Computer Aided Machine Drawing

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Orthogonal projection

- A projection is a representation of an object on a two-dimensional plane.
- The projections of an object should convey all the three dimensions, along with other details of the object on a sheet of paper.

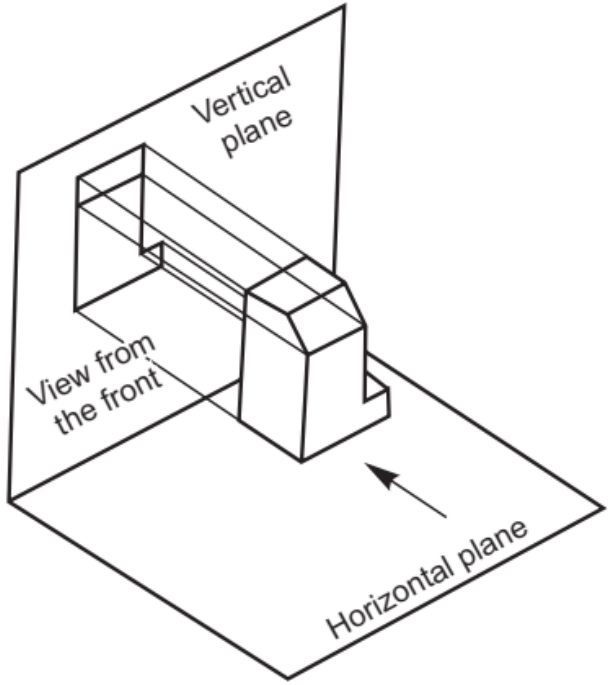


Fig. 3.1 Principle of obtaining the view from the front

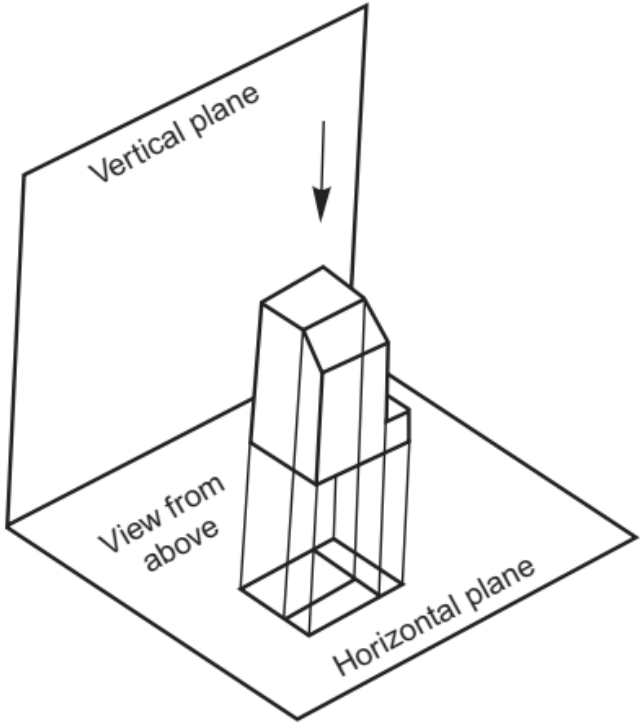


Fig. 3.2 Principle of obtaining the view from above

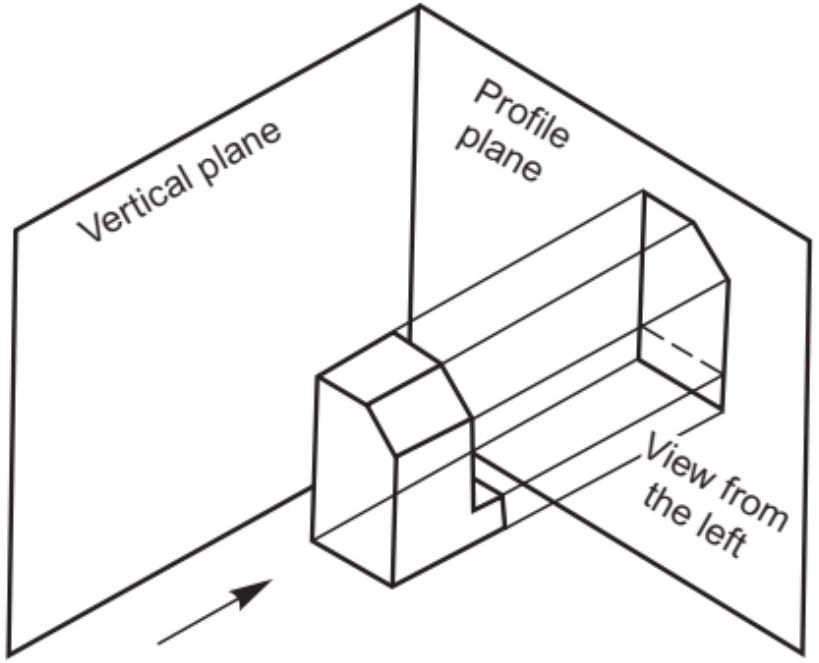
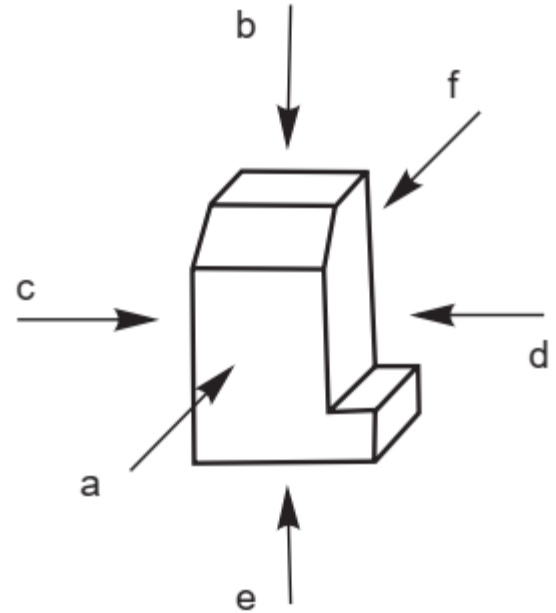


