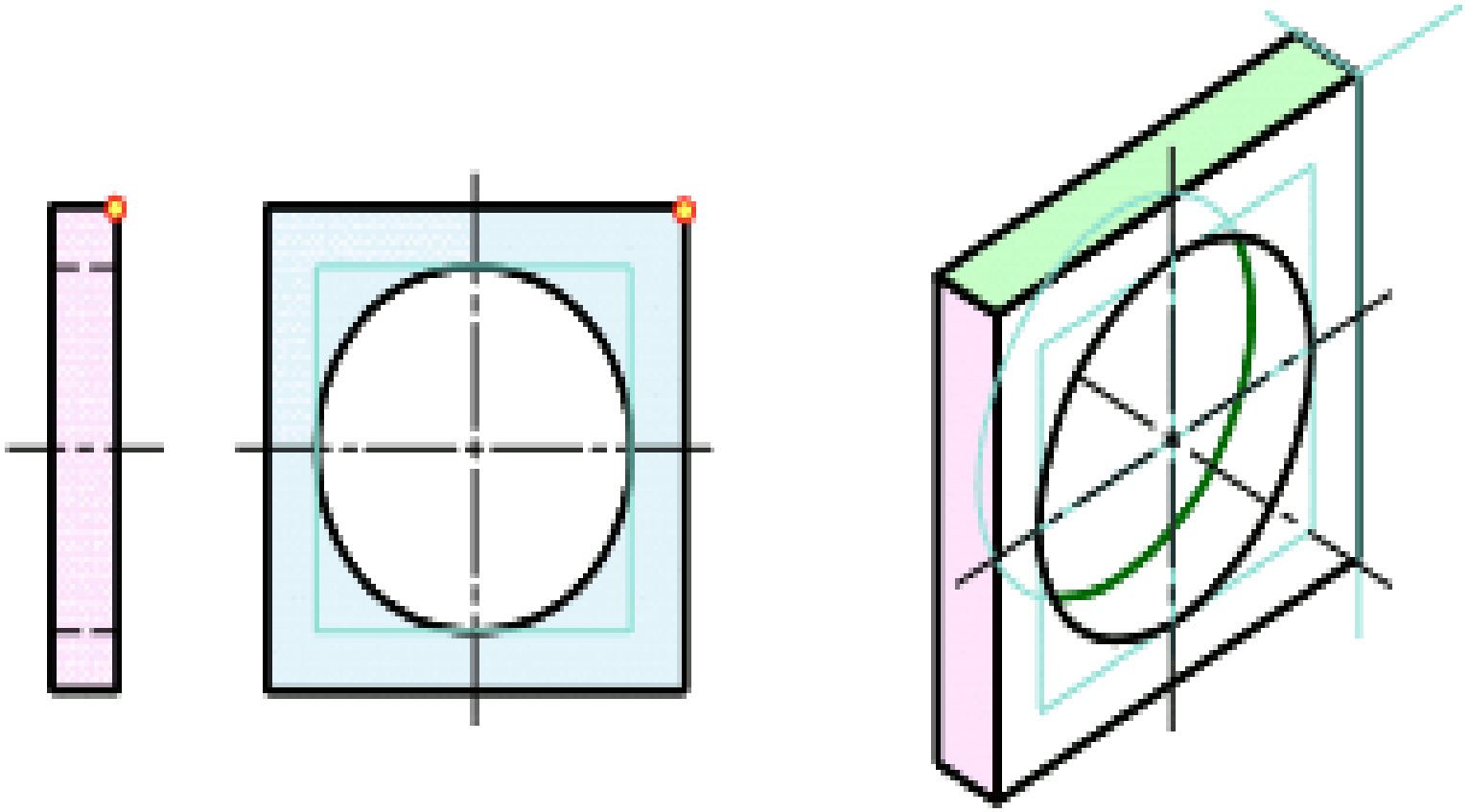
Four-centre method is usually used when drawn an isometric ellipse with drawing instrument.

Sketching Steps

1. Locate the center of an ellipse
2. Construct an isometric square.
3. Construct a perpendicular bisector from each tangent point.
4. Locate the four centers.
5. Draw the arcs with these centers and tangent to isometric square.



