

Isometric, Dimetric and Trimetric Projection – A Comparison

Isometric

So far we have only looked at isometric projection. In isometric the principal edges (axes) of an object make equal angles with the plane of projection, either by tilting the object (Figures 6.28, 6.29 and 6.30) or by using an axonometric plane (Fig. 6.50).

Isometric has only one scale as all sides are inclined equally to the projection plane.

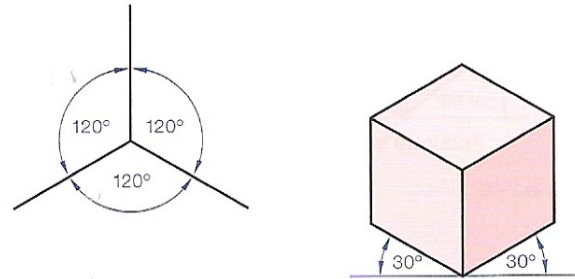


Fig. 6.71

Dimetric (Two Measures)

A dimetric projection is an axonometric projection of an object having two of its axes equally inclined to the projection plane. The third axis makes a different angle to the projection plane. Generally the object is so placed that one of its axes will be vertical when projected. Two different scales are needed in dimetric projection. The axes of similar angle will be foreshortened by the same amount. The third axis will need its own scale.

H I G H E R L E V E L

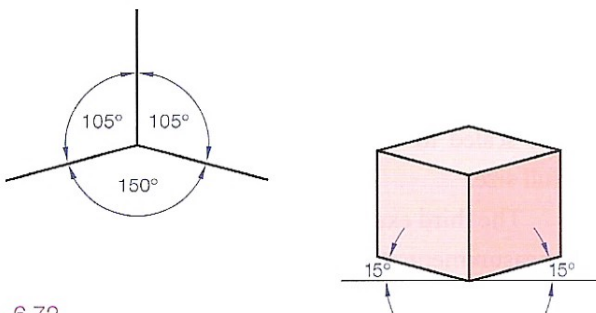


Fig. 6.72

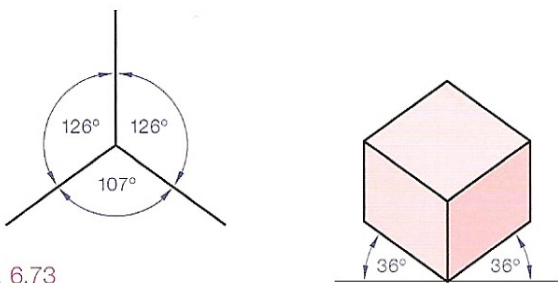
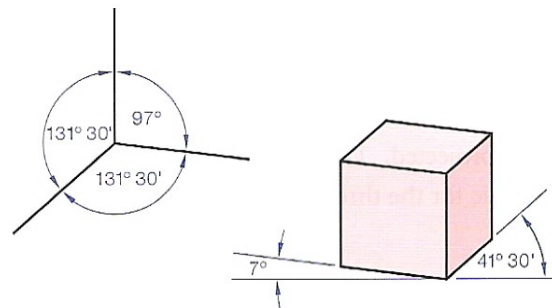


Fig. 6.73

This choice of angles shows more of the top face of the object.



A different choice of angles shows more of the left face.

