ENGINEERING GRAPHICS (BITS F110)

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CHAPTER- 5
ORTHOGRAPHIC PROJECTIONS

CHAPTER 5: ORTHOGRAPHIC PROJECTIONS

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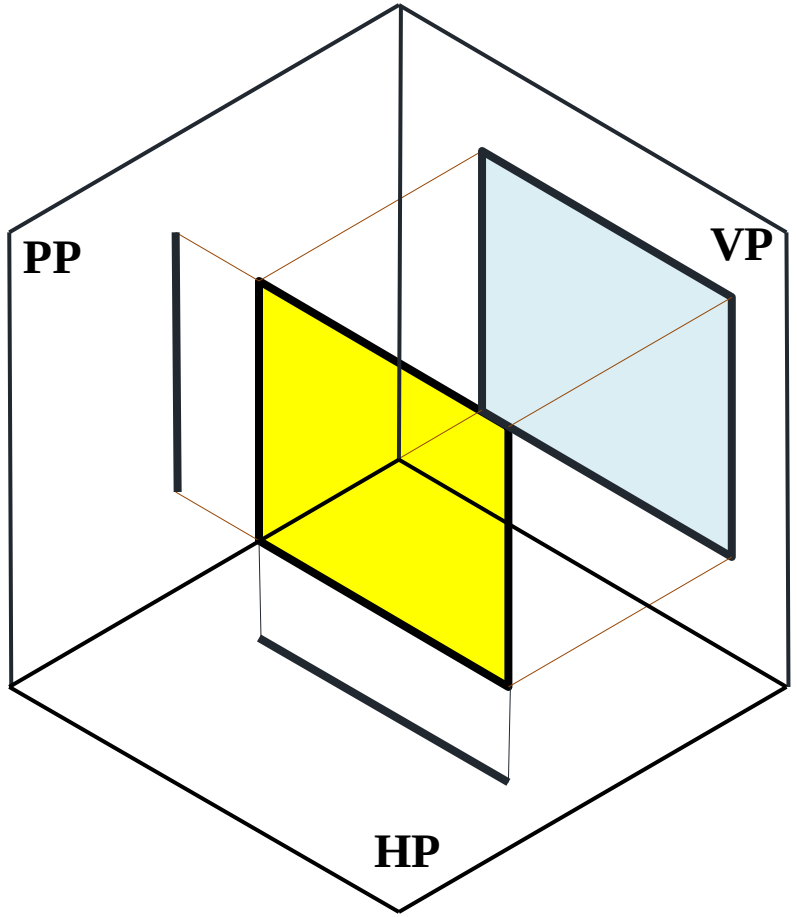
- Orthographic Projections is a technical drawing in which different views of an object are projected on different reference planes observing perpendicular to respective reference plane.
- Different Reference planes are;
  1. Horizontal Plane (HP)
  2. Vertical Plane (VP)
  3. Profile Plane (PP)
- Different views are;
  1. Front View (FV) – Projected on VP
  2. Top View (TV) – Projected on HP
  3. Side View (SV) – Projected on PP

Types of Surfaces

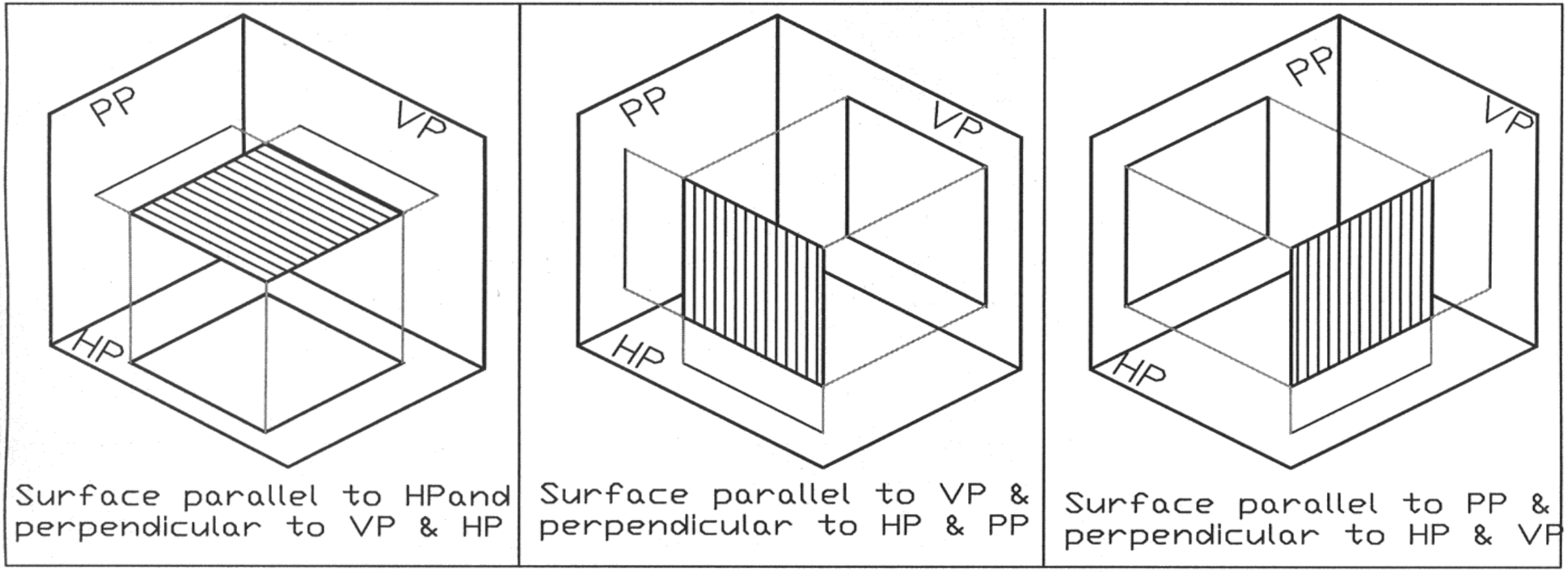
1. Principal surface
2. Inclined surface
3. Skew surface
4. Curved surface

Principal Surface

- The surface, which is parallel to one reference plane and perpendicular to other two, is referred as principal surface.
- It shows two line views and one area view as true area. Horizontal surfaces are always principal surfaces but not the vertical.