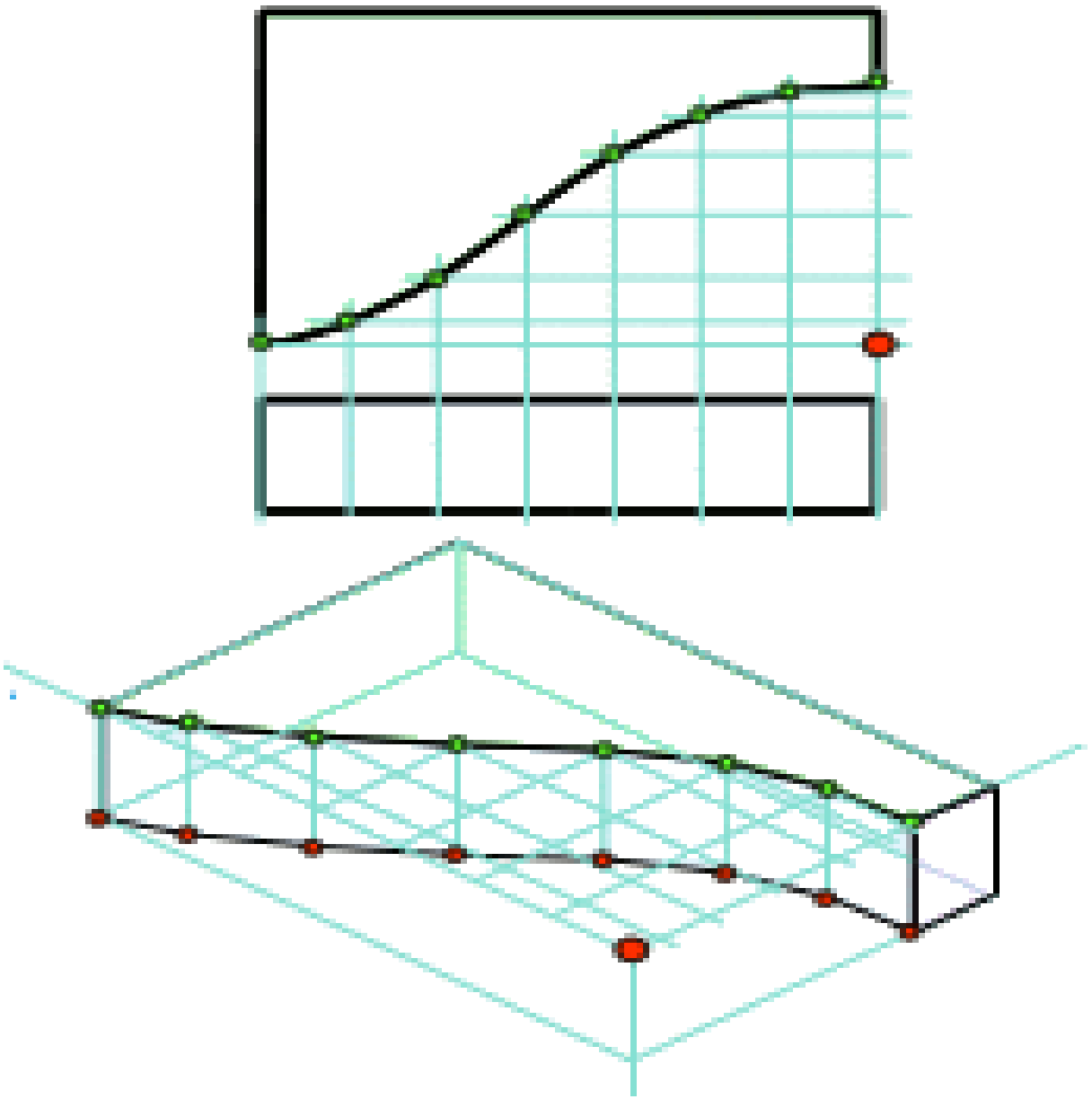
Example of isometric ellipse



Drawing of Irregular curves in Isometric drawing

Steps:

1. Construct points along the curve in multiview drawing.
2. Locate these points in the isometric view.
3. Sketch the connecting lines.