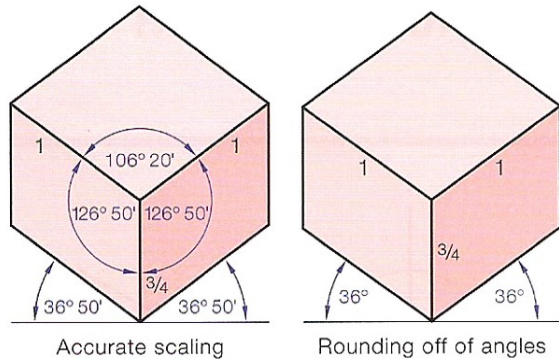


Fig. 6.74a

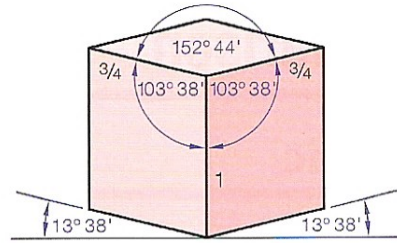


Fig. 6.74b

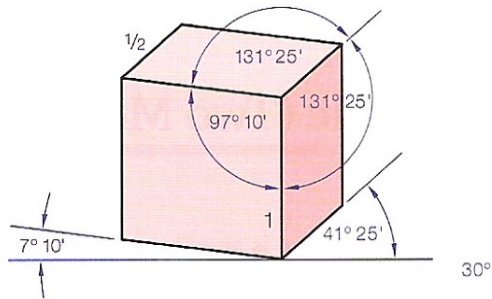


Fig. 6.74c

In order to get a realistic pictorial the measurements must be scaled. If we select our angles carefully we can do this quite easily. Fig. 6.74 shows a choice of dimetric angles which give easy scaling factors. These angles can be rounded off without much loss of accuracy.

In the first example, Fig. 6.74a, the vertical lines are scaled to three-quarters of the original size. Sloping lines parallel to the axes are left full size.

In the second example, Fig. 6.74b, the two side axes are scaled to three-quarters while the verticals are left full size.

The third example, Fig. 6.74c, shows the verticals and measurements to the left remaining full size while the measurements to the right are scaled by half.

Trimetric (Three Measures)

A trimetric projection is an axonometric projection of an object placed in such a position that none of its axes makes an angle with the projection plane equal to that made by any other axis. As with dimetric, the object is usually placed so that one of its edges will appear vertical when projected. Three different scales are needed in trimetric for the three different axes.

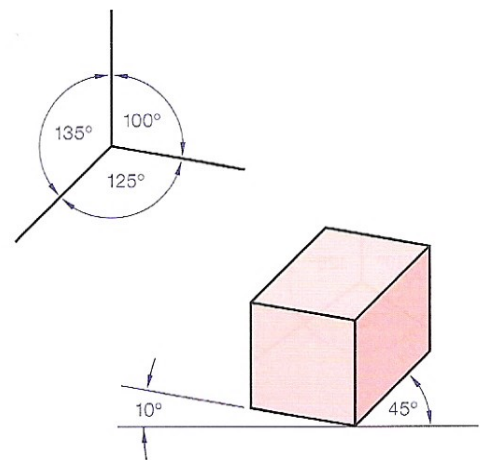


Fig. 6.75

Draw a dimetric projection of the given solid Fig. 6.76 having axes inclined as shown. Use the axonometric plane method.

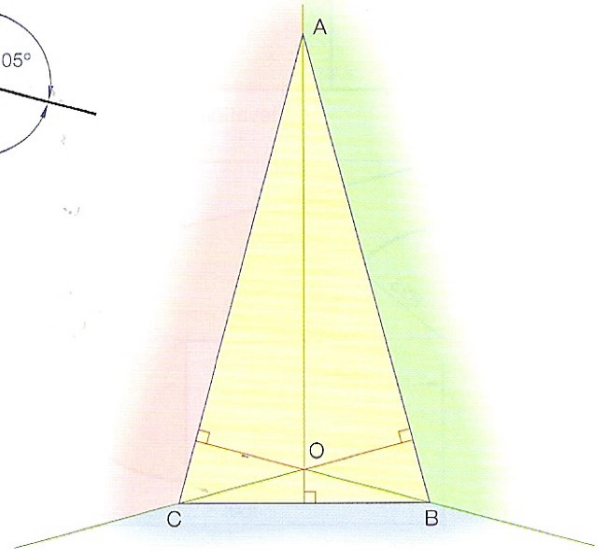
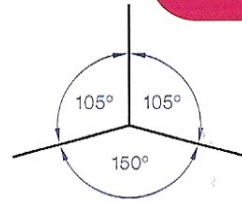
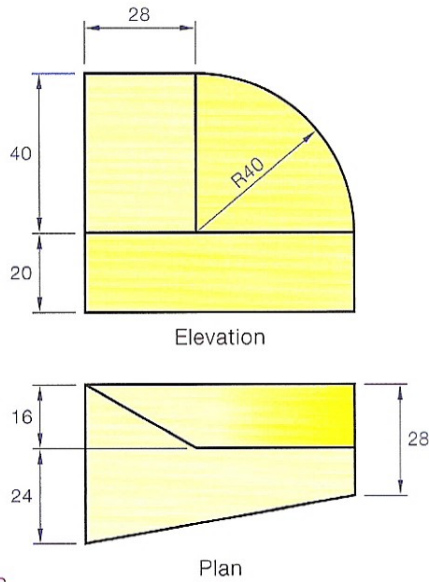