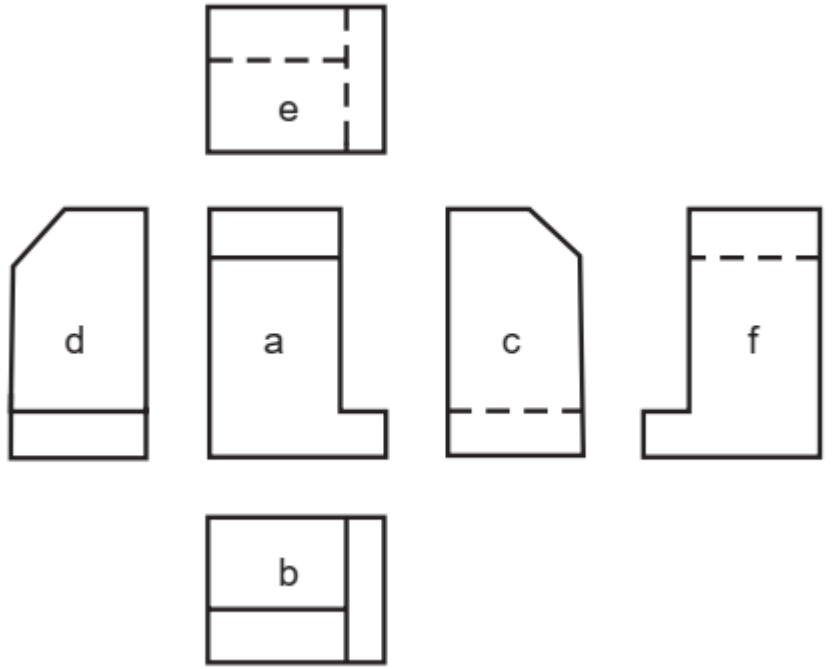
Fig. 3.3 Principle of obtaining the view from the left

Representation of views



There are six possible directions to obtain the different views which are designated as follows:

1. View in the direction **a** = view from the front
2. View in the direction **b** = view from above
3. View in the direction **c** = view from the left
4. View in the direction **d** = view from the right
5. View in the direction **e** = view from below
6. View in the direction **f** = view from the rear



Position of the object

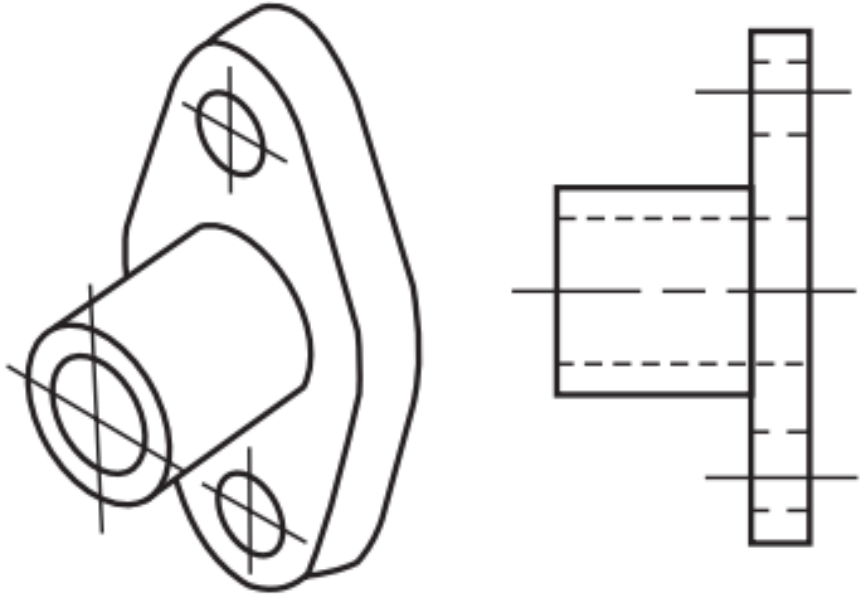
To get useful information about the object in the orthographic projections, the object may be imagined to be positioned properly because of the following facts :

1. Any line on an object will show its true length, only when it is parallel to the plane of projection.

2. Any surface of an object will appear in its true shape, only when it is parallel to the plane of projection.

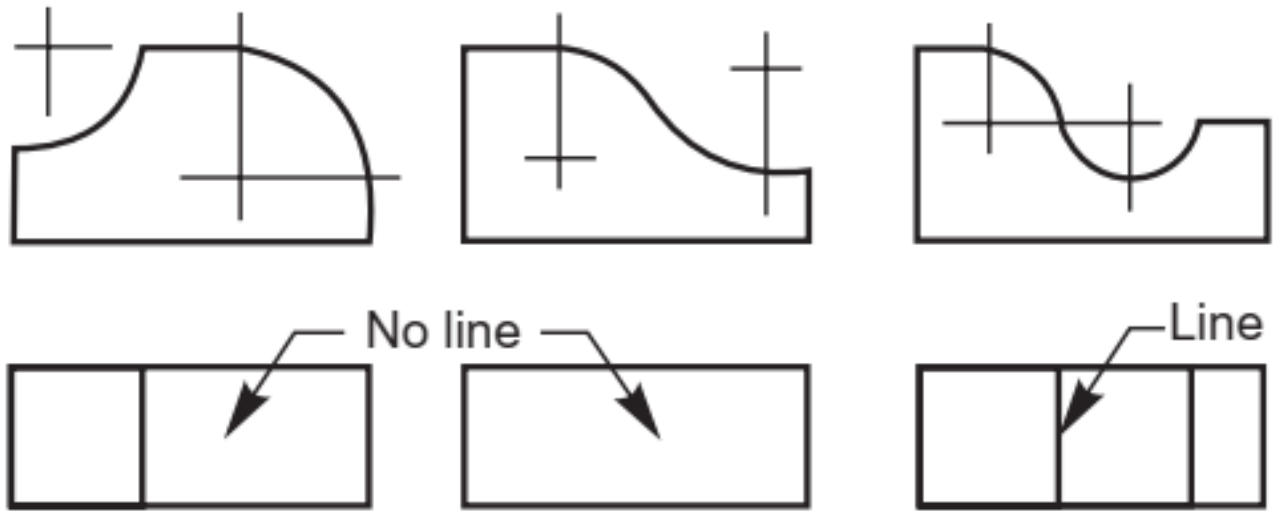
Position of the object – Hidden lines

The invisible or hidden features are represented by short dashes of medium thickness.



Position of the object – Curved surfaces

Wherever a tangential line drawn to the curved surface becomes a projector, a line should be drawn in the adjacent view.

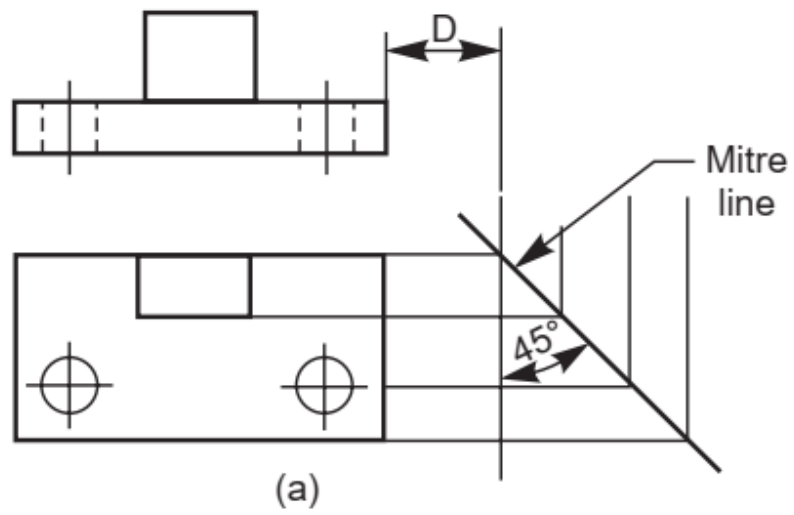


Development of missing views

- When two views of an object are given, the third view may be developed by the use of a mitre line.