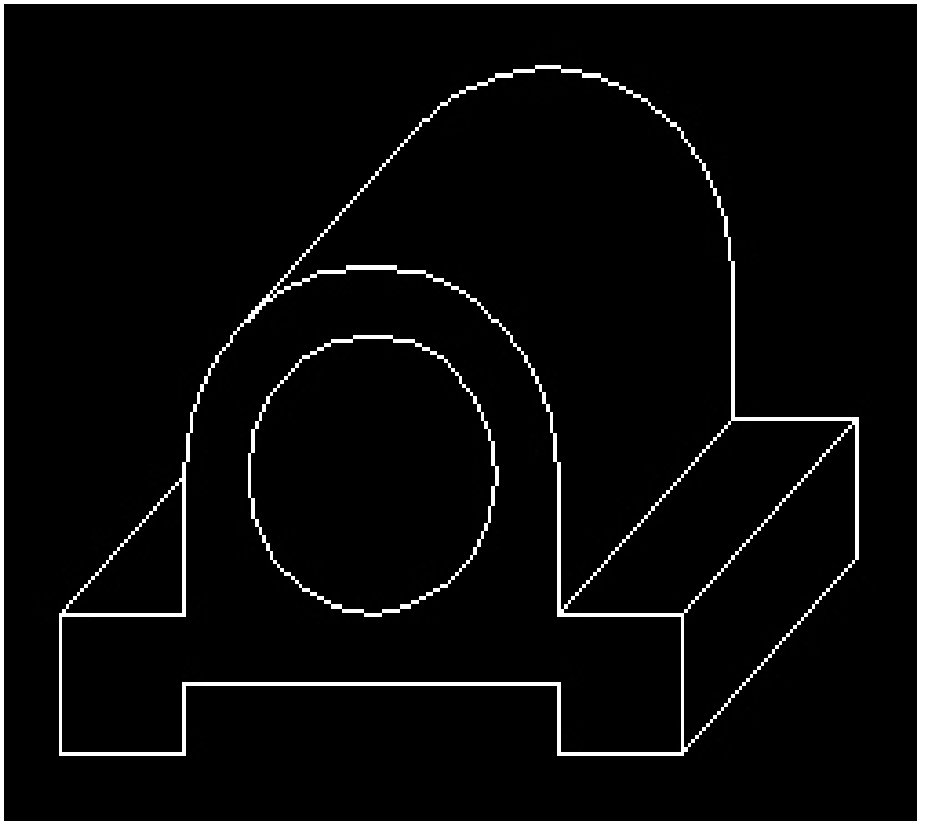
Oblique Projection

In oblique projections the front view is drawn true size, and the receding surfaces are drawn on an angle to give it a pictorial appearance. This form of projection has the advantage of showing one face (the front face) of the object without distortion. Generally, the face with the greatest detail faces the front.

There are two types of oblique projection used in engineering design.