Fig. 6.77

Fig. 6.76

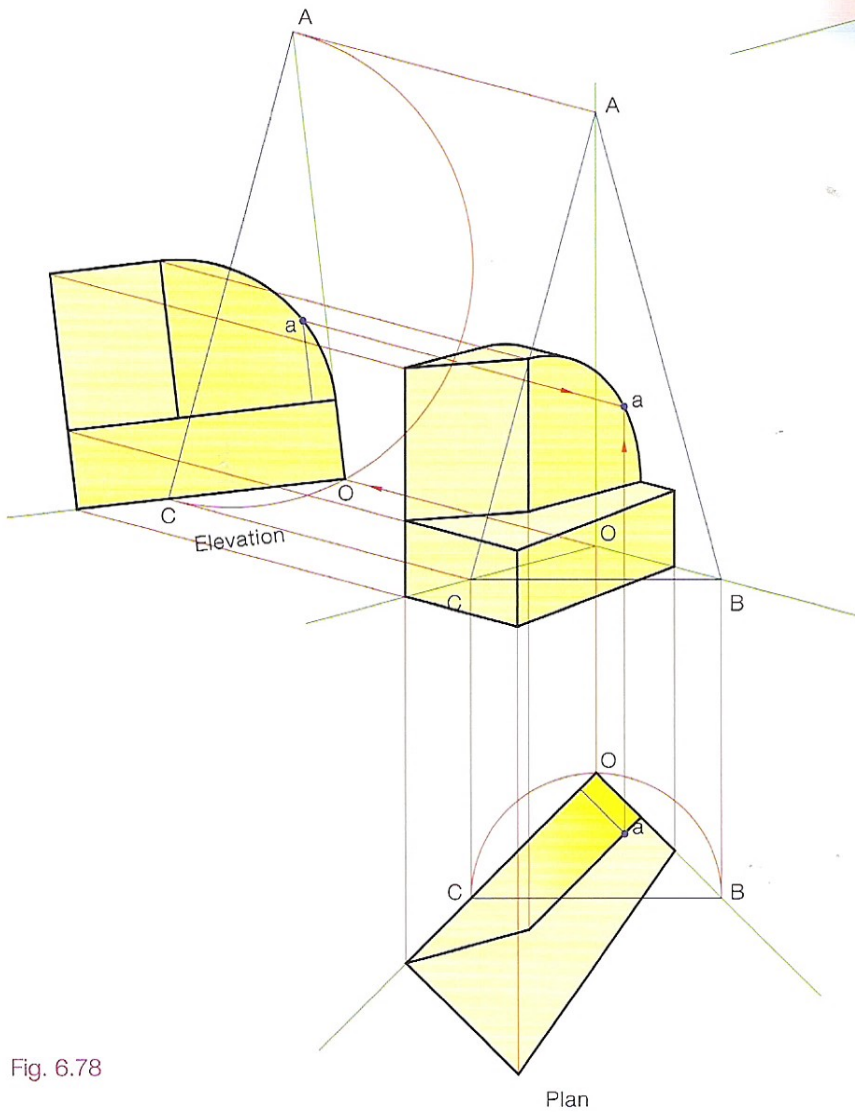


Fig. 6.78

- (1) Set up the axes as shown in Fig. 6.77.
- (2) The axonometric plane is now drawn. The plane is drawn such that edge AB is perpendicular to axis CO, edge BC is perpendicular to axis AO and edge CA is perpendicular to axis BO. The size of the triangle does not matter.
- (3) Find the true shape of the triangular portion of the horizontal plane BOC in the same way as we did for isometric projection.
- (4) Similarly for the vertical plane, triangle COA.
- (5) Construct the orthographic views on these true shapes.
- (6) The dimetric view is found by projection from the elevation and plan as we have done for isometric.
- (7) The pictorial will be scaled automatically, Fig. 6.78.