To construct view from the left

1. Draw the views from the front and above.
2. Draw the projection lines to the right of the view from above.
3. Decide the distance, D from the view from the front at which, the side view is to be drawn.
4. Construct a mitre line at 45°.
5. From the points of intersection between the mitre line and the projection lines, draw vertical projection lines.
6. Draw the horizontal projection lines from the view from the front to intersect the above lines.



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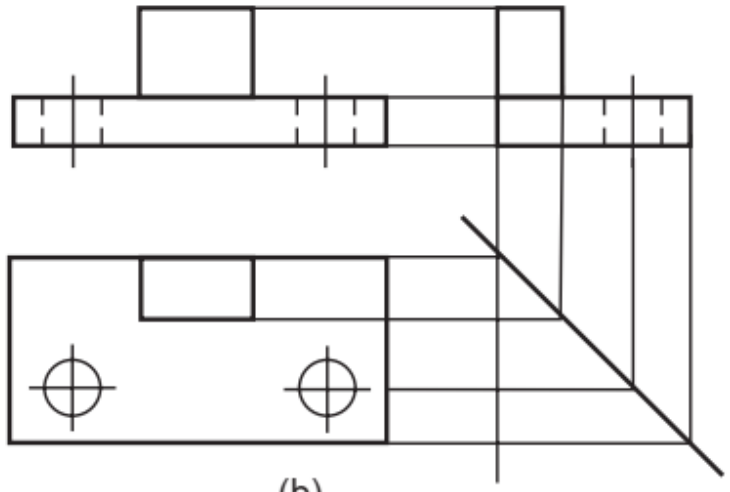
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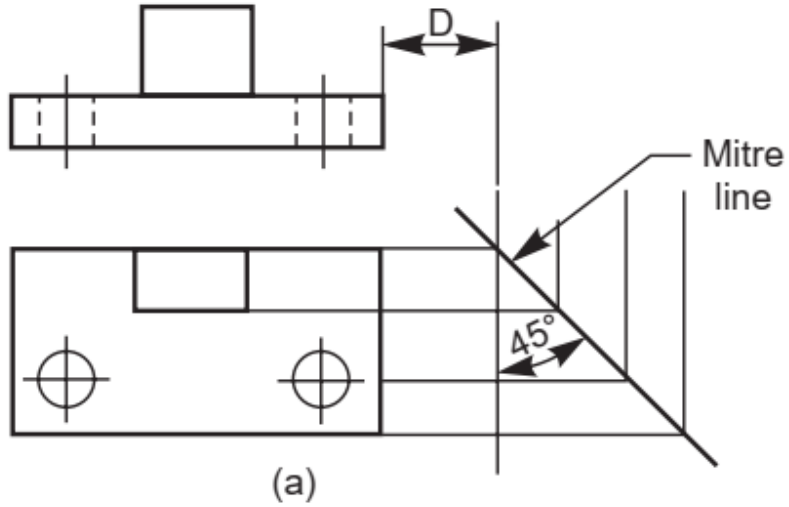
Development of missing views



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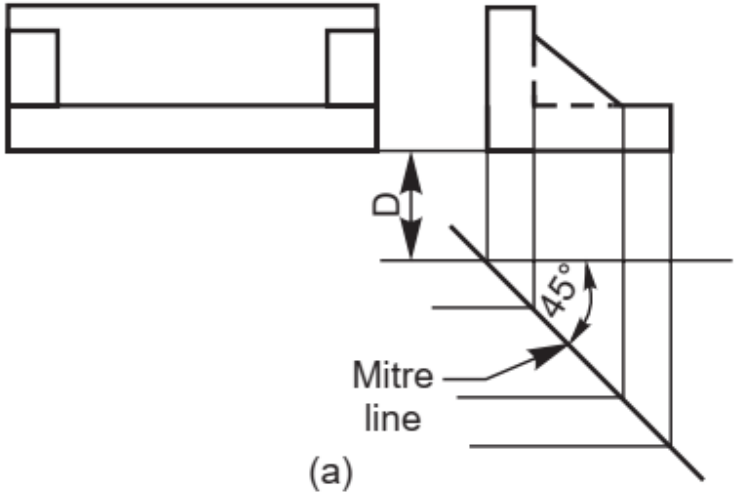

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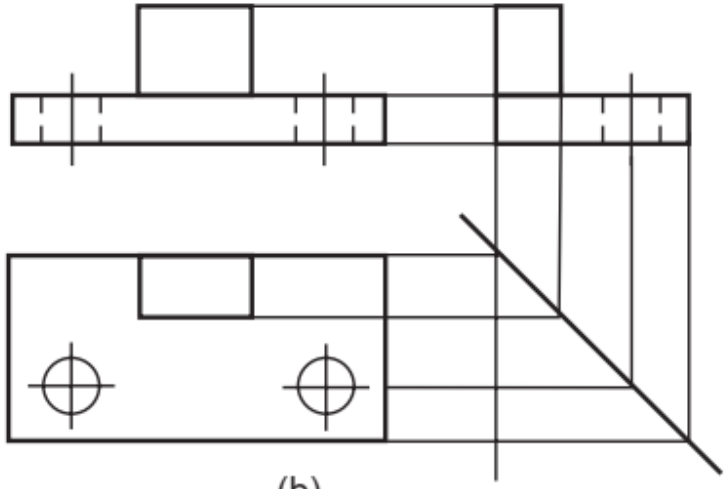

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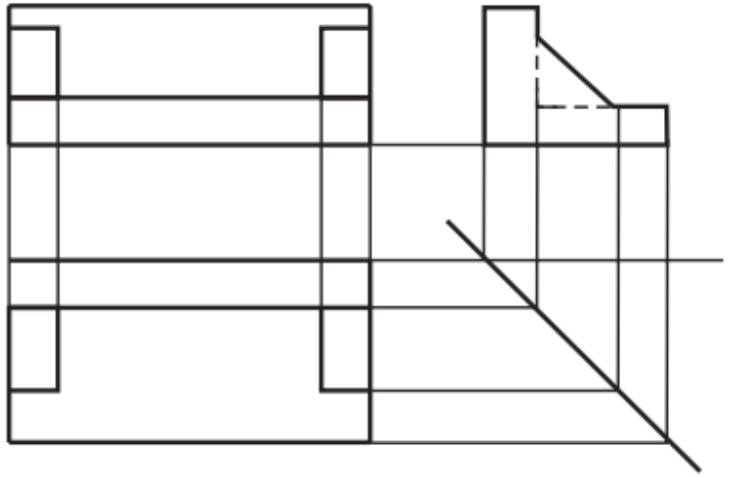