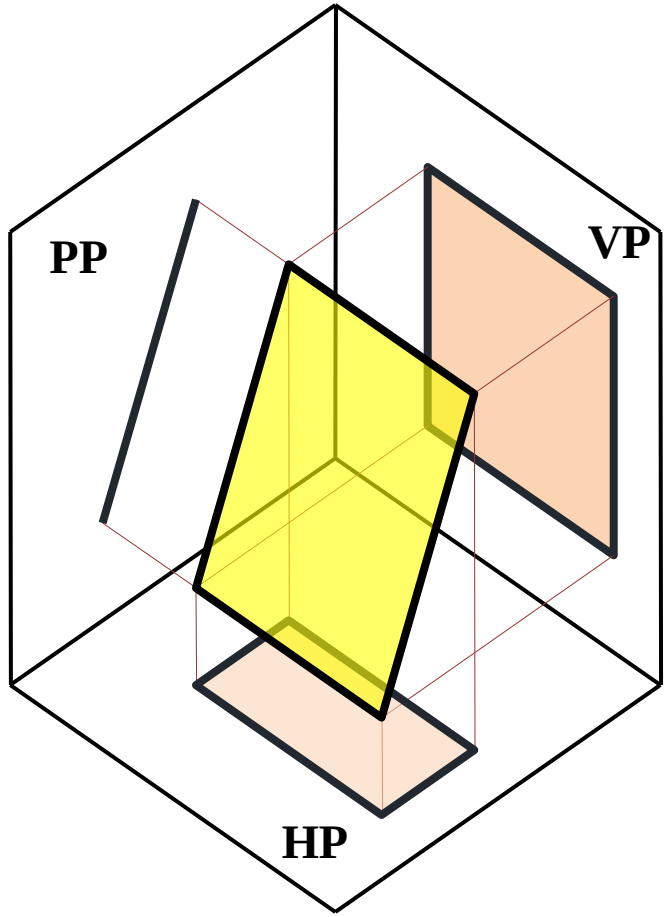


Principal Surface



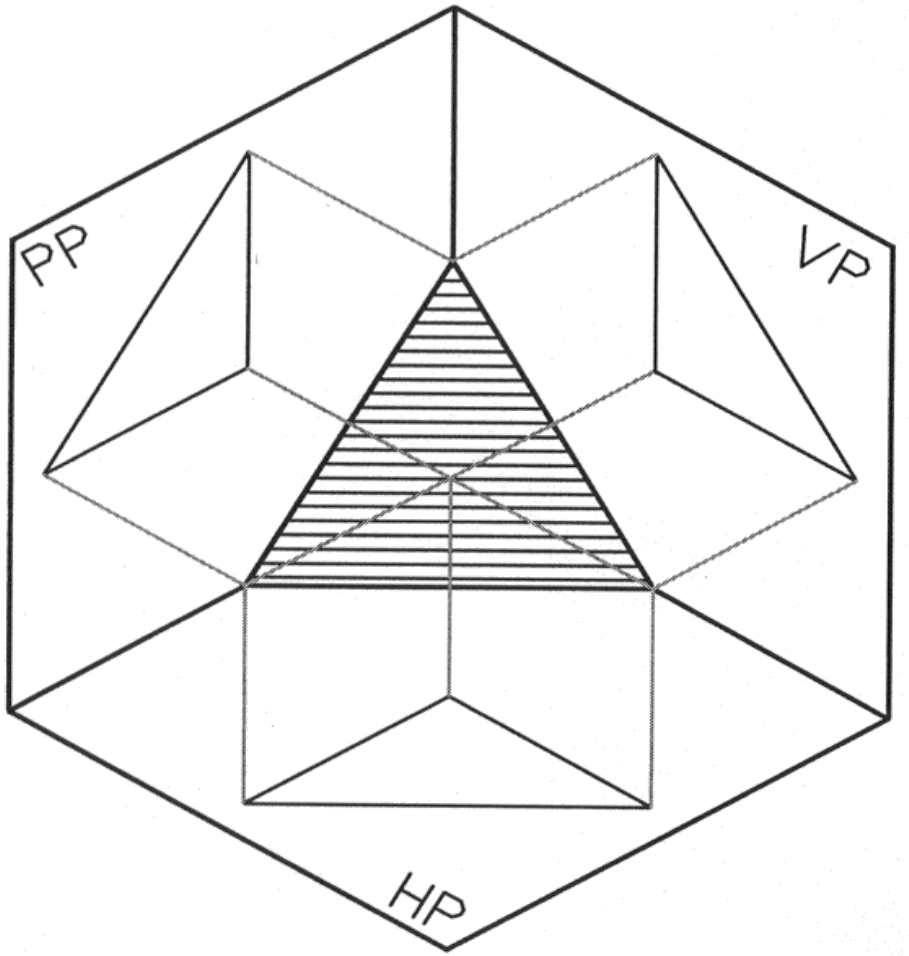
Inclined Surface

- The surface, which is inclined to two reference planes and perpendicular to other, is referred as an inclined (or slant) surface.
- It shows one line view and two area-views with apparent size as shown in Figure. In this type of surface, in general, at least one edge of the surface is along/ parallel the principal axis.



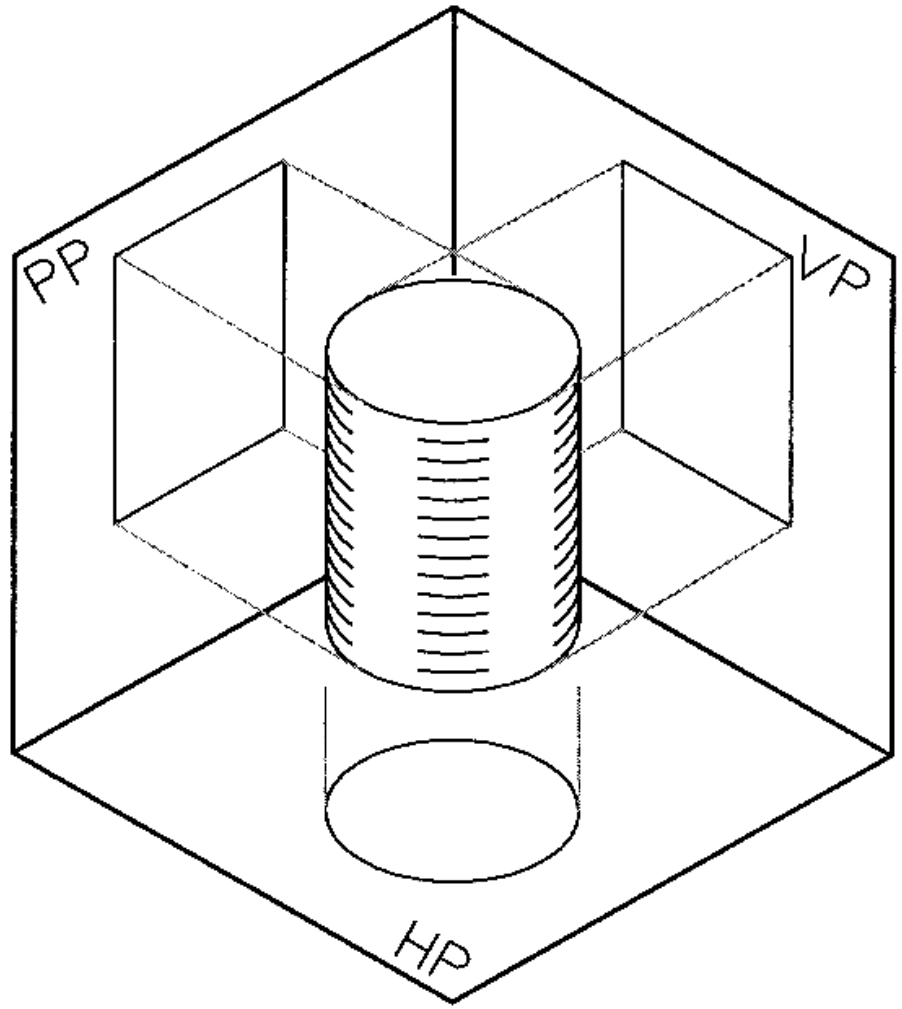
Skew Surface

- The surface, which is inclined to all three principal planes (HP, VP and PP), is referred as a skew (or oblique) surface. It shows 3 area-views with apparent size as shown in Figure.
- In this type of surface, none of the edge of the surface is along/ parallel the principal axis.