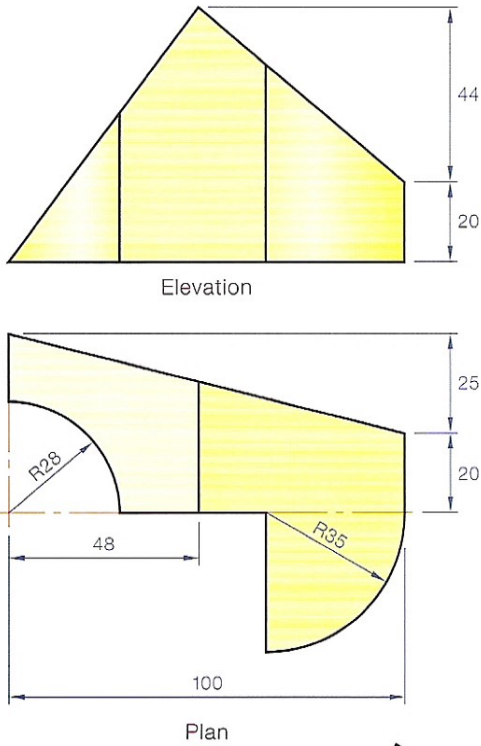


Fig. 6.79

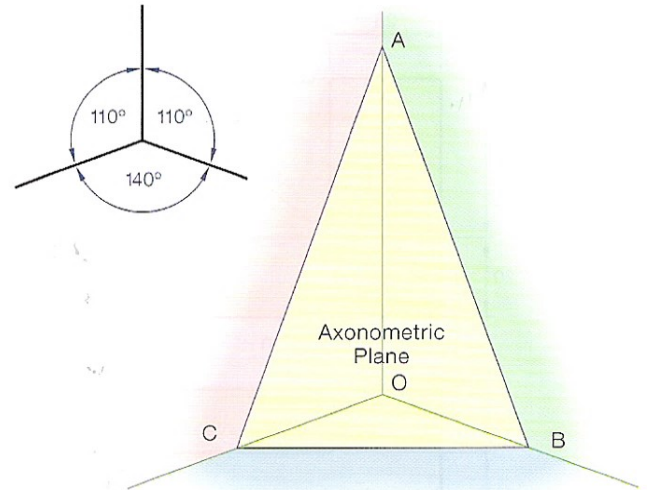


Fig. 6.80

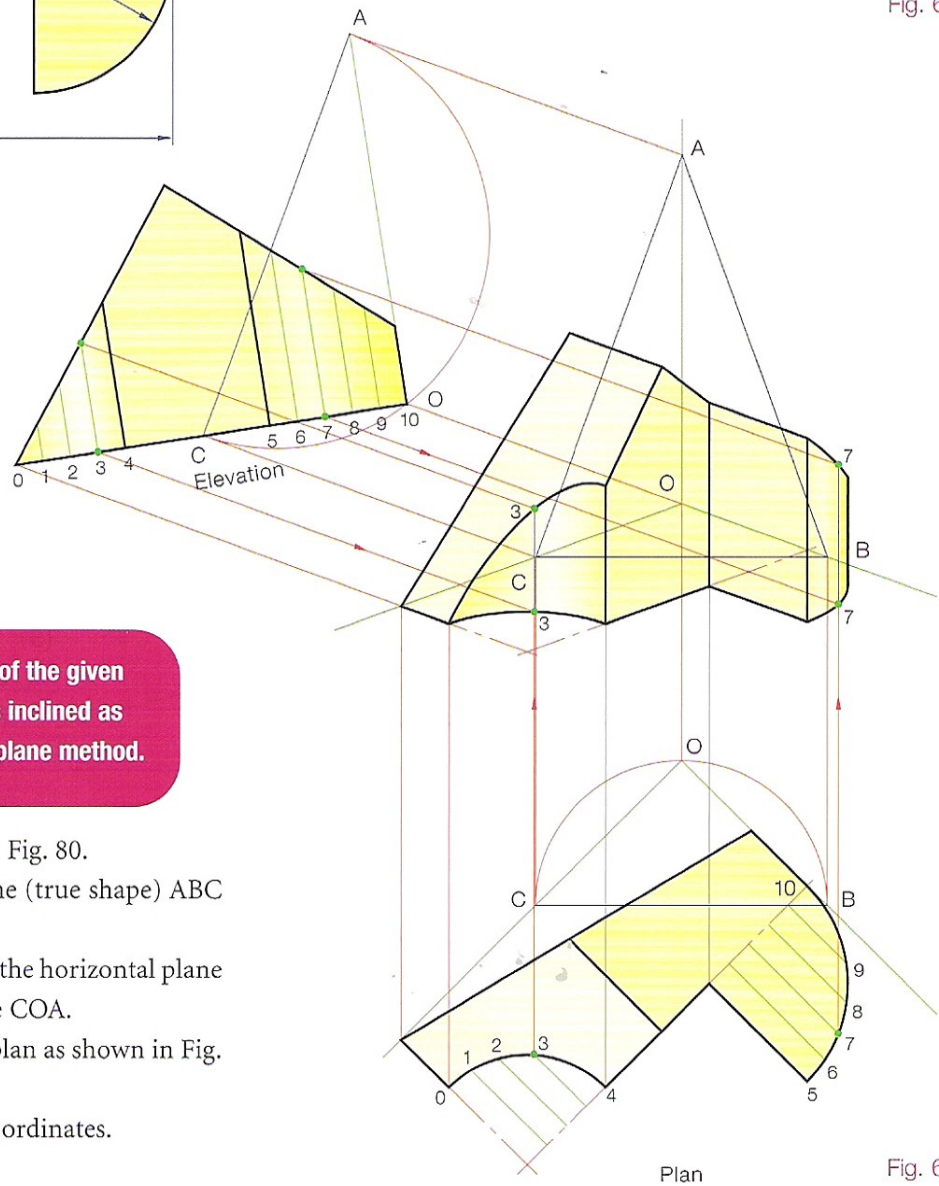


Fig. 6.81

Draw a dimetric projection of the given solid, Fig. 6.79, having axes inclined as shown. Use the axonometric plane method.

- (1) Set up the axes as shown in Fig. 80.
- (2) Draw the axonometric plane (true shape) ABC as before.