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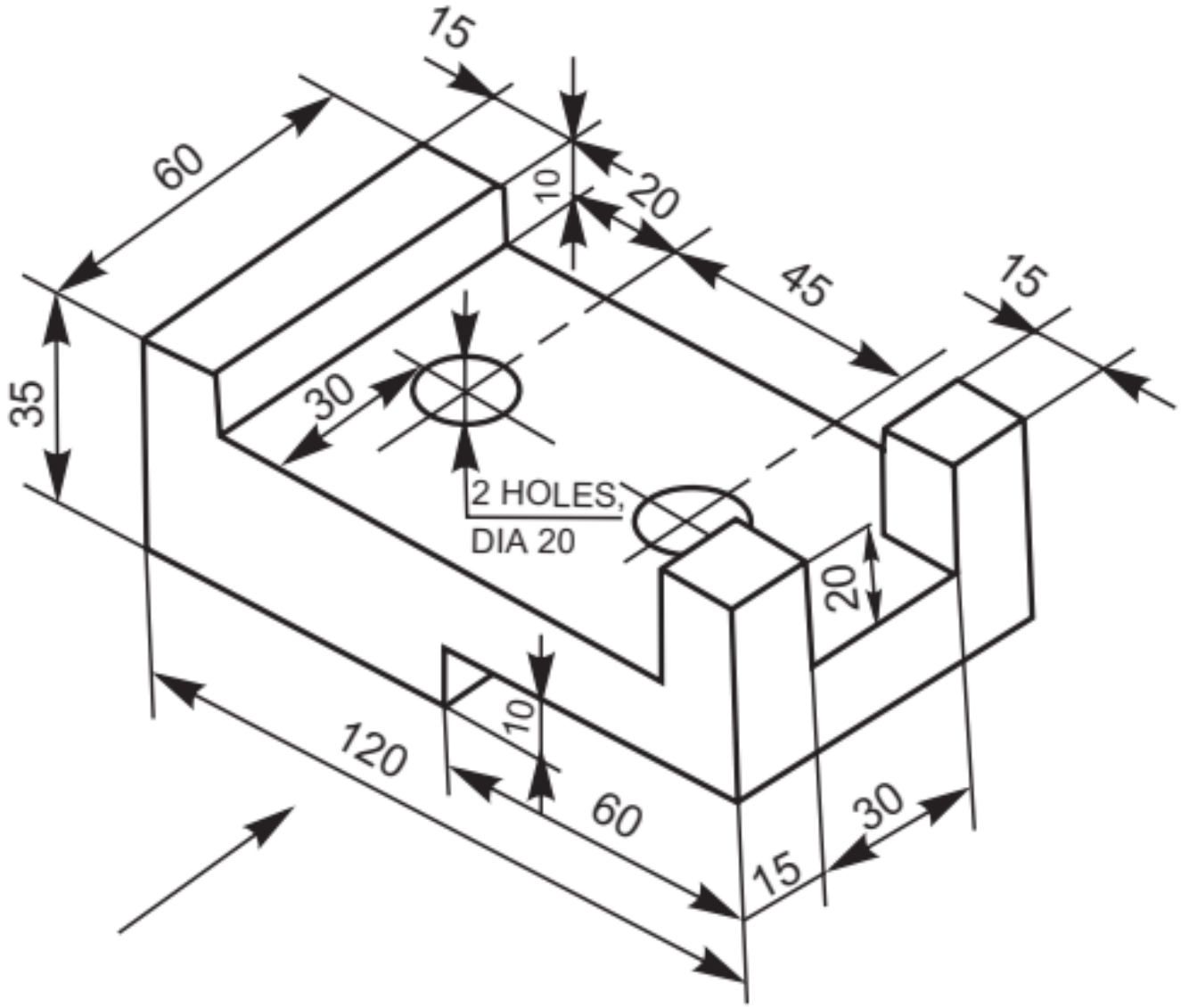