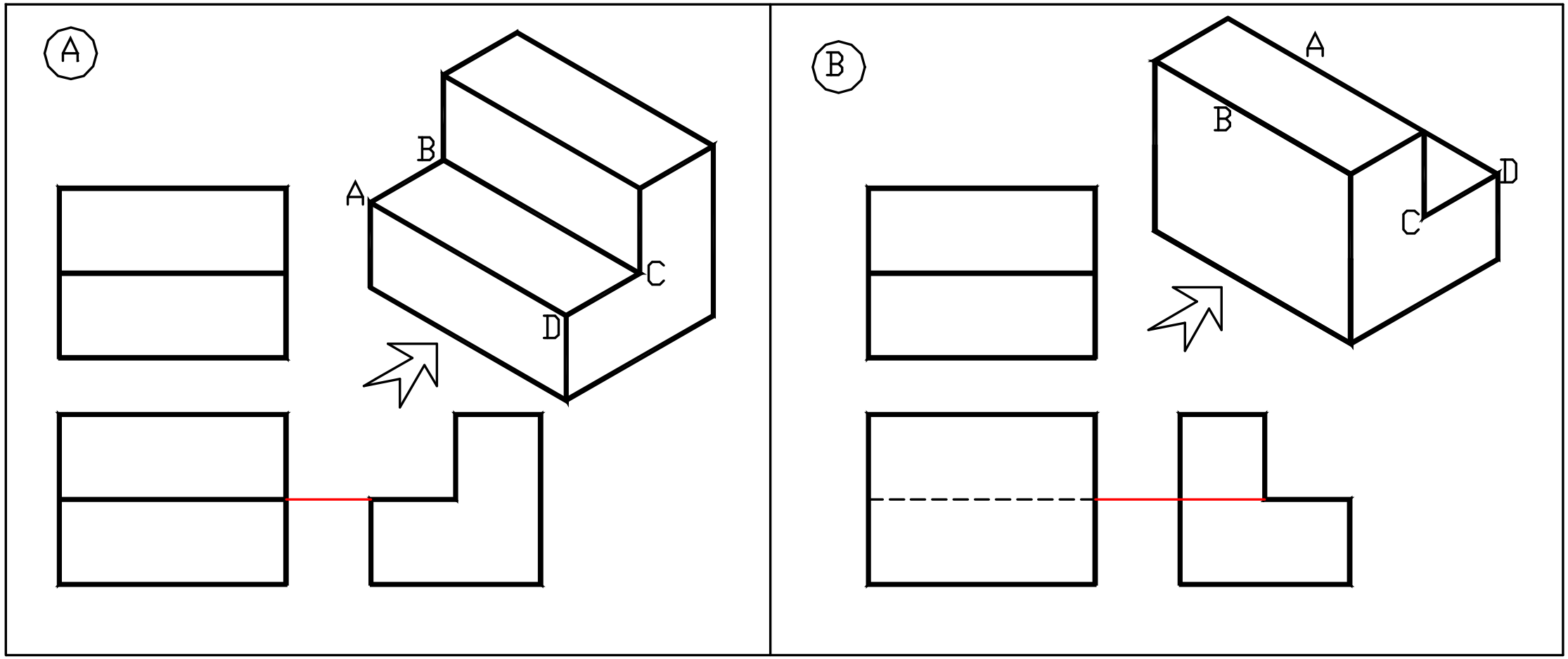


Curved Surfaces

- The surface, which has constant radius such as arc or circle, is referred as curved (or rounded surface).
- In this type of surface, the last visible part of the curved surface falls in line view.