- (3) Find the true shape of both the horizontal plane COB and the vertical plane COA.
- (4) Draw in the elevation and plan as shown in Fig. 6.81.
- (5) Divide up the curves using ordinates.
- (6) Project the dimetric view.

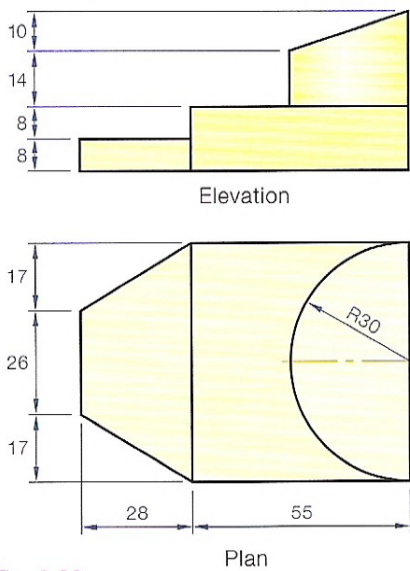


Fig. 6.82

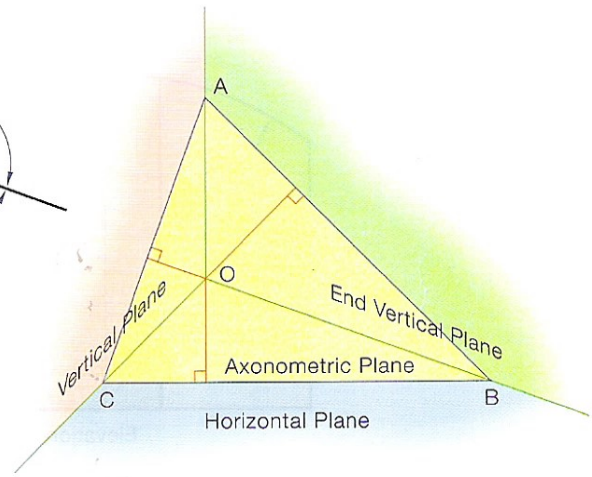
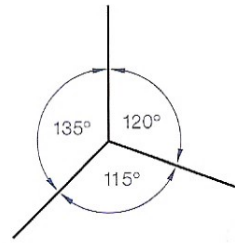


