

Bangladesh University of Engineering and Technology

ME 174 (CSE):

MECHANICAL ENGINEERING DRAWING AND CAD

Course Teachers:

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Course Outcomes

At the end of the course, the students will be able to:

1. Understand the theory of projection. To improve the visualization skills.
2. Know and understand the conventions and the methods of engineering drawing.
3. Identify the orthographic views of a given 3D objects precisely.
4. Predict the isometric view of an object from the given orthographic views correctly.
5. Sketch sectional views of an object if needed.
6. Sketch orthographic and sectional views using AutoCAD

Reference Books

The most common book to follow:

Mechanical Engineering Drawing

-Dr. Amalesh Chandra Mandal

-Dr. Md. Quamrul Islam

You may also look for resources online.

Lecture Plan

Lecture 1: Introduction: Basic Drawing Practice

Lecture 2: Orthogonal views of simple block with circular holes

Lecture 3: Orthogonal views with fillets and rounds

Lecture 4: Sectional views

Lecture 5: Isometric views

Lecture 6: Isometric views with circular holes

Lecture 7 onwards: Mechanical Drawing using CAD

Mark Distribution

- Total mark will be distributed tentatively as follows:

Attendance 10%

Class Performance 30%

Viva 10%

Midterm Quiz 25%

Final Quiz (CAD) ____25%

Total 100%

Students are given a task to draw in every class and it is evaluated and returned back in the next class. Preserve the drawing sheets as you will have to submit them before quiz. The best six marks from all the class-works will be counted.

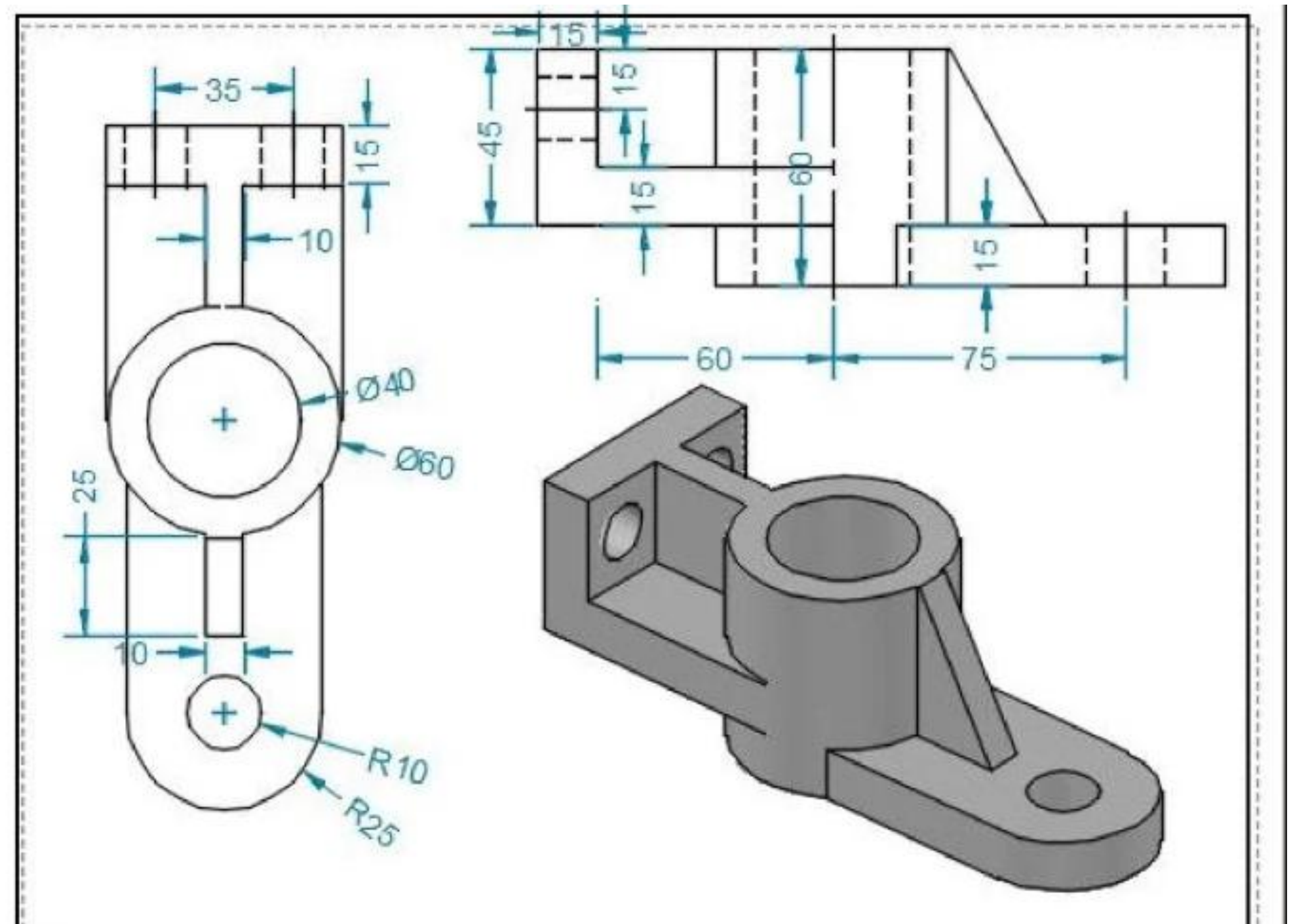
The viva or oral exam will be taken during any of the classes. The date will be announced later.

Application

Try to describe the object above to another person who has not seen it and see if he/she understands or not. You can easily realize that words are inadequate to describe the object completely.

To build or manufacture any object, its complete information has to be provided to the manufacturer.

Mechanical drawing of an object provides complete information of it.



Principal Views

The views from different angles are different.