Concept of invisible (hidden) line



Representation of Curve Surfaces

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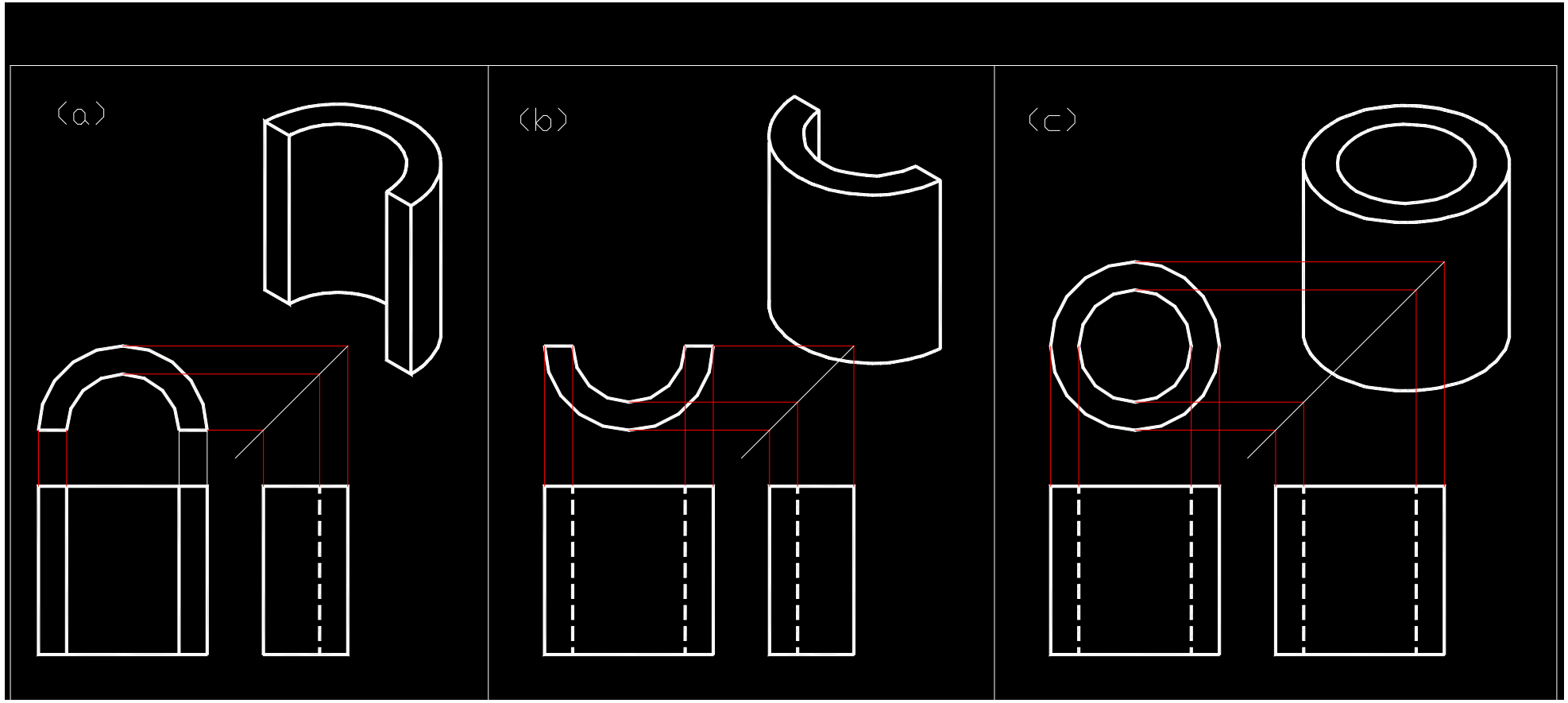
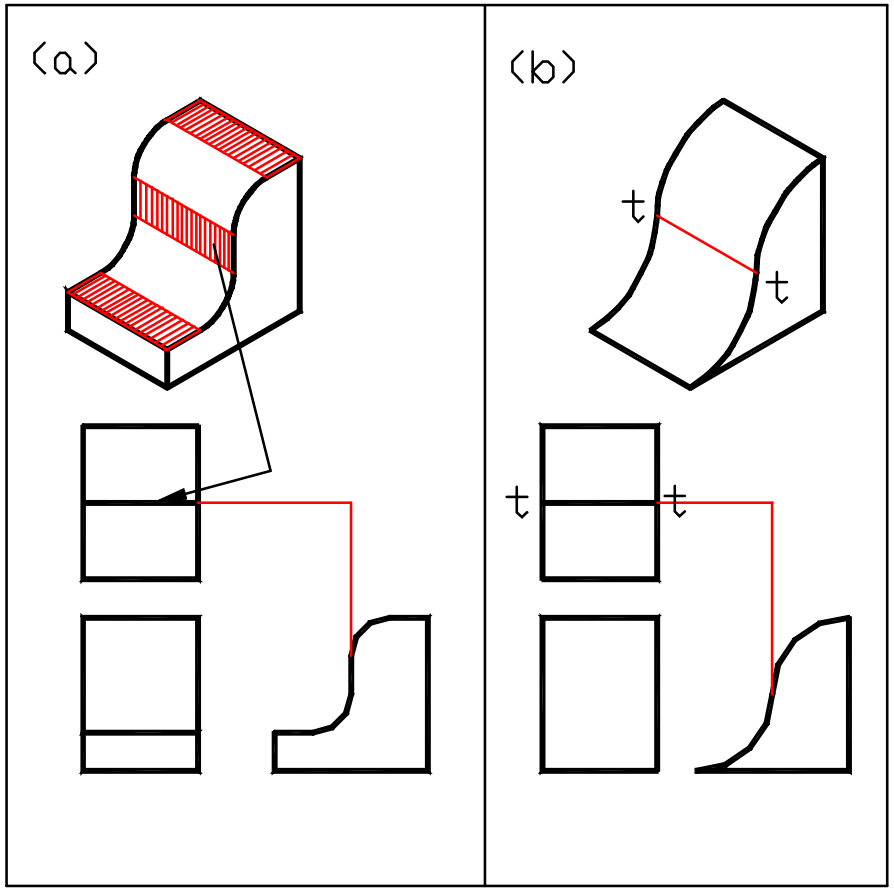
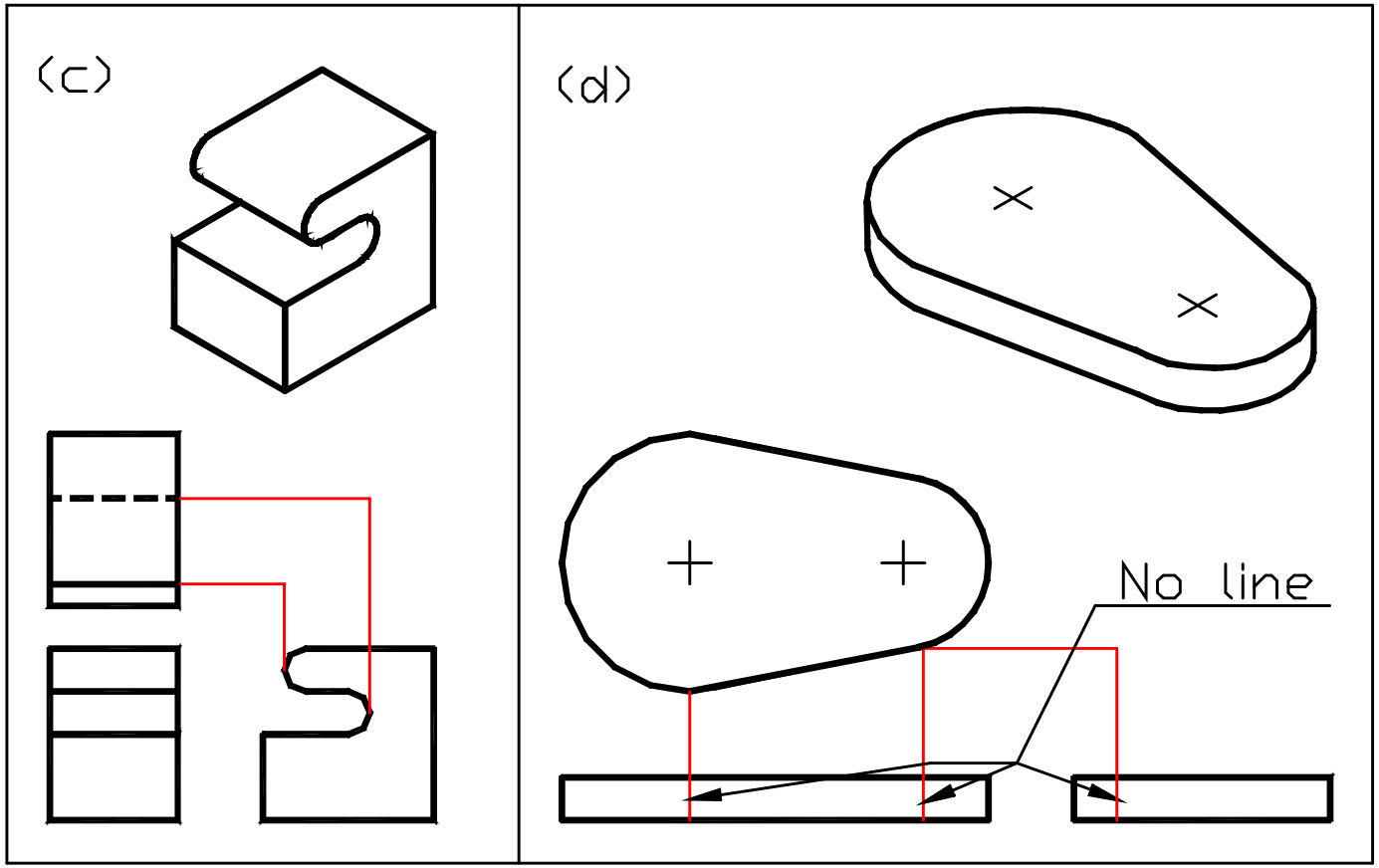
Last visible part of curved surface falls into line view