Fig. 6.83

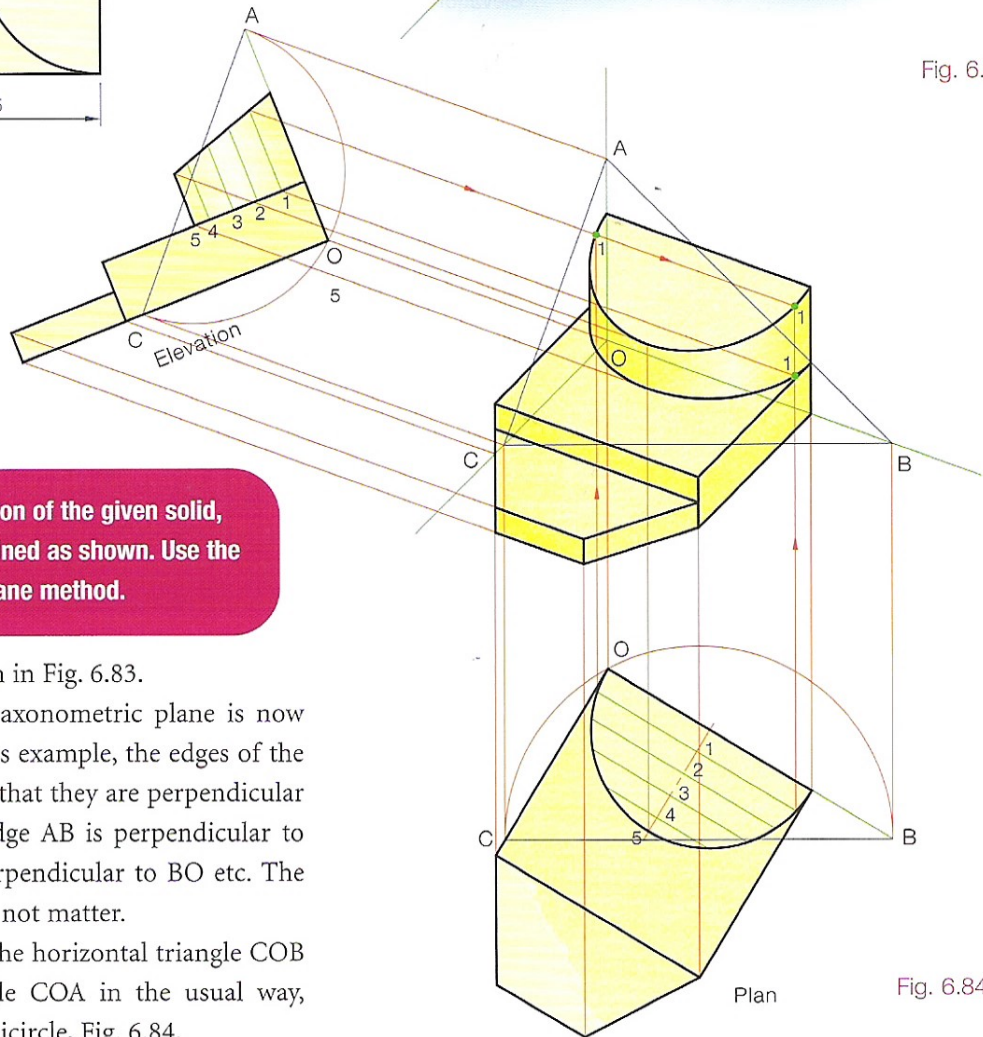


Fig. 6.84

Draw a trimetric projection of the given solid, Fig. 6.82, having axes inclined as shown. Use the axonometric plane method.