Front View

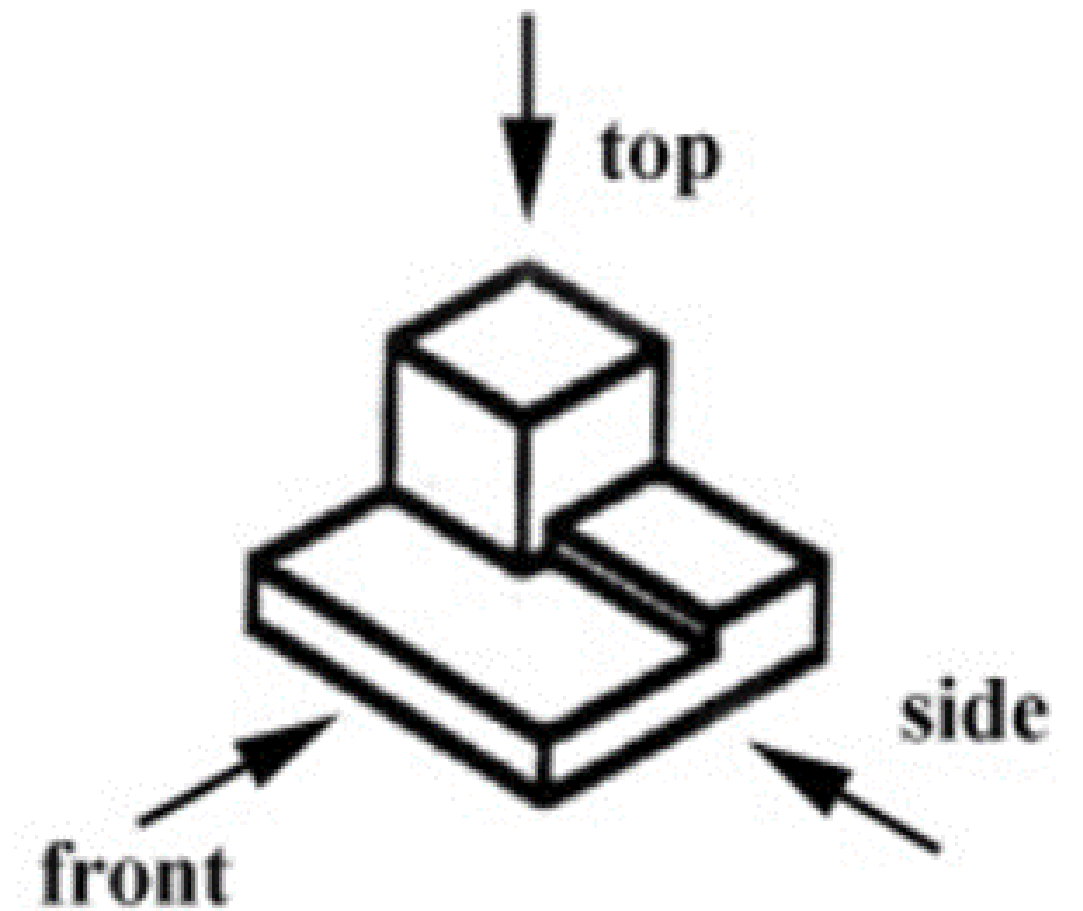
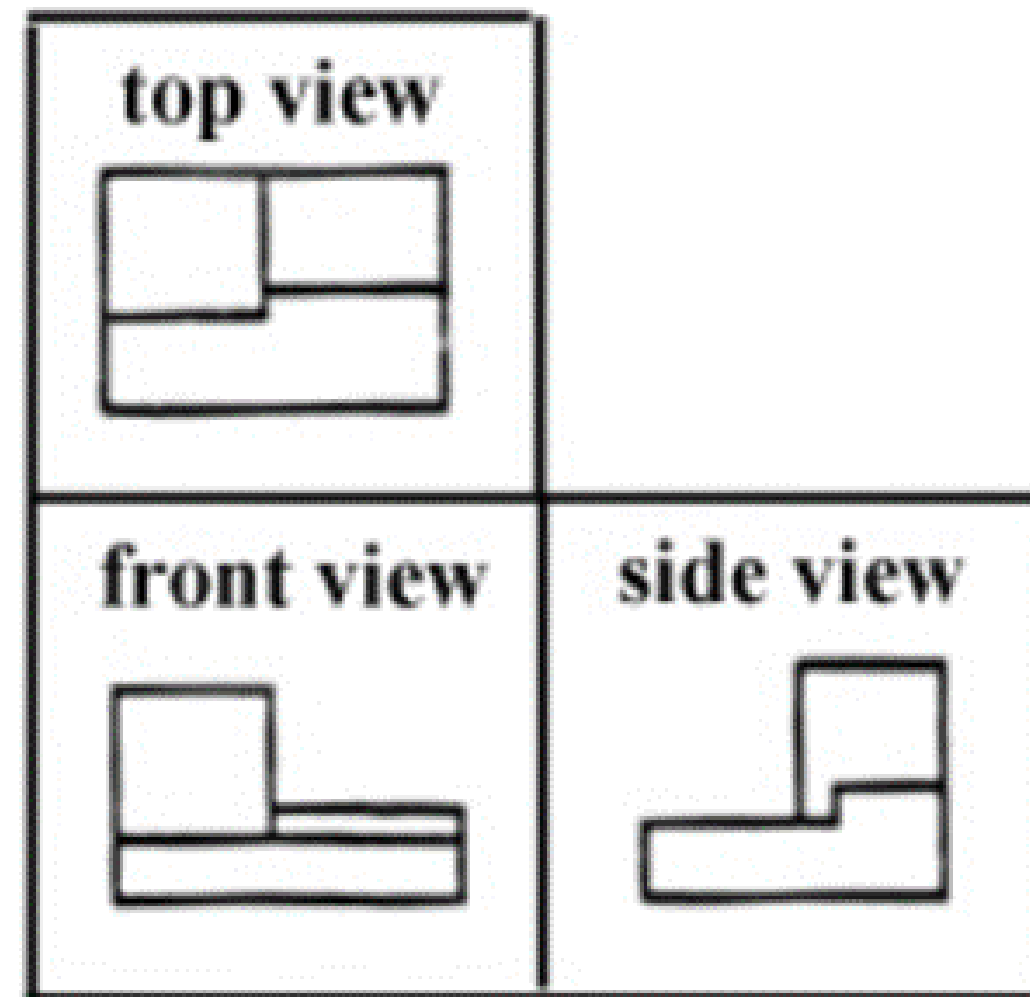
Top View