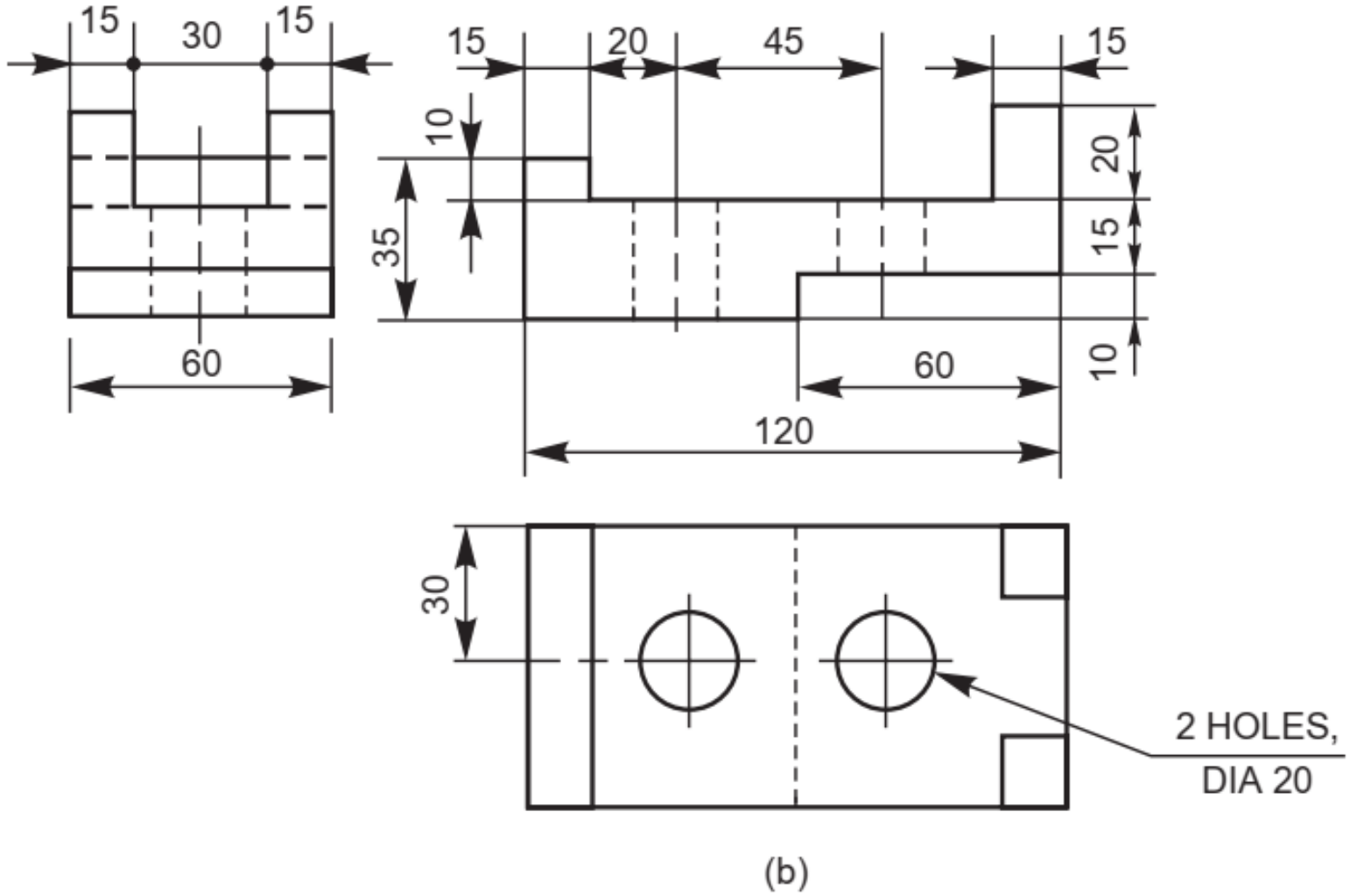
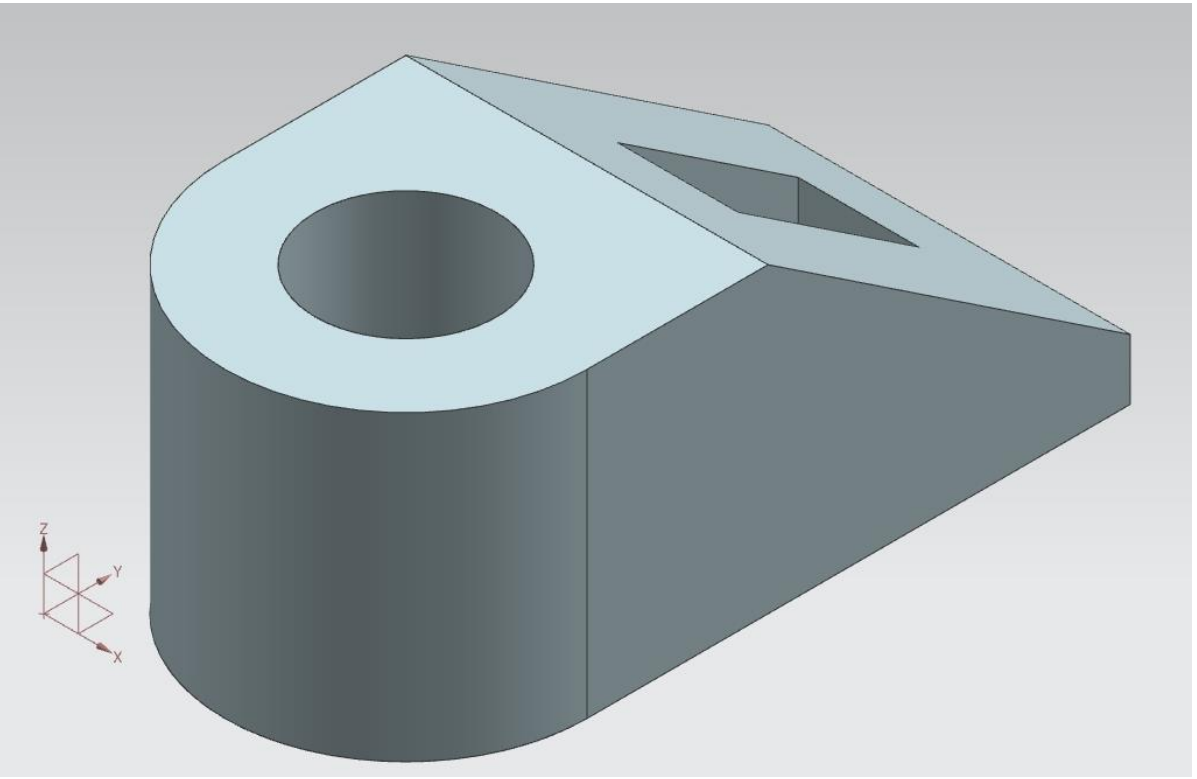
Exercise – Plot two views