Representation of Curve Surfaces





Interpretation of Object

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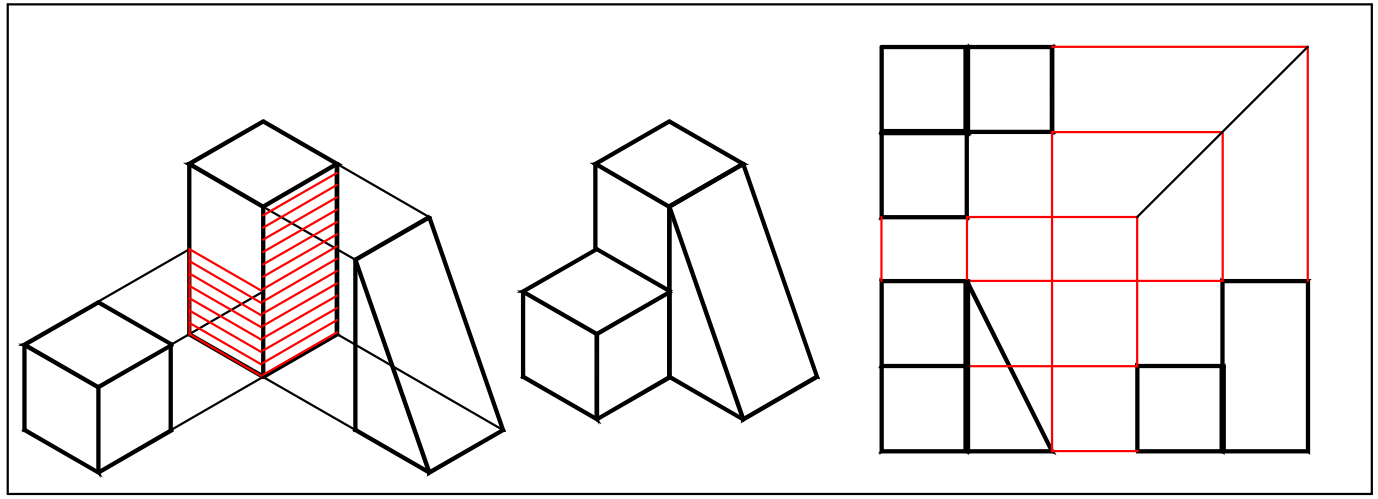
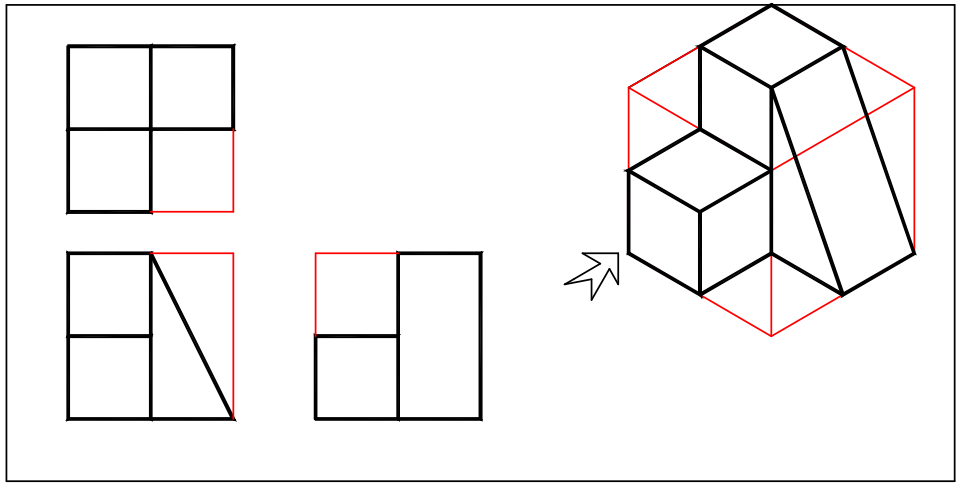
Object as an Assembly