Right Side View

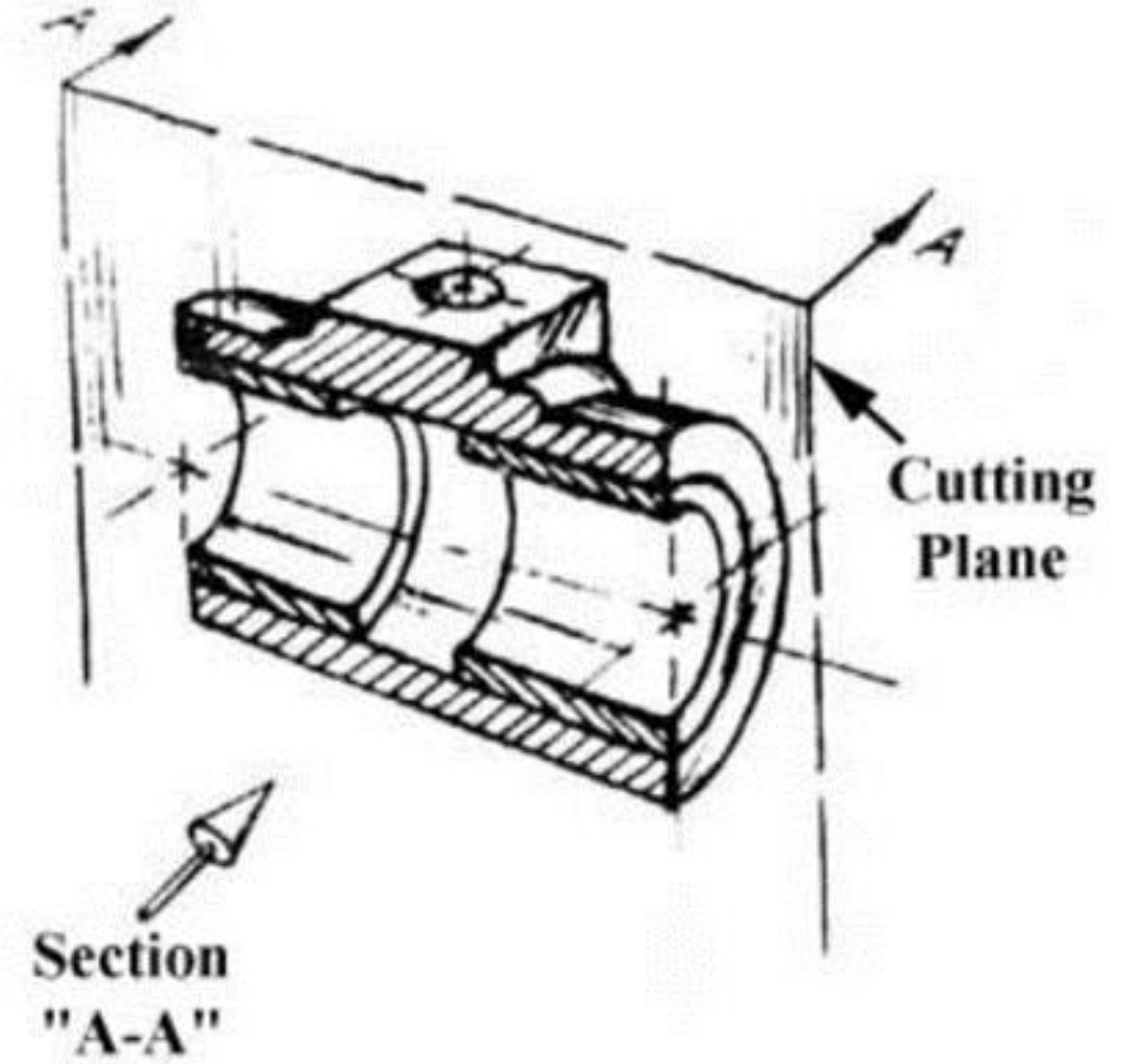
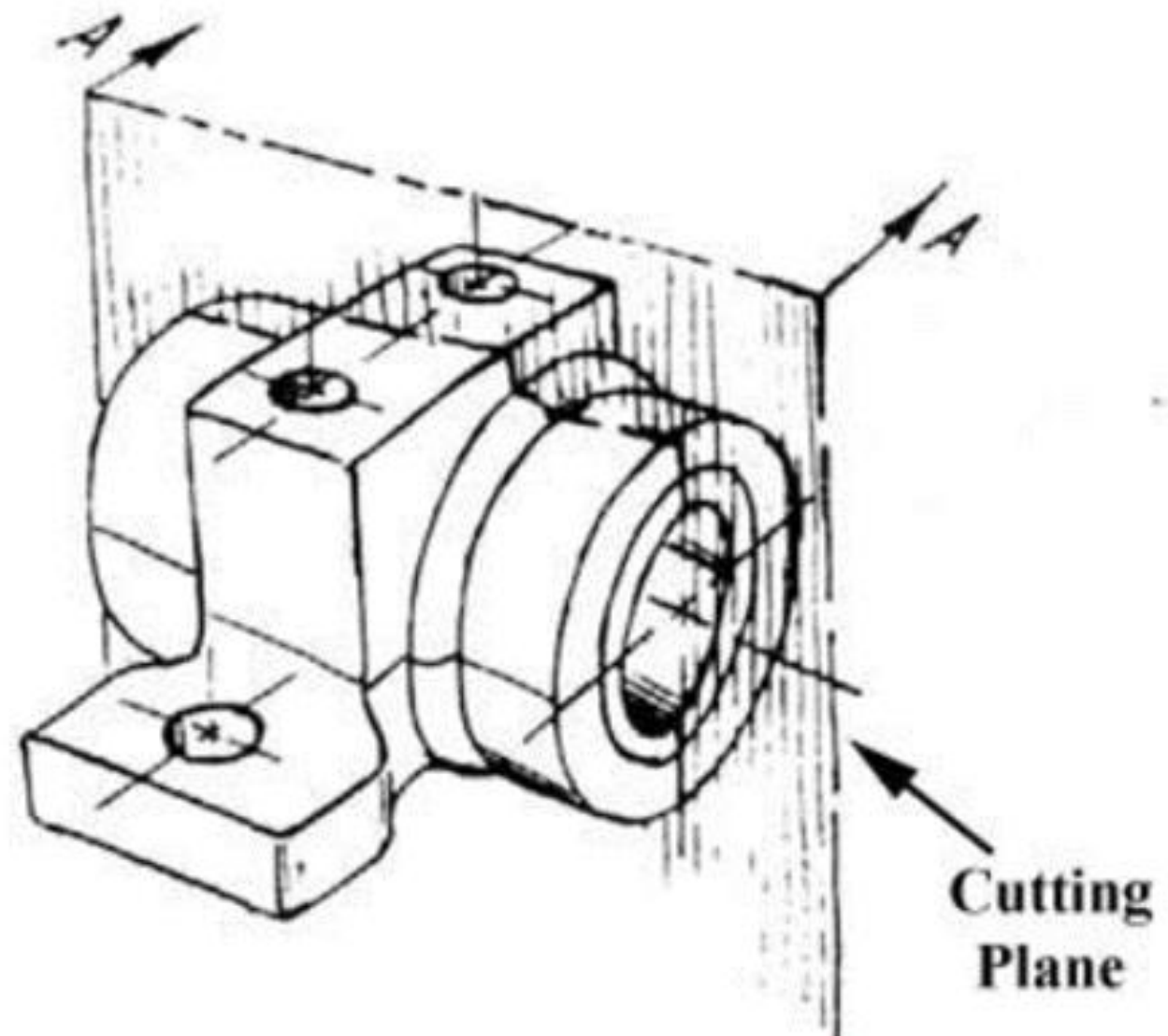
Left Side View