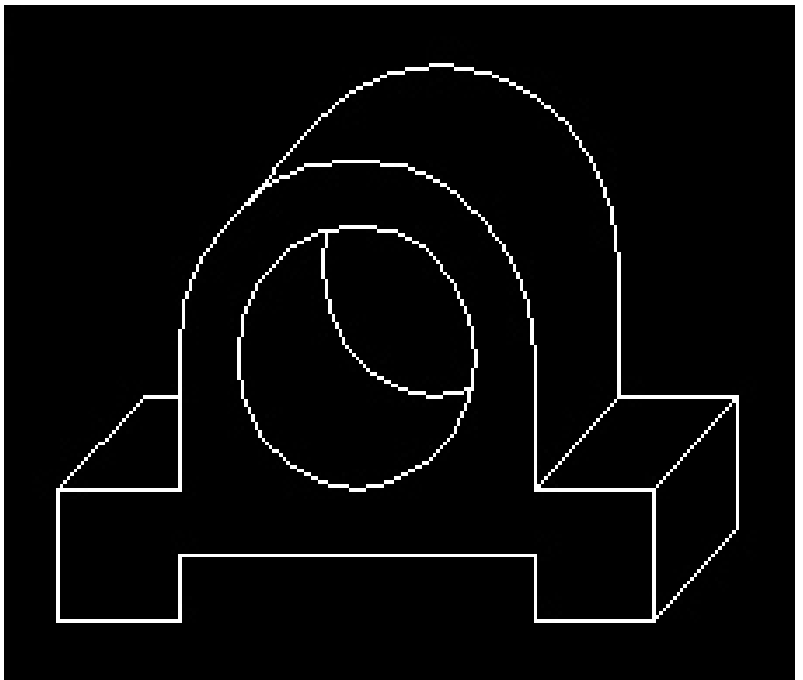
Cavalier Oblique

In cavalier oblique drawings, all lines (including receding lines) are made to their true length.



Cabinet Oblique

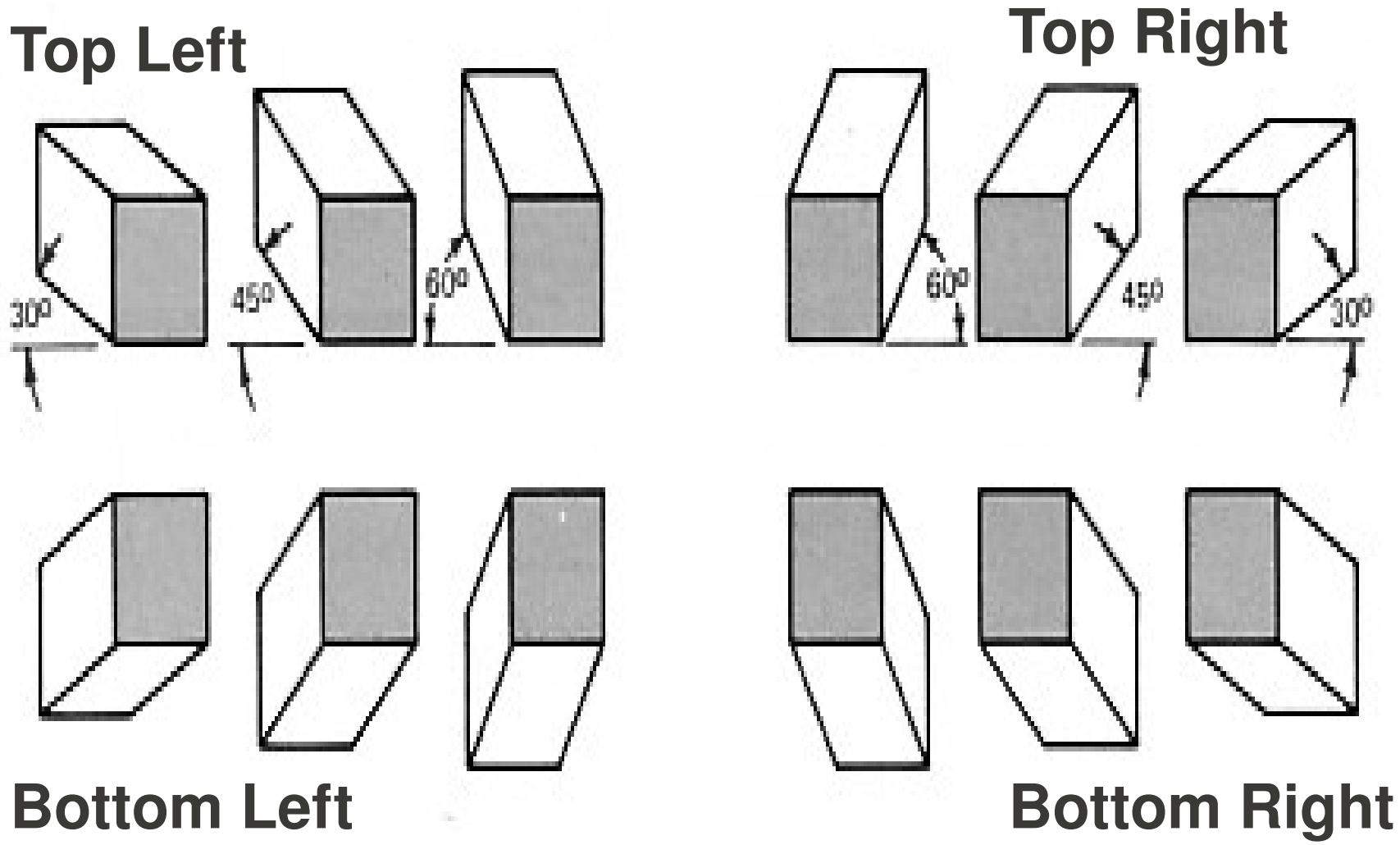
In cabinet oblique drawings, the receding lines are shortened by one-half their true length to compensate for distortion and to approximate more closely what the human eye would see. It is for this reason that cabinet oblique drawings are the most used form of oblique drawings.