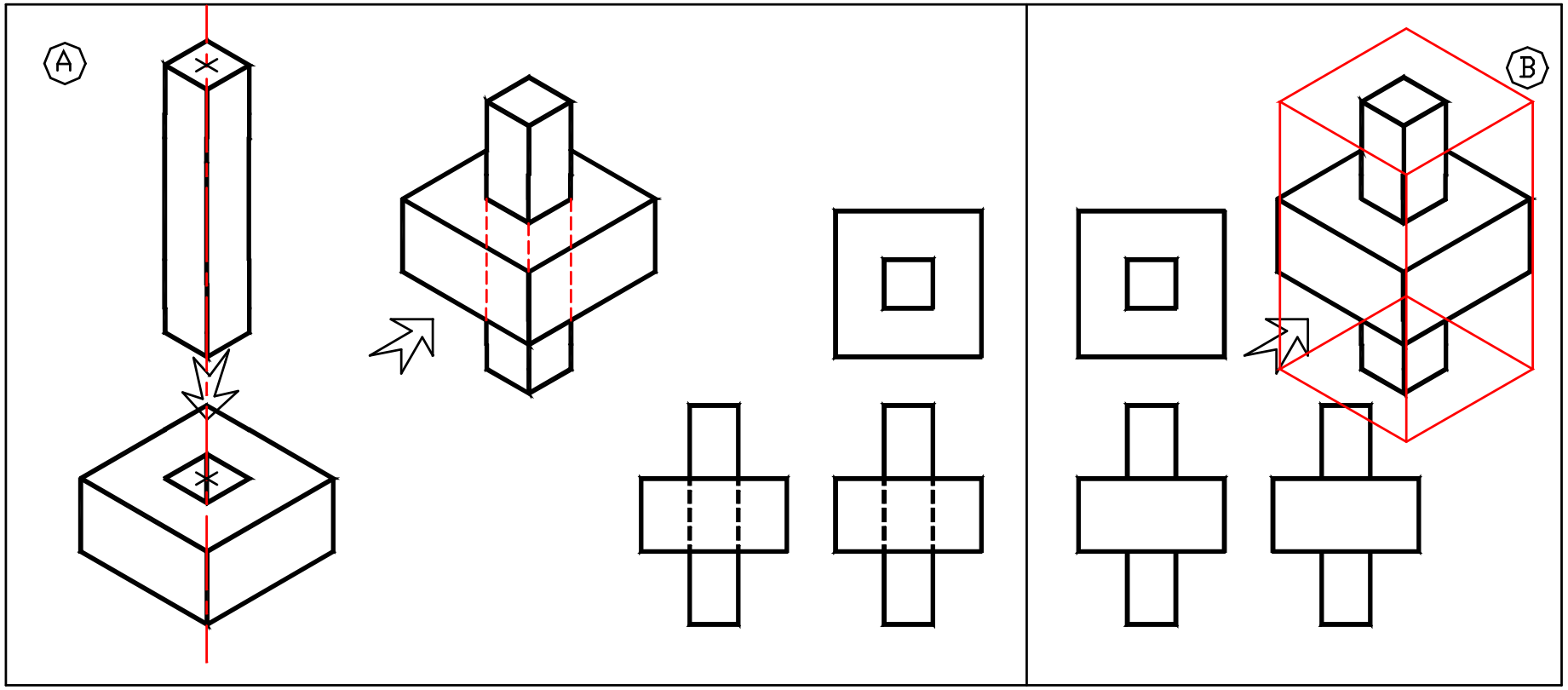
Object as a Single Piece



Interpretation of Object

A. Object is an Assembly

B. Object is a single piece



Interpretation of Object

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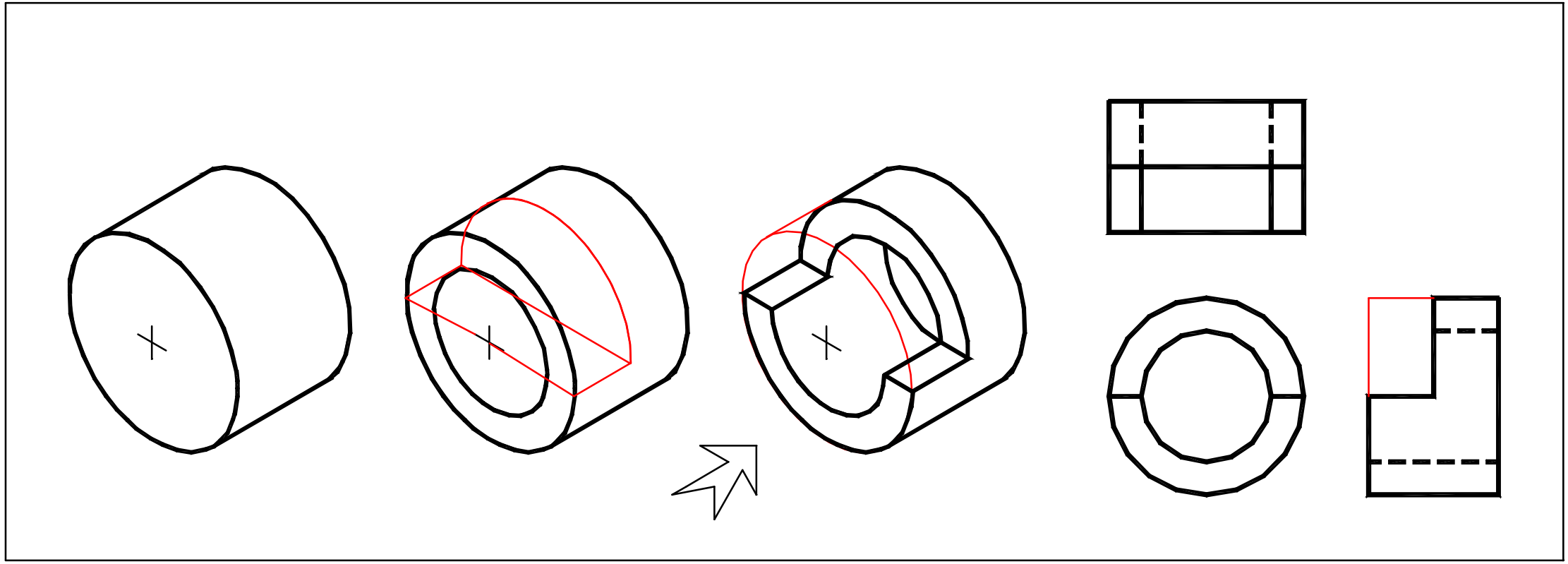
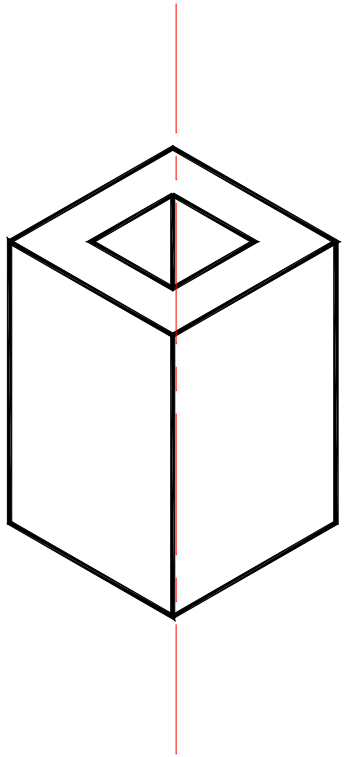
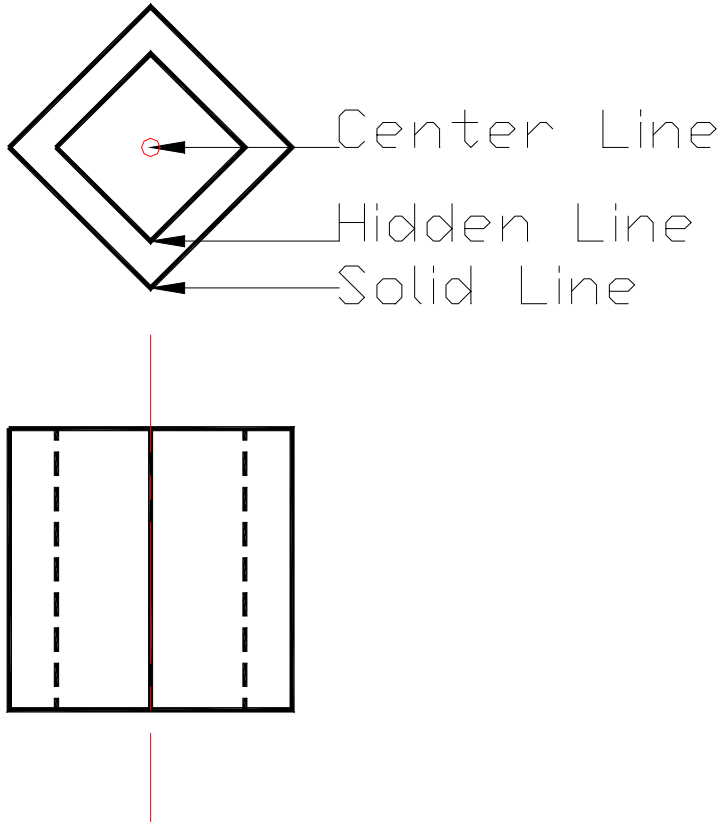
Object is a single piece



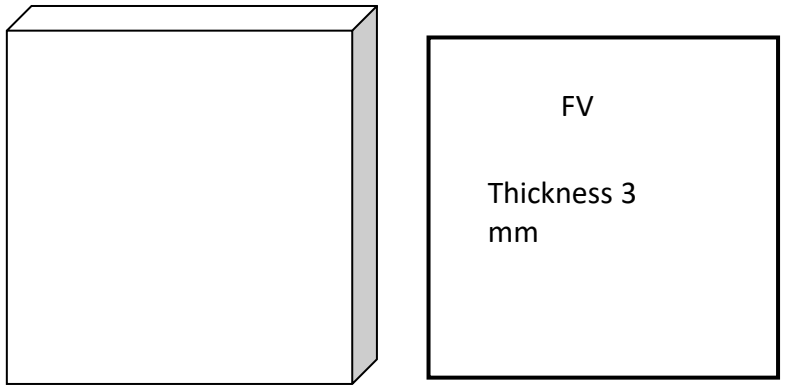
Precedence of lines

- Continuous line over hidden
- Hidden line over centerline

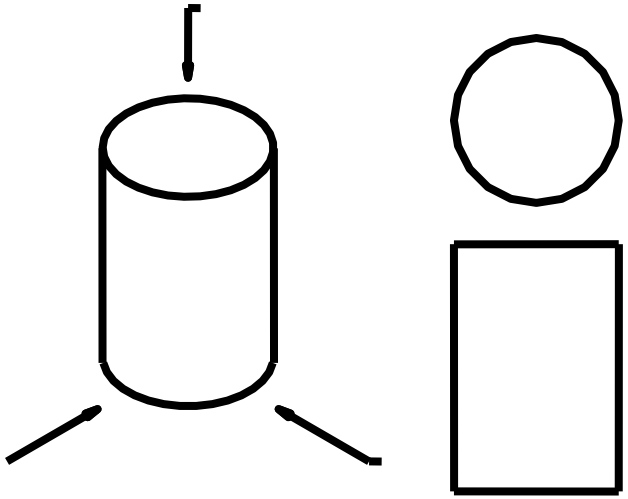




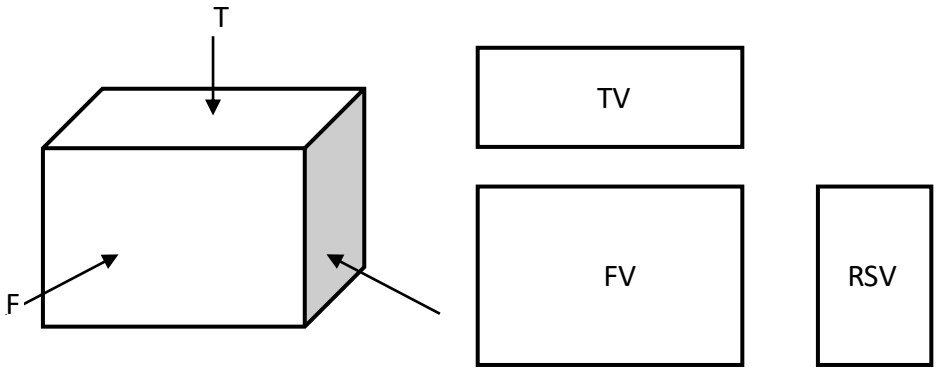
Types of Drawing



Single View Drawing



Two View Drawing



Three View Drawing

Steps to Draw Orthographic Views

Box Method (For flat surfaces only)

1. Find the maximum length (L), maximum depth (D) and maximum height (H) from a given pictorial view.
2. Accommodate a given object in a box of *L* x *D* x *H* with any colour on AutoCAD screen.
3. The surfaces of this box serve the purpose of principal planes.
4. Start drawing from a view which shows more details.
5. While drawing any view, the principal surfaces (which show true area) should be drawn first.