Rear View

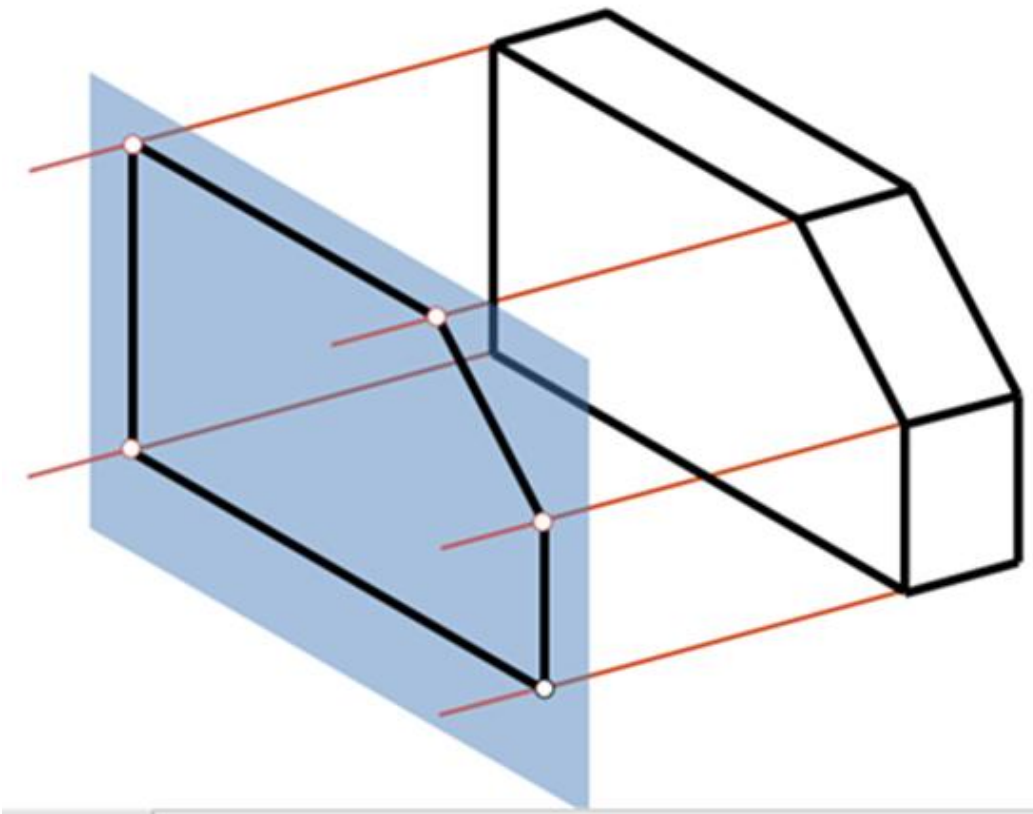
Bottom View



Sectional View

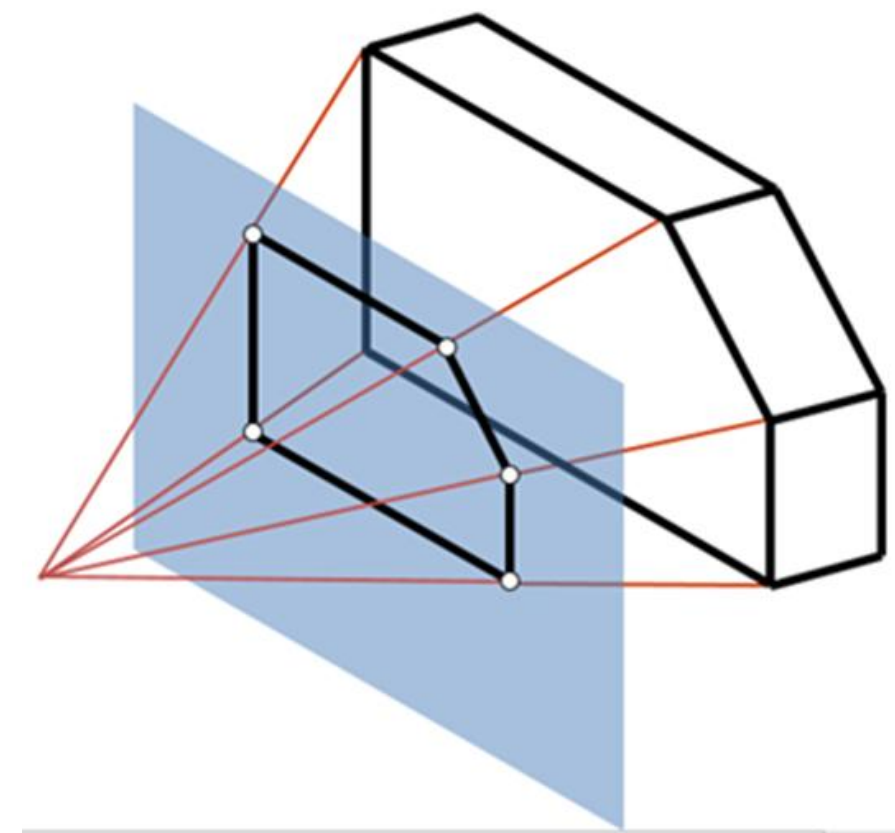


Parallel Projection and Perspective Projection



Parallel Projection:

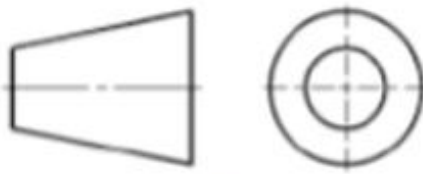

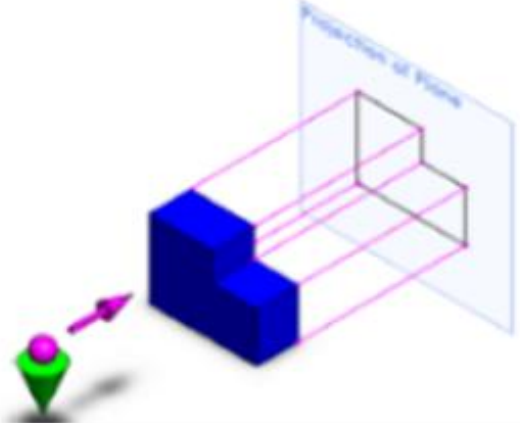