Typical Angles of Projection

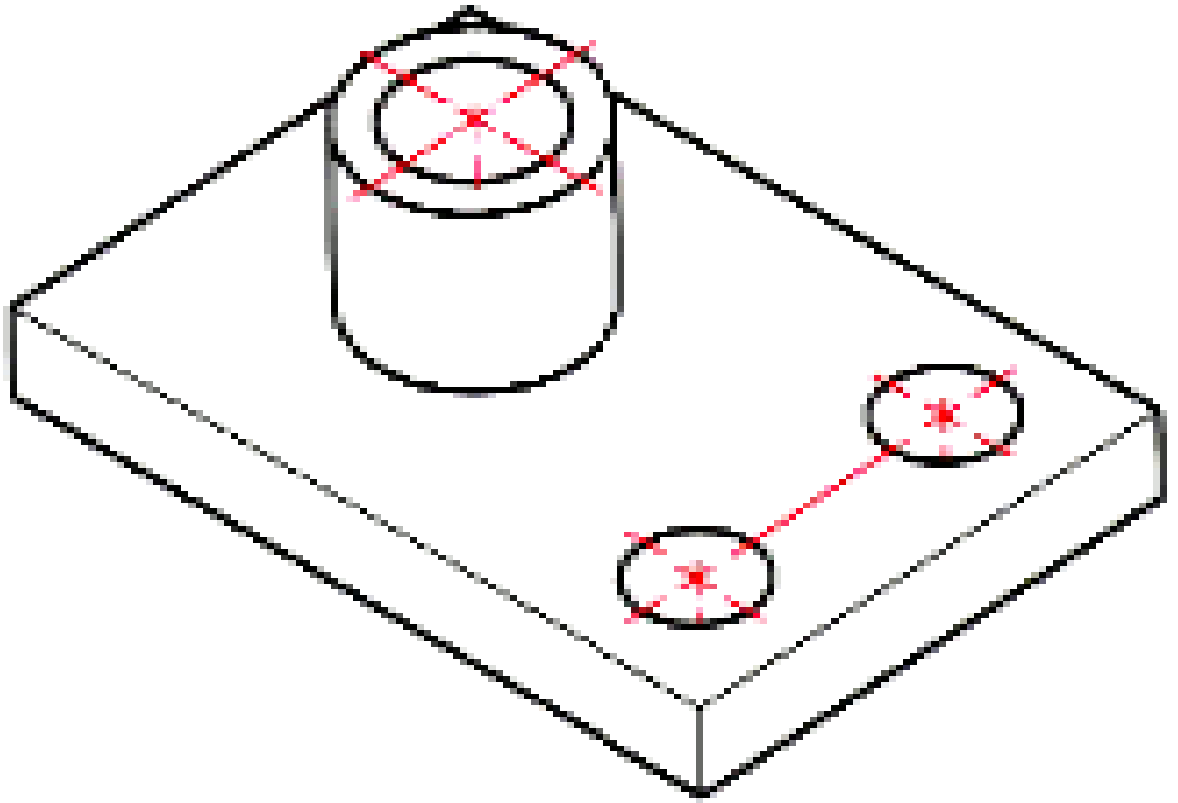
In oblique drawings, the three axes of projection are vertical, horizontal, and receding. The front view (vertical & horizontal axis) is parallel to the frontal plane and the other two faces are oblique (receding). The direction of projection can be top-left, top-right, bottom-left, or bottom-right. The receding axis is typically drawn at 60, 45, or 30 degrees.