- (1) Set up the axes as shown in Fig. 6.83.
- (2) The true shape of the axonometric plane is now drawn. Like the previous example, the edges of the plane are positioned so that they are perpendicular to the opposite axis. Edge AB is perpendicular to axis CO, edge AC is perpendicular to BO etc. The size of the triangle does not matter.
- (3) Find the true shape of the horizontal triangle COB and the vertical triangle COA in the usual way, using the angle in a semicircle, Fig. 6.84.
- (4) Construct the orthographic views in these triangles.
- (5) The trimetric is found by projection from these views parallel to the axes.
- (6) The cylindrical portion is found by using ordinates as shown.
- (7) The lengths are scaled automatically using this method.

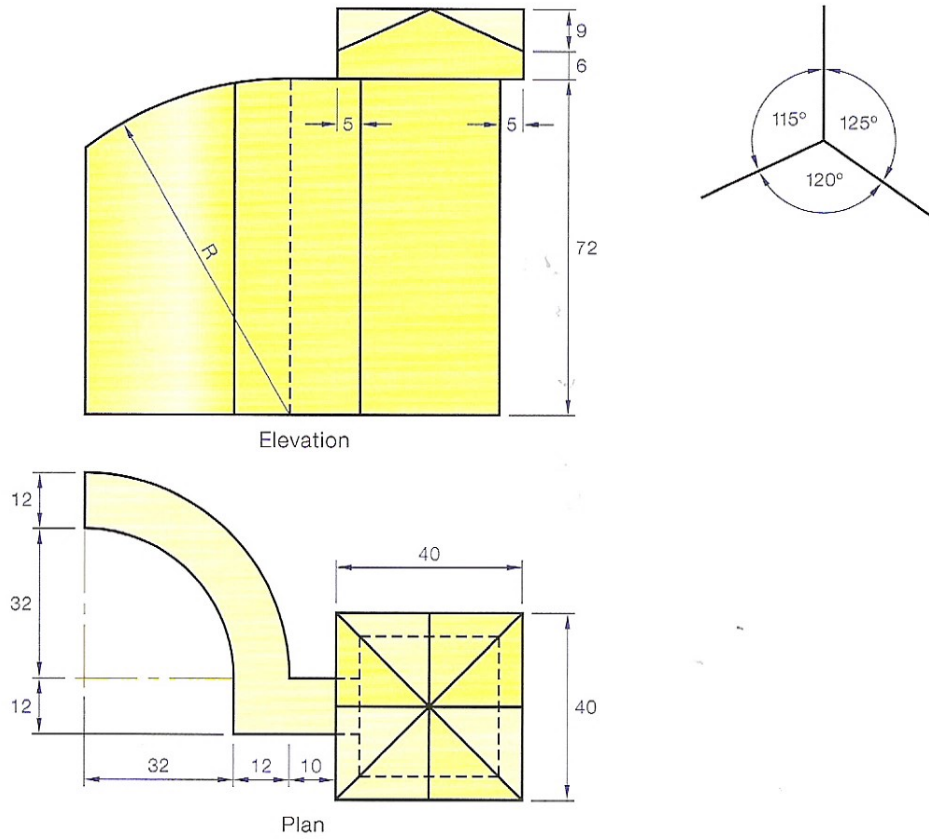


Fig. 6.85

Draw a trimetric projection of the given solid, Fig. 6.85, having axes inclined as shown. Use the axonometric plane method.

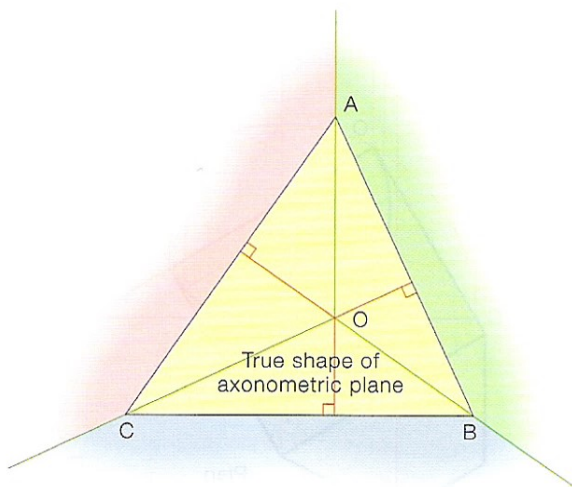


Fig. 6.86

- (1) Set up the axes to the given angles, Fig. 6.86.
- (2) Find the true shape of the axonometric plane ABC as described before.
- (3) Project the true shape of the horizontal plane COB and the vertical plane COA.
- (4) Draw the plan and elevation on their respective planes, Fig. 6.87.
- (5) Project the trimetric view of the solid from the two orthographic views.