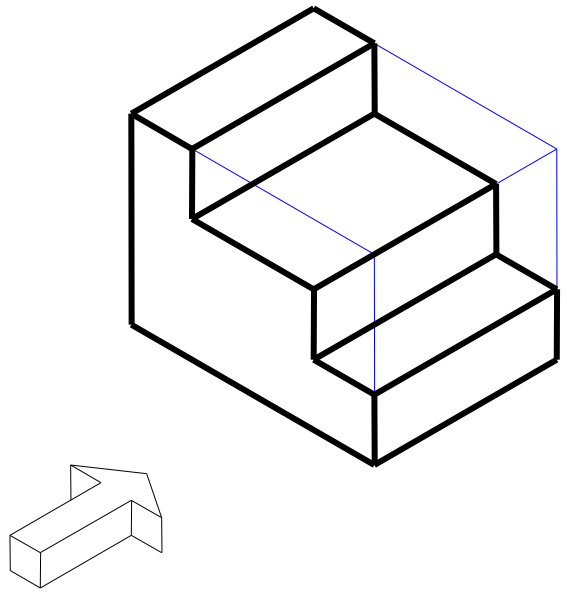
Steps to Draw Orthographic Views

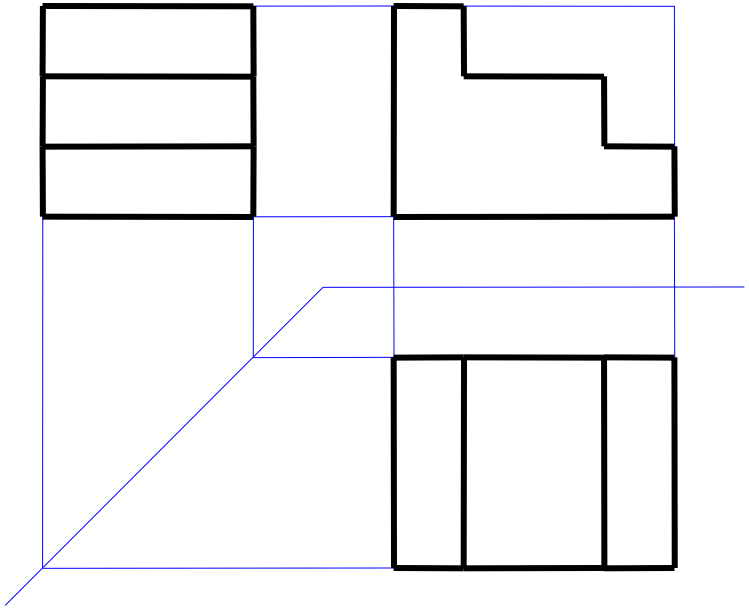
Box Method (For flat surfaces only)

6. The inclined and skew surfaces cannot be drawn directly.
7. Locate the corners of non-principal surfaces and complete those surfaces by connecting the appropriate points.
8. Satisfy all visible surfaces in all three views.
9. Check for the hidden lines if any.

Orthographic Projections

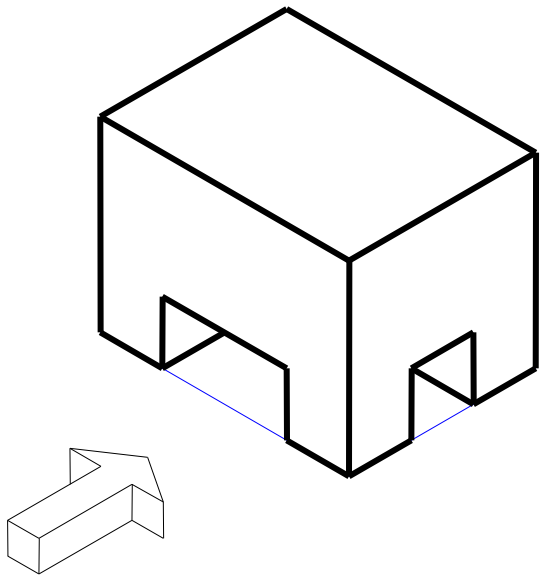
Examples (Solved in I angle method of projection)

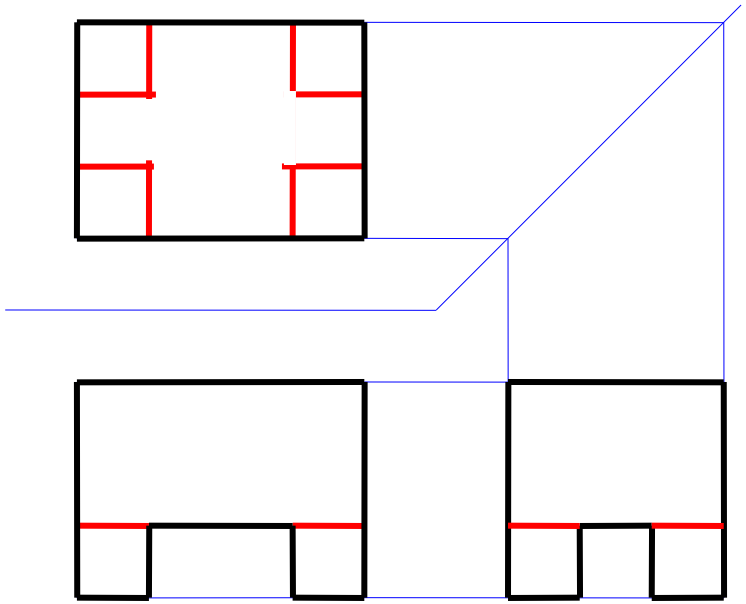




Orthographic Projections

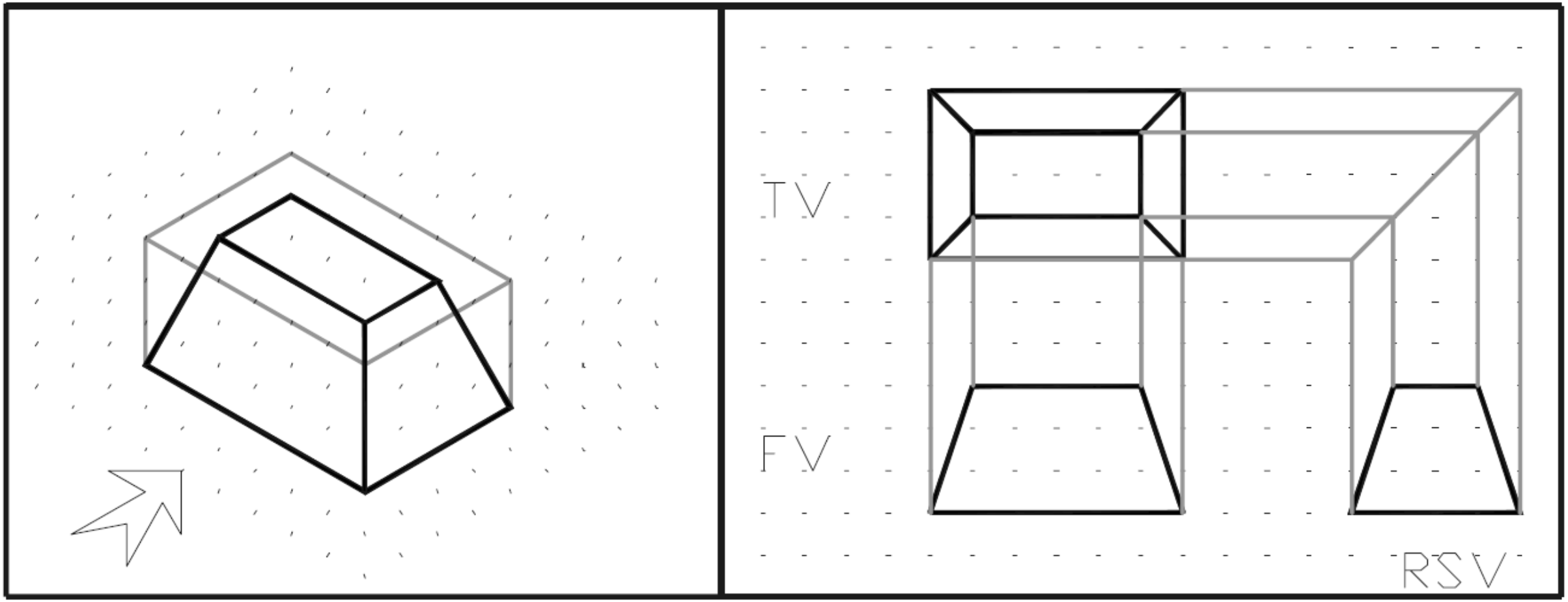
Examples (Solved in III angle method of projection)