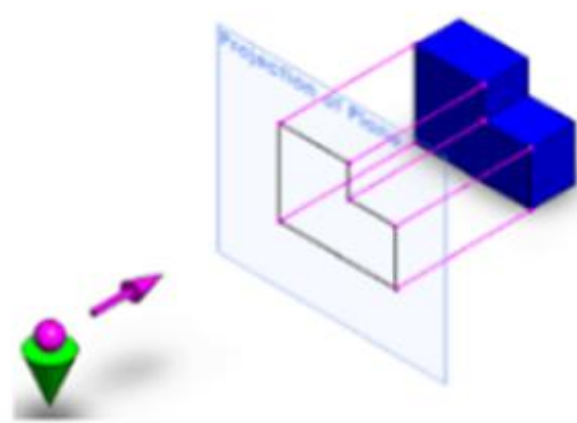
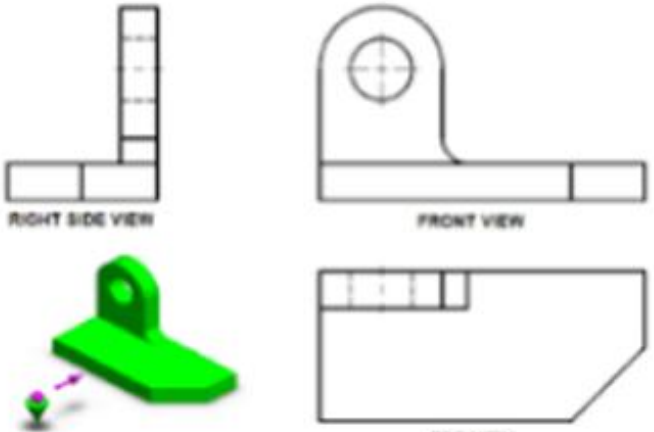
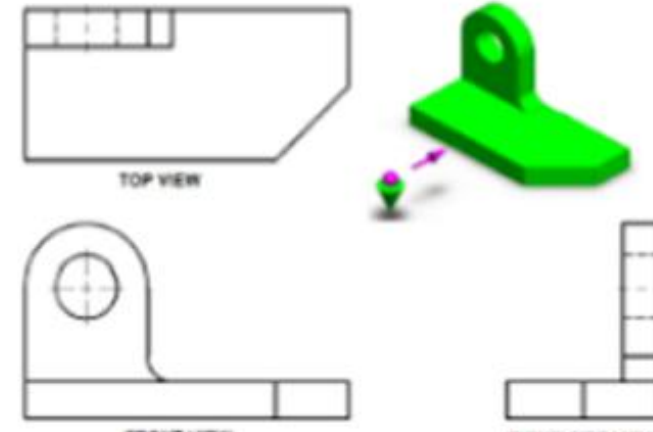
1. The lines of sight are parallel
2. Parallel lines remain parallel
3. Good for exact measurement
4. Less realistic looking.