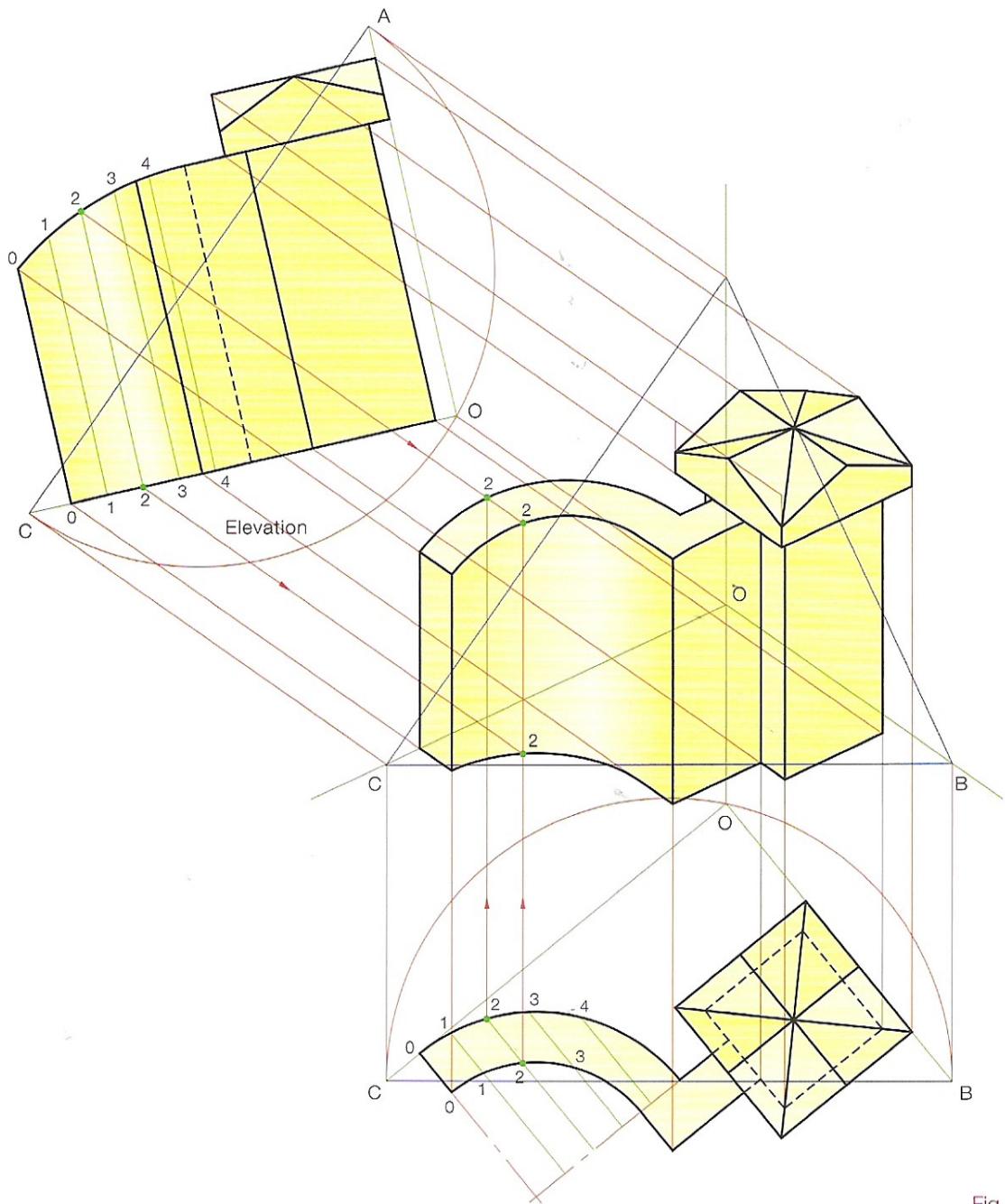


Fig. 6.87