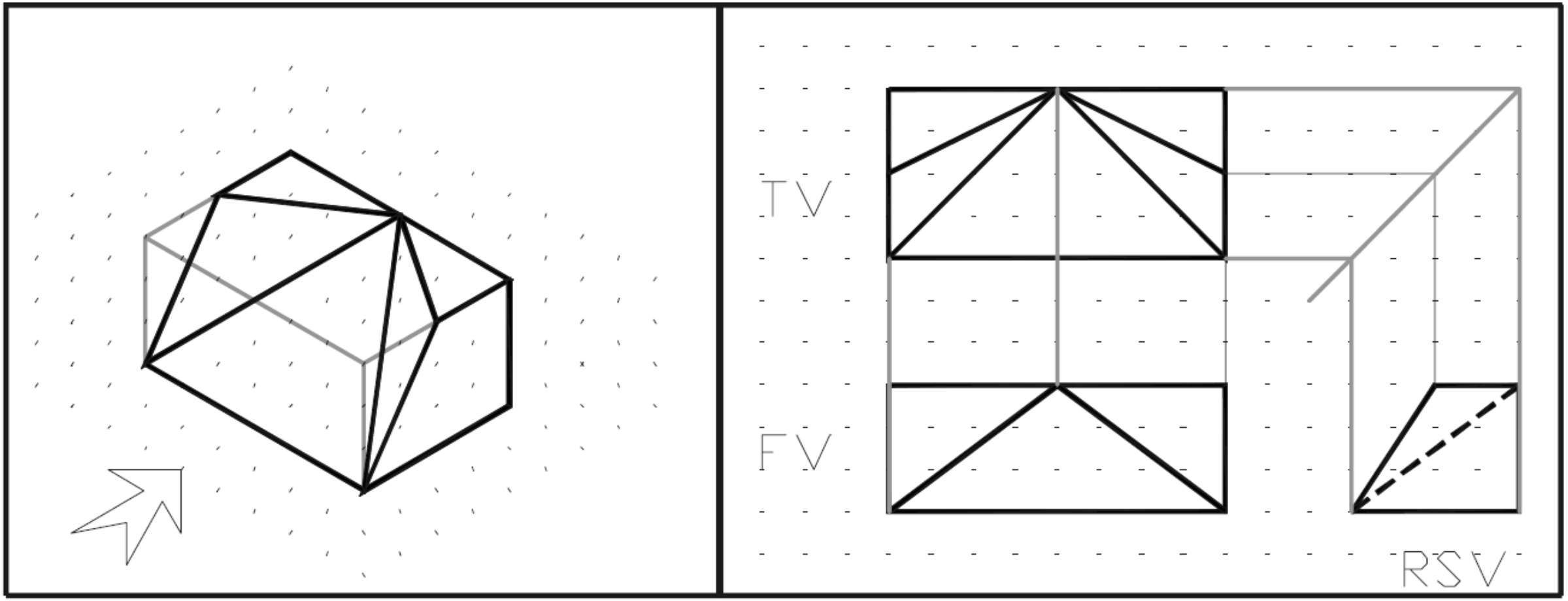
Orthographic Projections

Examples (Solved in III angle method of projection)



Orthographic Projections

Examples (Solved in III angle method of projection)



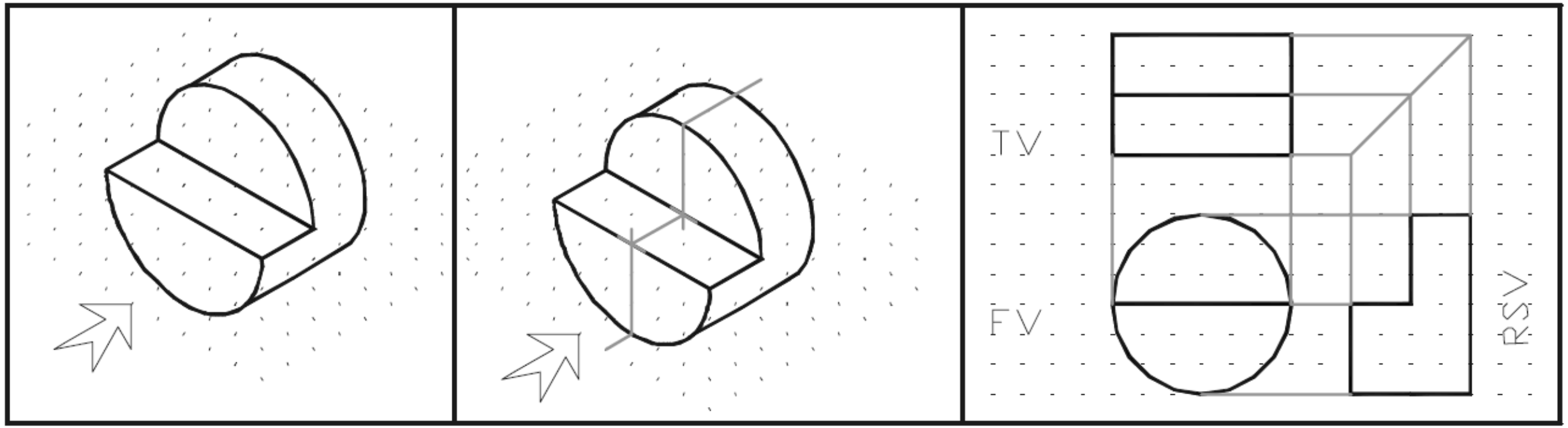
Steps to Draw Orthographic Views

Centre Line Method (for curve & flat surfaces)

1. Locate the centers of the curved parts.
2. Join the centers by a thin centerline, which is referred here as a centerline.
3. This centerline serves the purpose to find maximum length (L), maximum depth (D) and maximum height (H) from the pictorial view. While finding these dimensions move along the centerline and grid-lines perpendicular to centerline.
4. Draw that view first in which circles or curves appears. With circles it becomes easy to draw other views.
5. Repeat the steps 5 to 9 mentioned in box method.

Orthographic Projections

Examples (Solved in III angle method of projection)



Thank You!