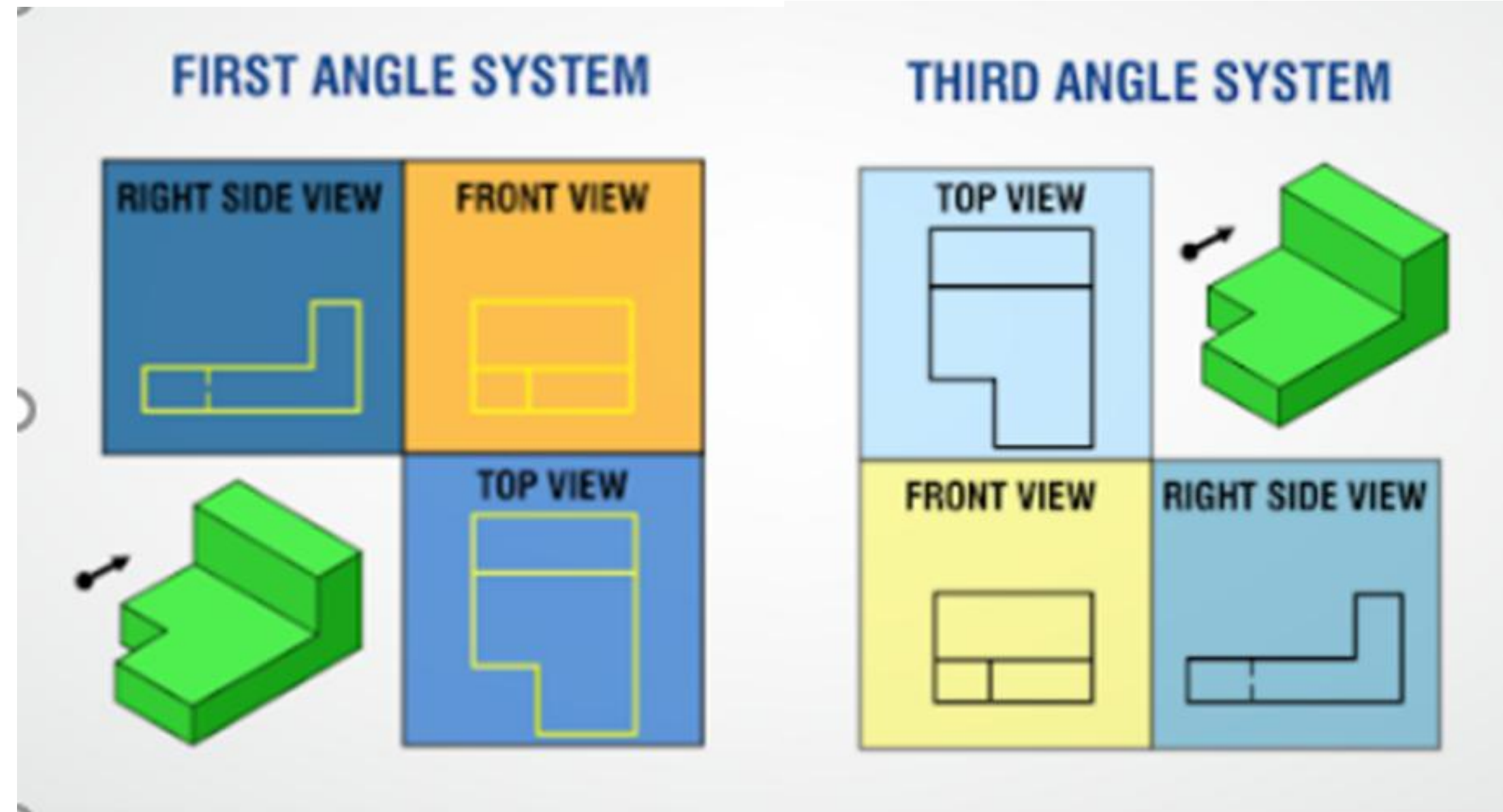


Perspective Projection:

1. The lines of sight converge to one (or more) point(s).
2. Size varies inversely with distance.
So, looks more realistic.
3. Parallel lines do not remain parallel.