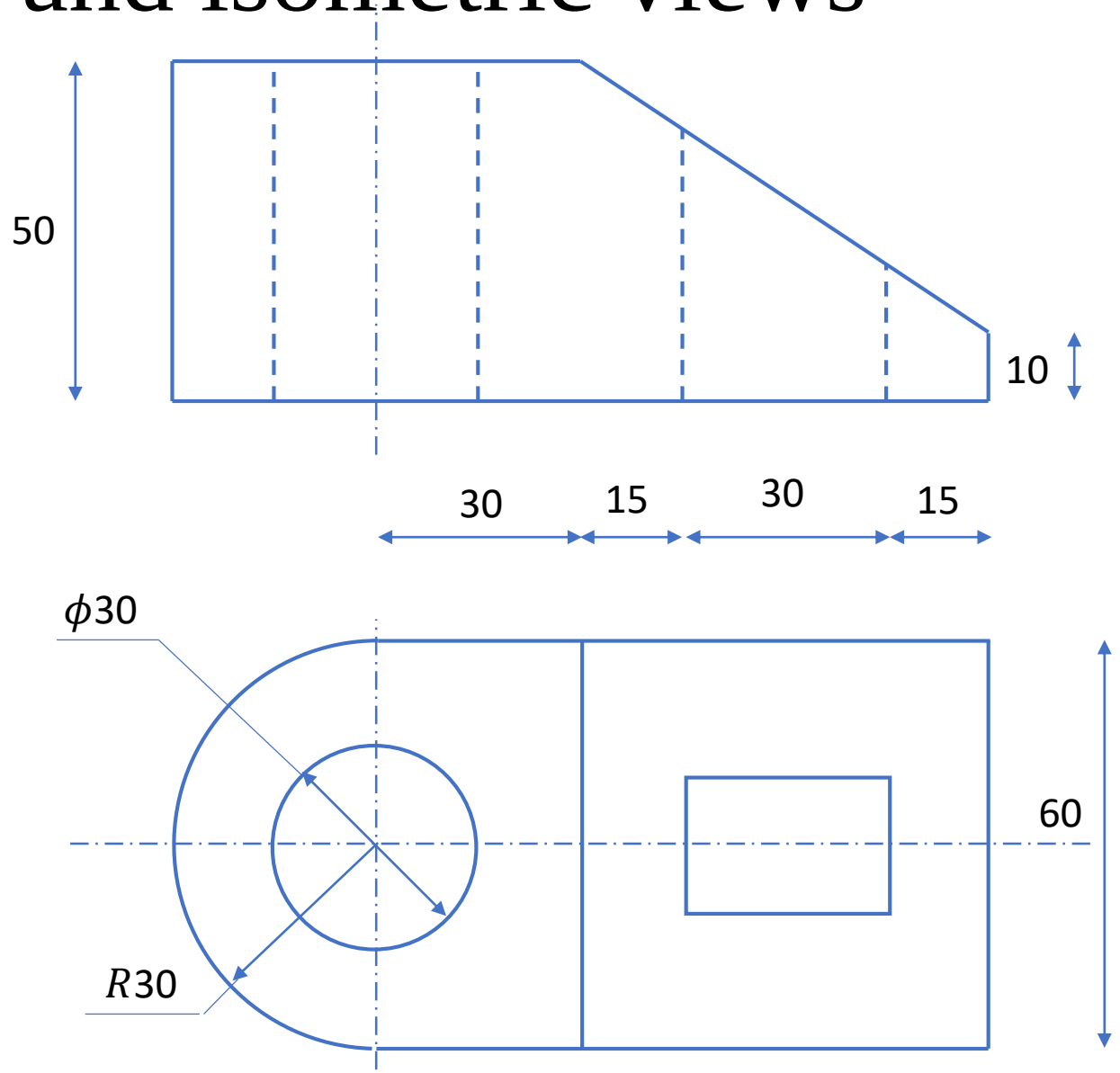


Exercise – Plot two views



Orthogonal projection and isometric views





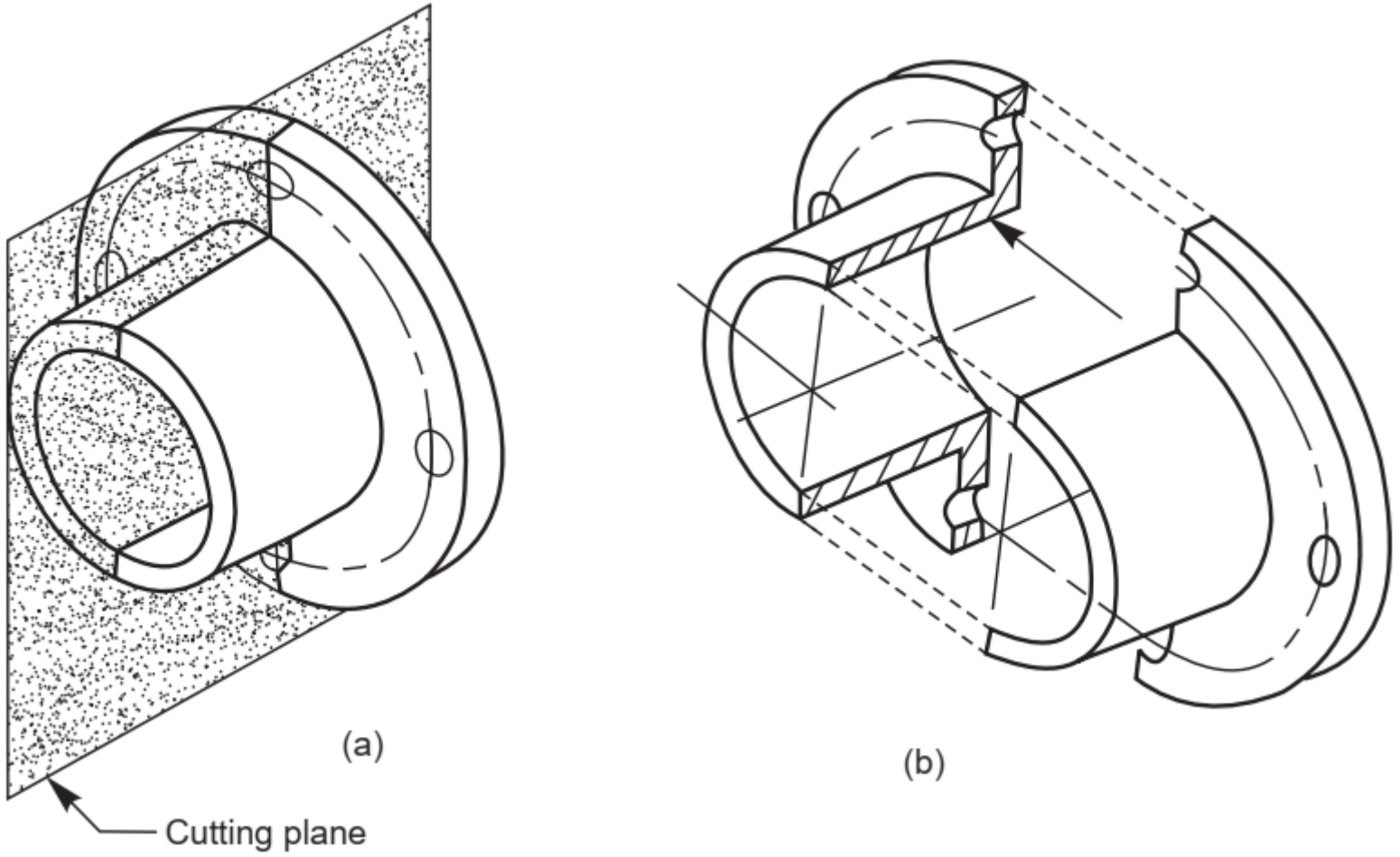
Chapter 4 – Sectional views

Sectional views

- Orthographic views when carefully selected, may reveal the external features of even the most complicated objects.
- However, there are objects with complicated interior details and when represented by hidden lines, may not effectively reveal the true interior details.
- This may be overcome by representing one or more of the views ‘in section’.

Sectional views

A sectional view is obtained by imagining the object, as if cut by a cutting plane and the portion between the observer and the section plane being removed.



Sectional views

A sectional view obtained by assuming that the object is completely cut by a plane is called a full section or sectional view.