Typical angles of projection



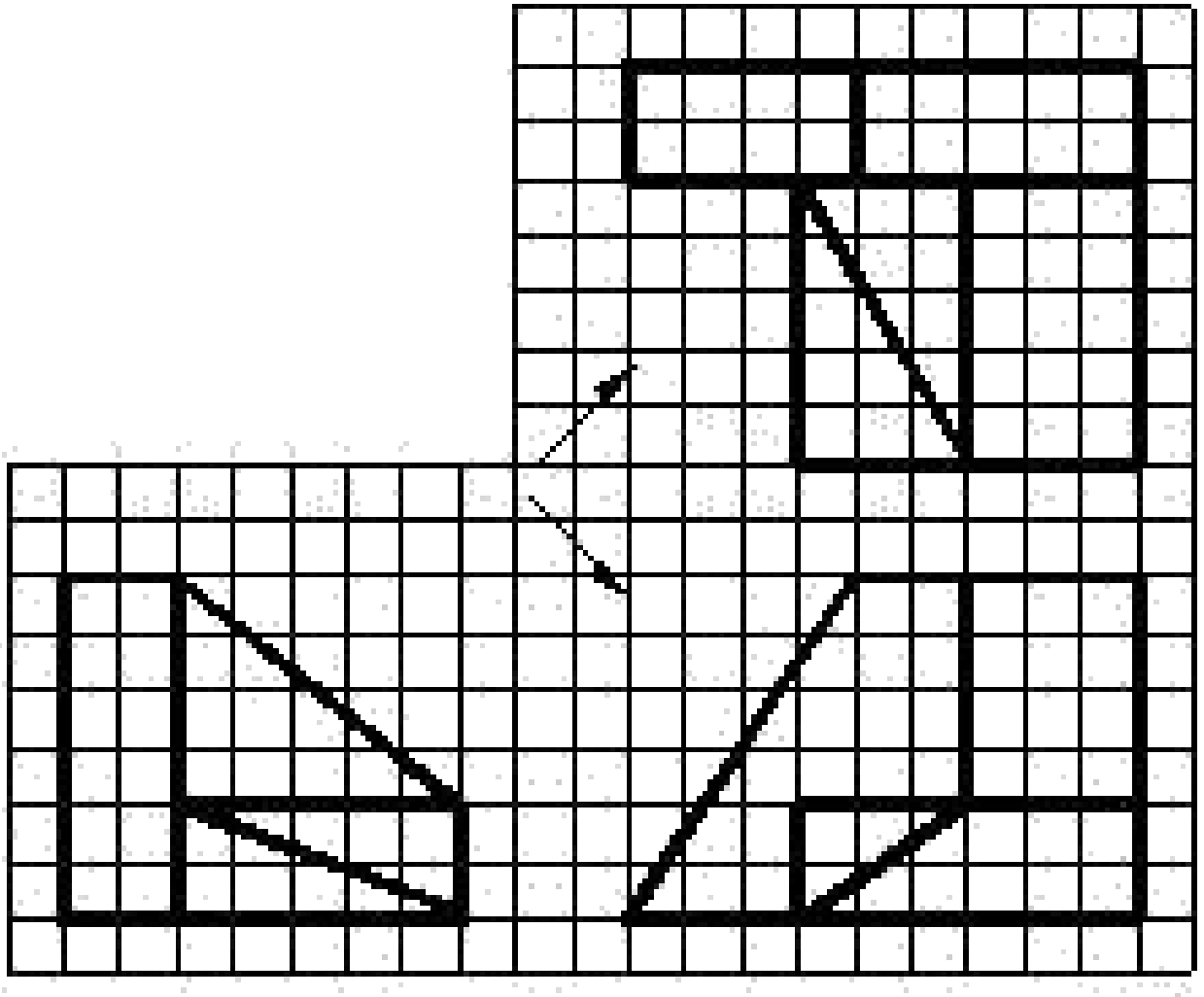
Center lines in Isometric drawing

Centerlines are drawn only for showing symmetry or for dimensioning. Normally, centerlines are not shown, because many isometric drawings are used to communicate to nontechnical people and not for engineering purposes.