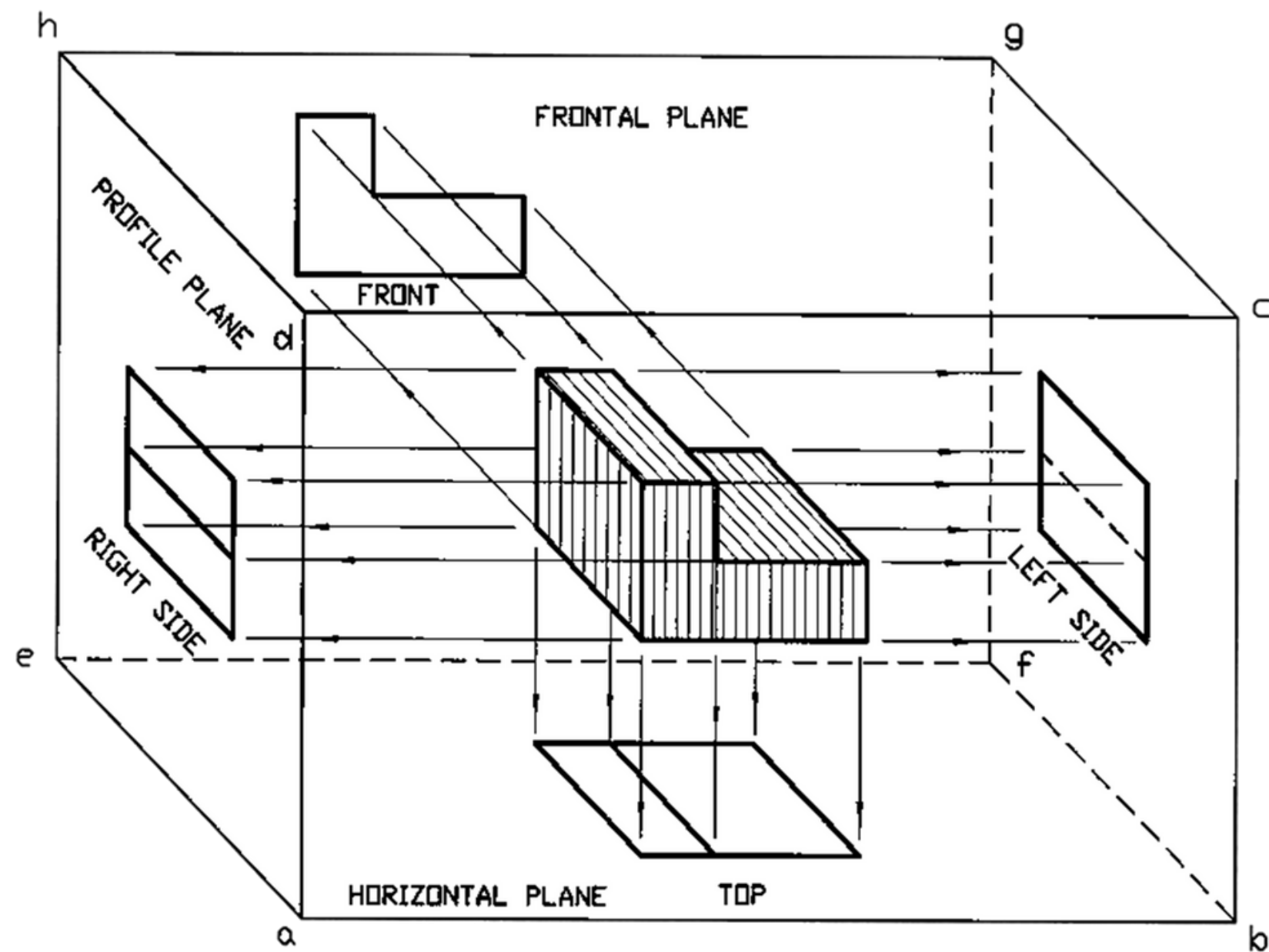
First Angle vs Third Angle Projection

First Angle Projection	Third Angle Projection
The object is imagined to be in first quadrant.	The object is imagined to be in third quadrant.
The object lies between the observer and plane of projection.	The plane of projection lies between the observer and object.
The plane of projection is assumed to be non transparent.	The plane of projection is assumed to be transparent.
When views are drawn in their relative position Top view comes below Front view, Right side view drawn to the left side of elevation.	When views are drawn in their relative position Top view comes above Front view, Right side view drawn to the right side of elevation.
 <p>SYMBOL</p>	 <p>SYMBOL</p>
	
	