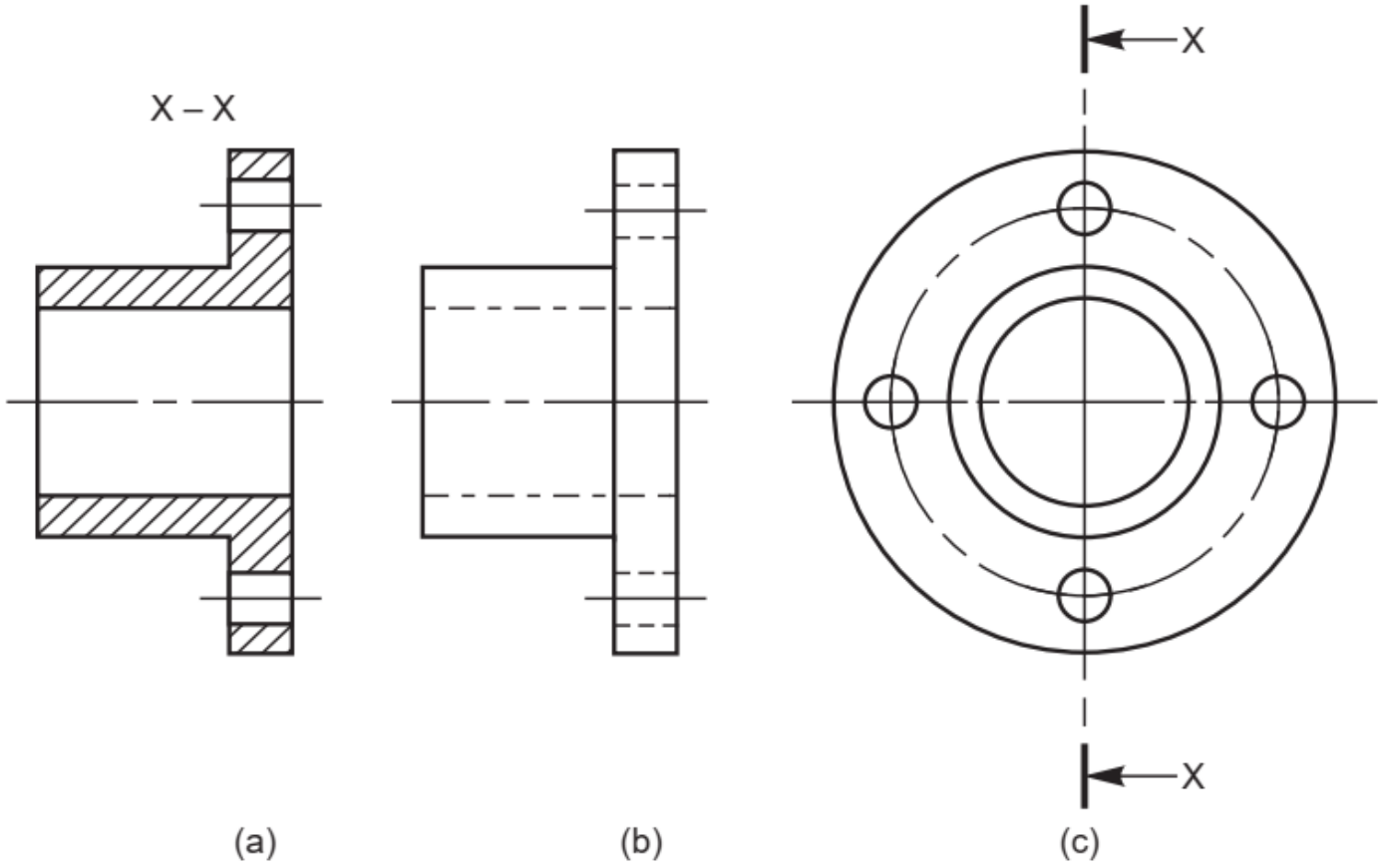
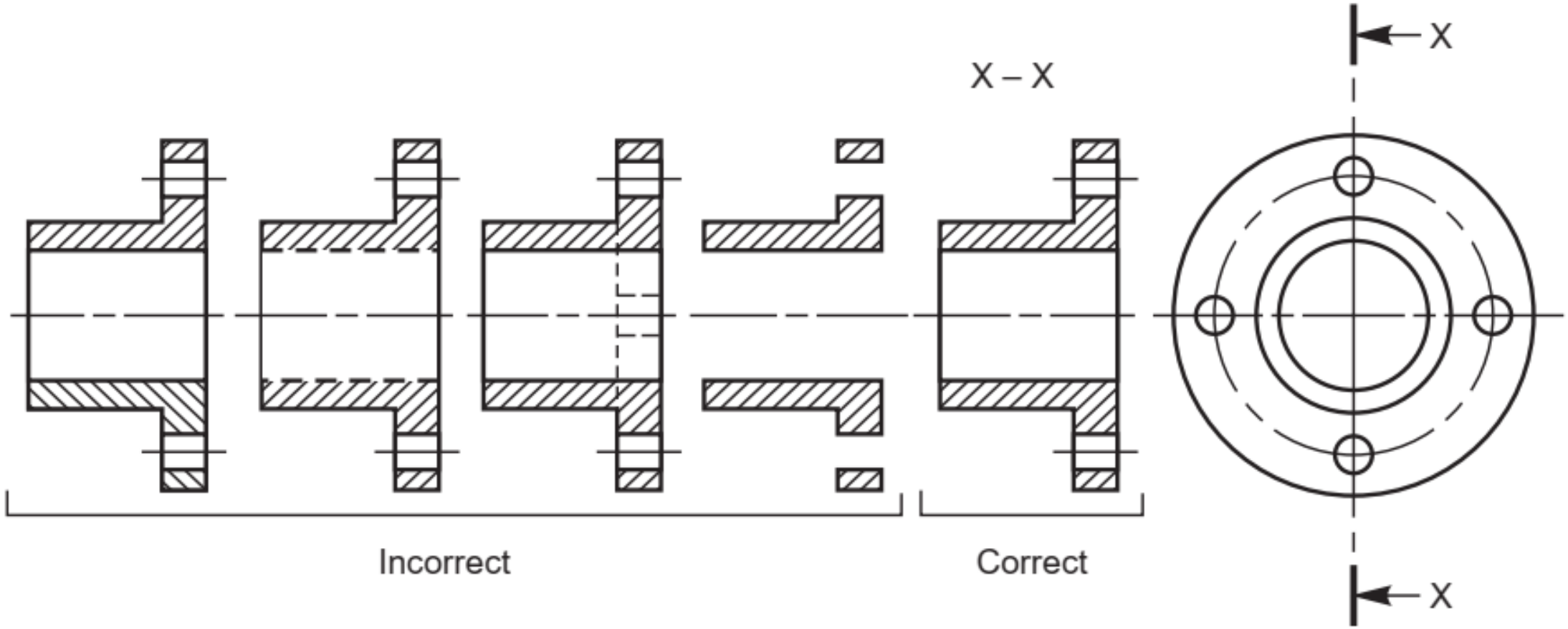


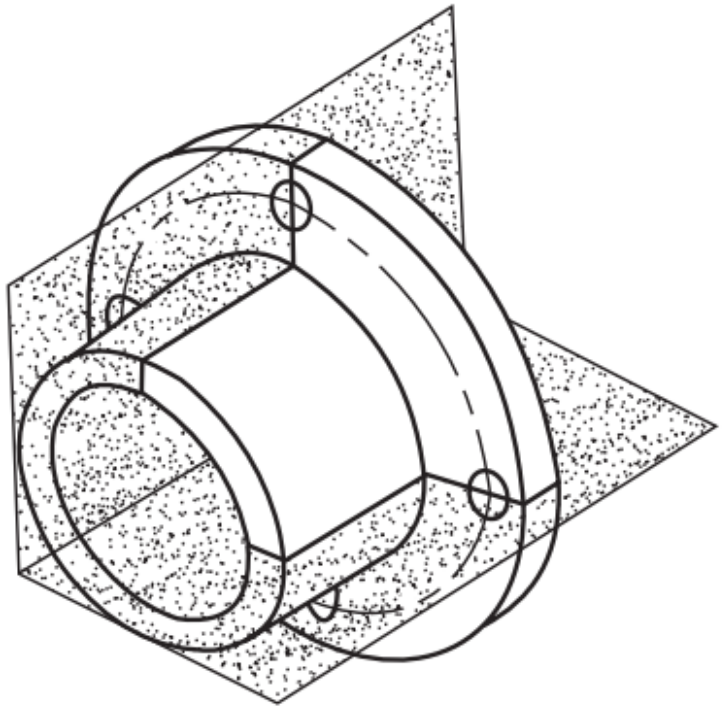
Fig. 4.2 Sectioned and un-sectioned views