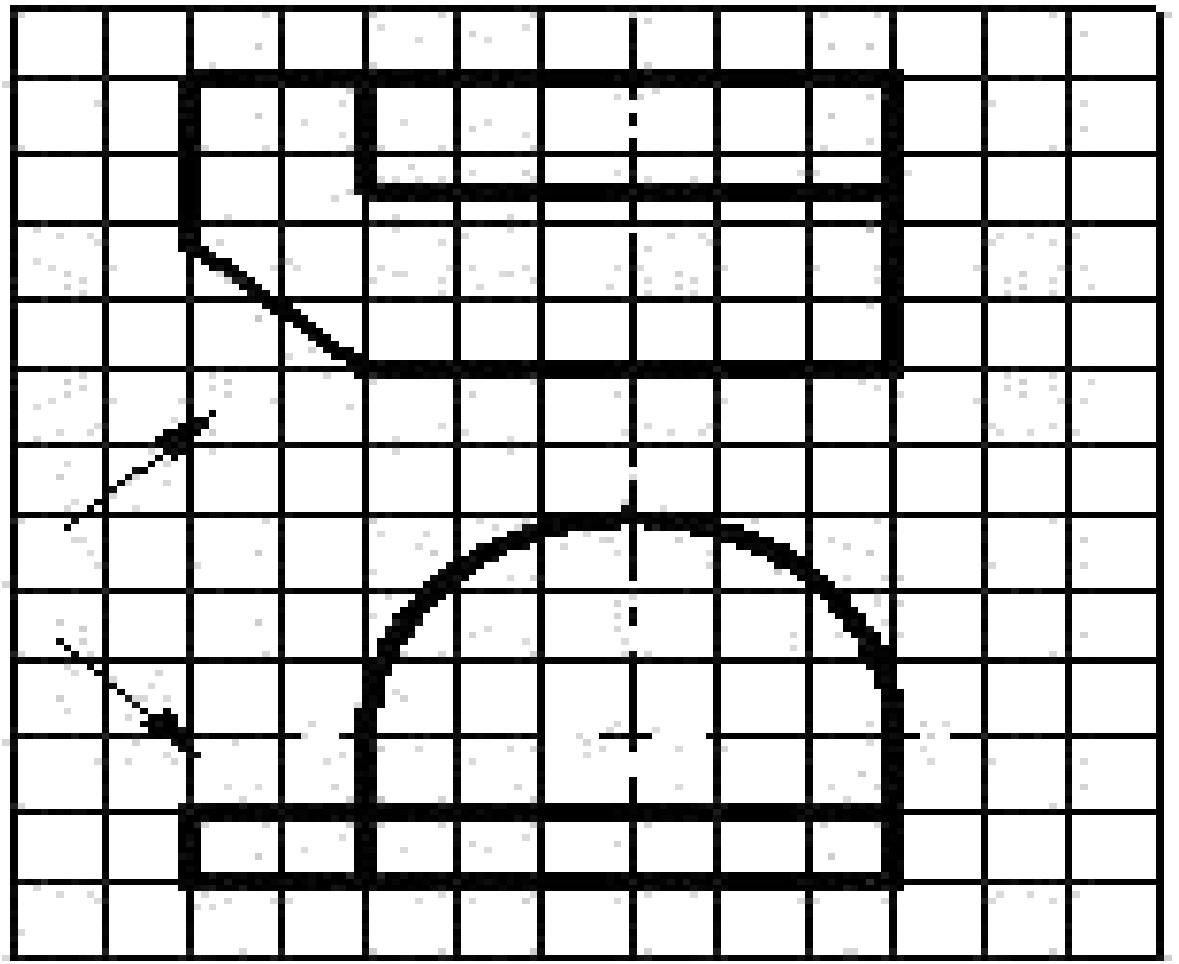


Exercise:

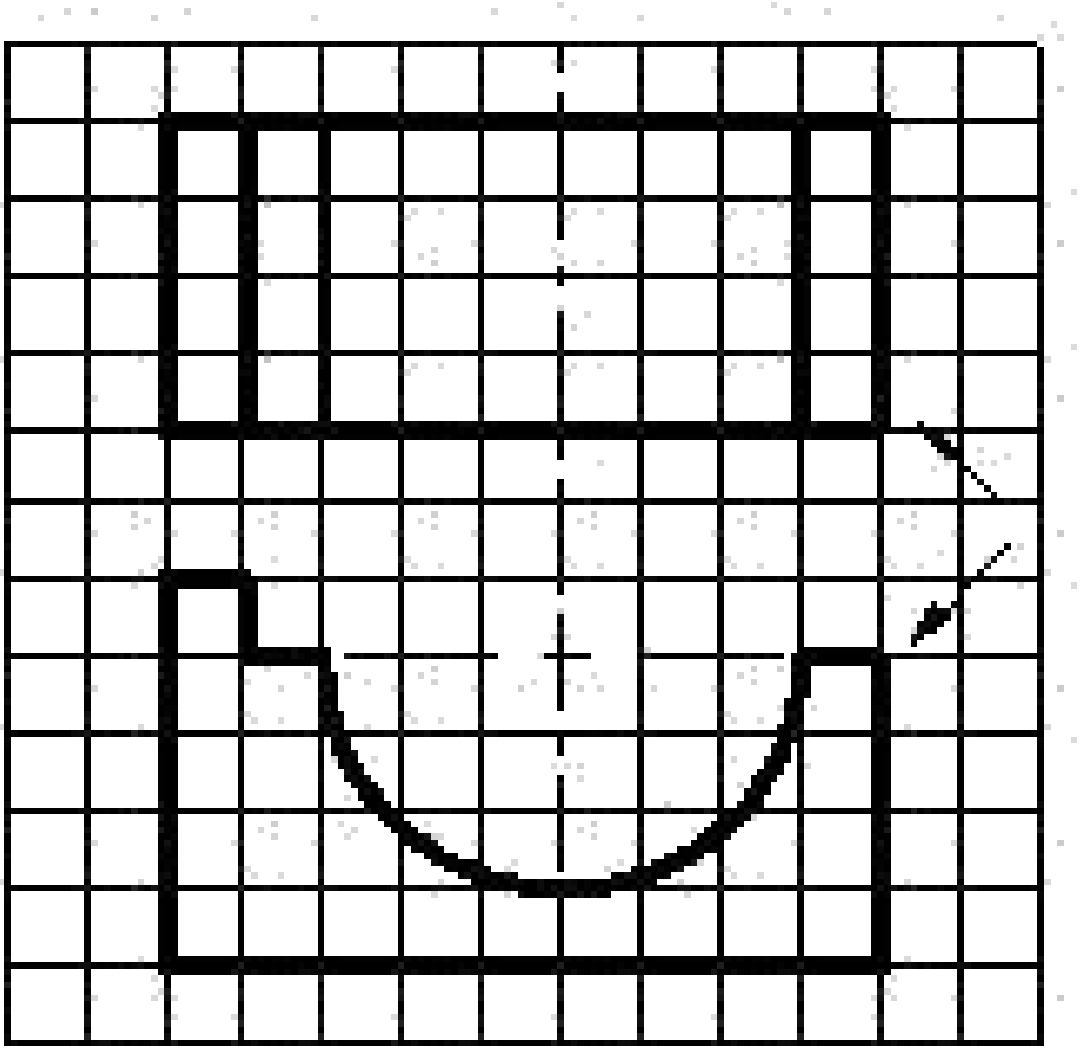
1. Draw in full size an isometric view of the object. The grid size is 10mm x 10mm.



2. Draw in full size an isometric view of the object. The grid size is 10mm x 10mm.



3. Draw in full size an isometric view of the object. The grid size is 10mm x 10mm.



4. Draw in full size a cavalier-oblique view of the object. Choose the proper orientation. The grid size is 10mm x 10mm.