Sectional views

Correct versus incorrect sectional views



Half section



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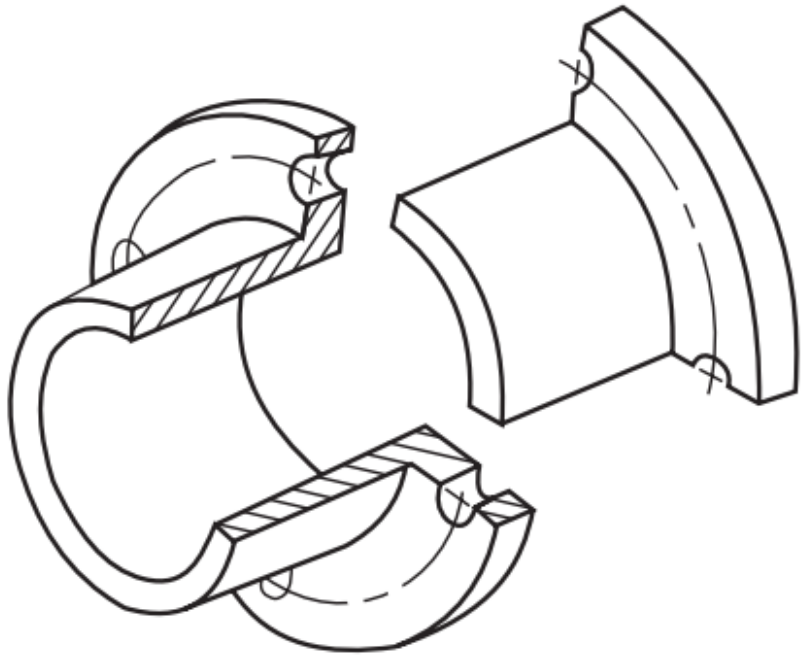

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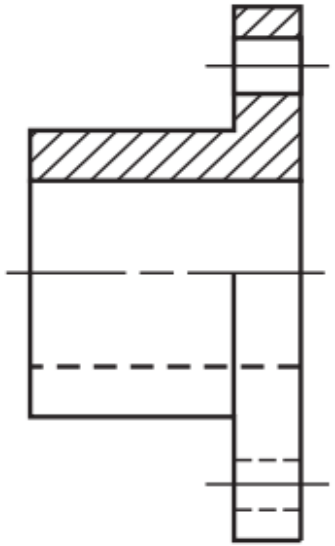
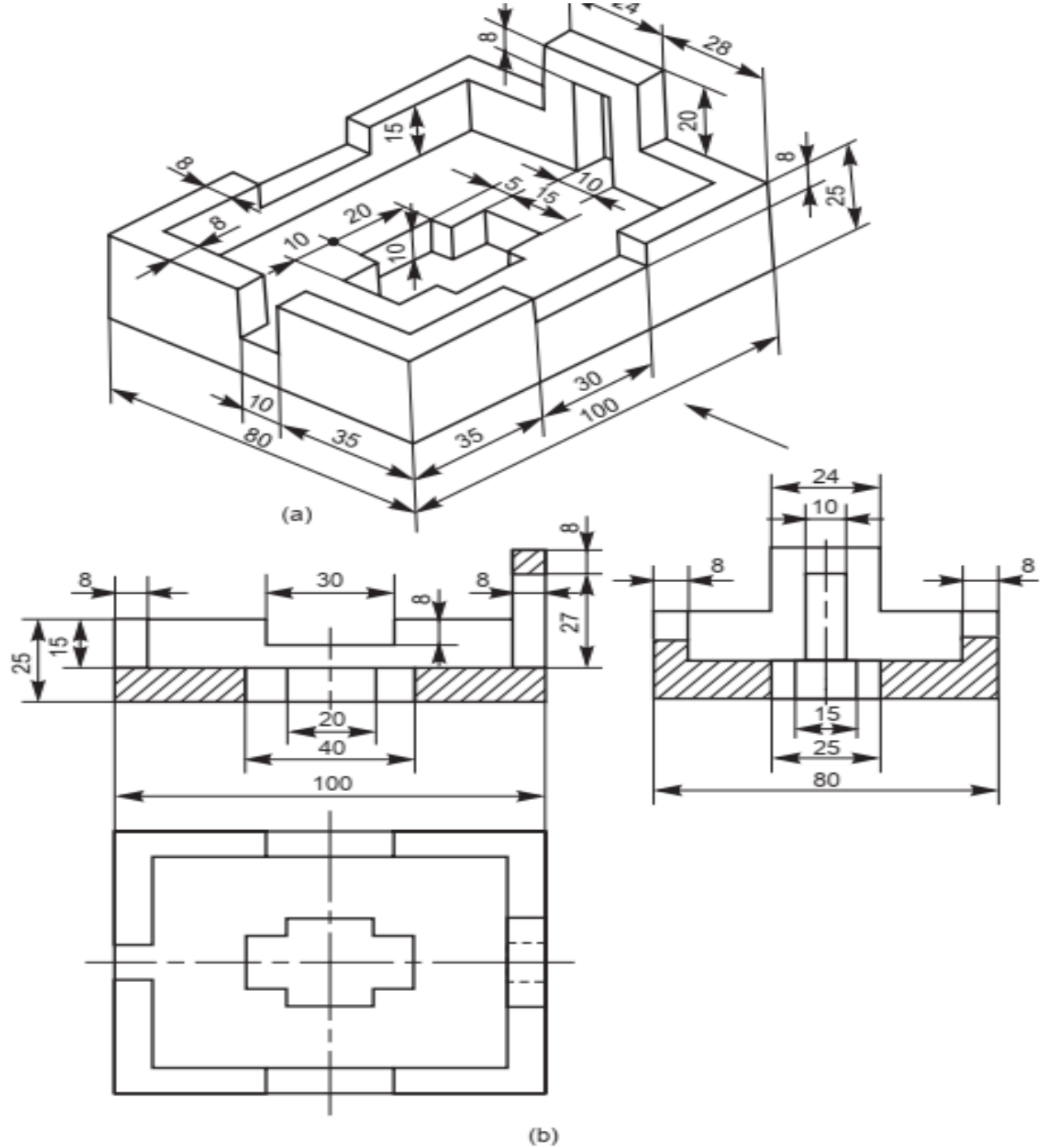


(c)

A half sectional view is preferred for symmetrical objects. For a half section, the cutting plane removes only one quarter of an object.

Example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