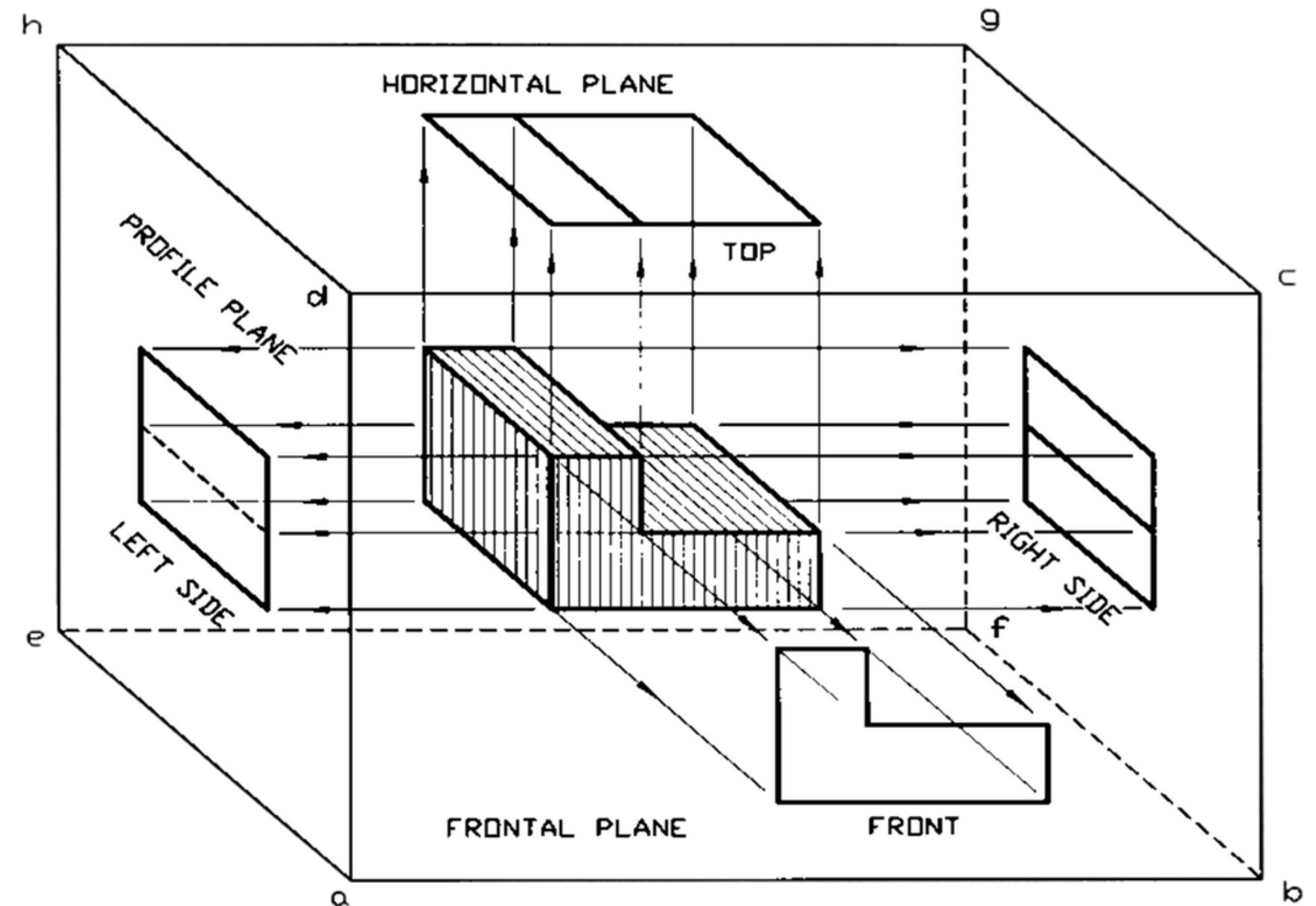
First Angle Projection

The object is placed between the observer and the plane of projection. i.e. between you and the drawing plane. Each face of the box contains the view that satisfies the above condition.

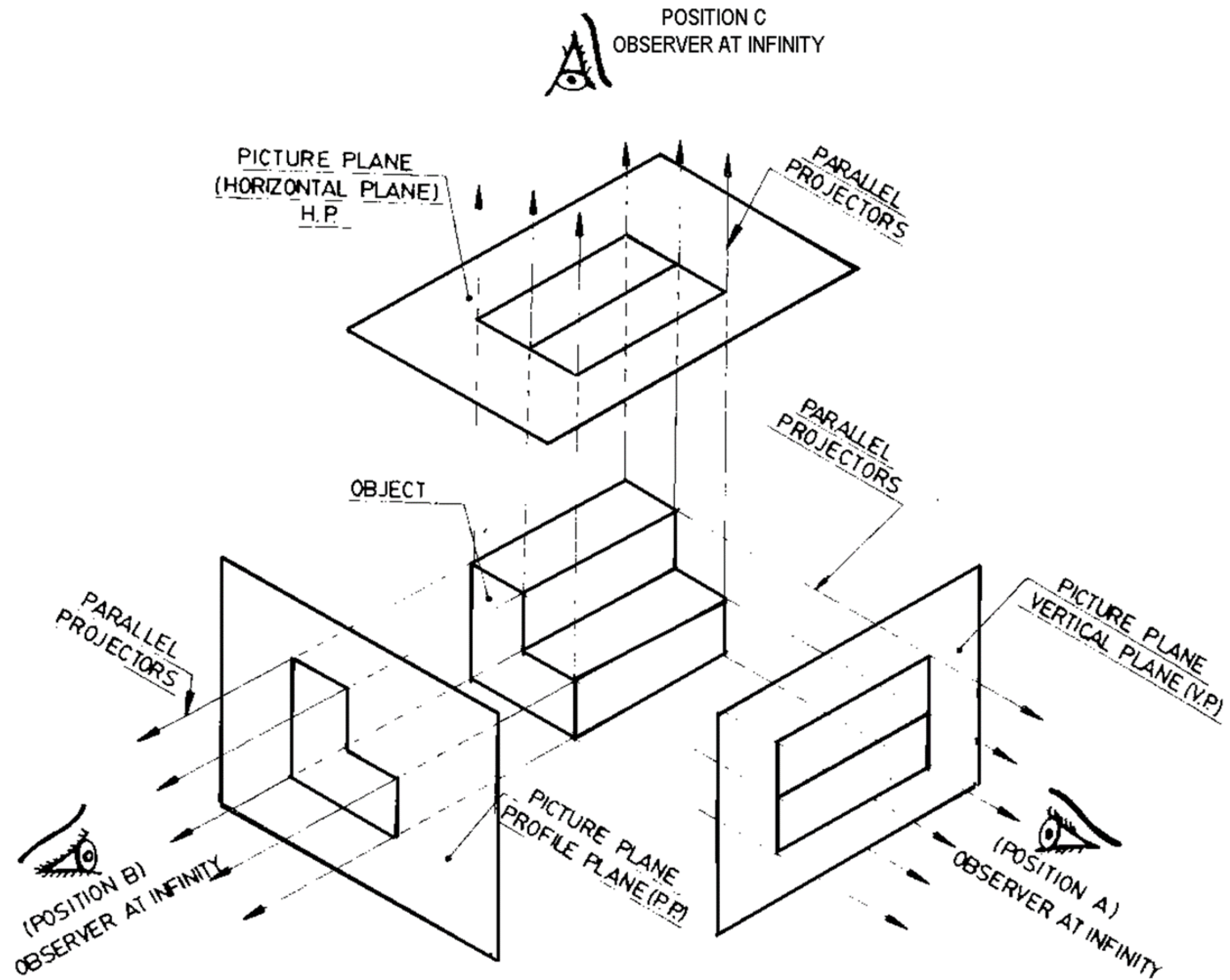


Third Angle Projection

The plane of projection i.e. the art paper is placed between the observer and the object. Each plane of the box contains the view that satisfies the above condition.



Basics of Orthographic Views



Lines



Thickness: 100%

Object Line



Dashes are 3 mm, gaps are 1 mm. **Thickness: 50%.**

Hidden Line



Short dashes are 3 mm, long dashes are 19-38 mm, gaps are 1 mm.

Thickness: 50%.

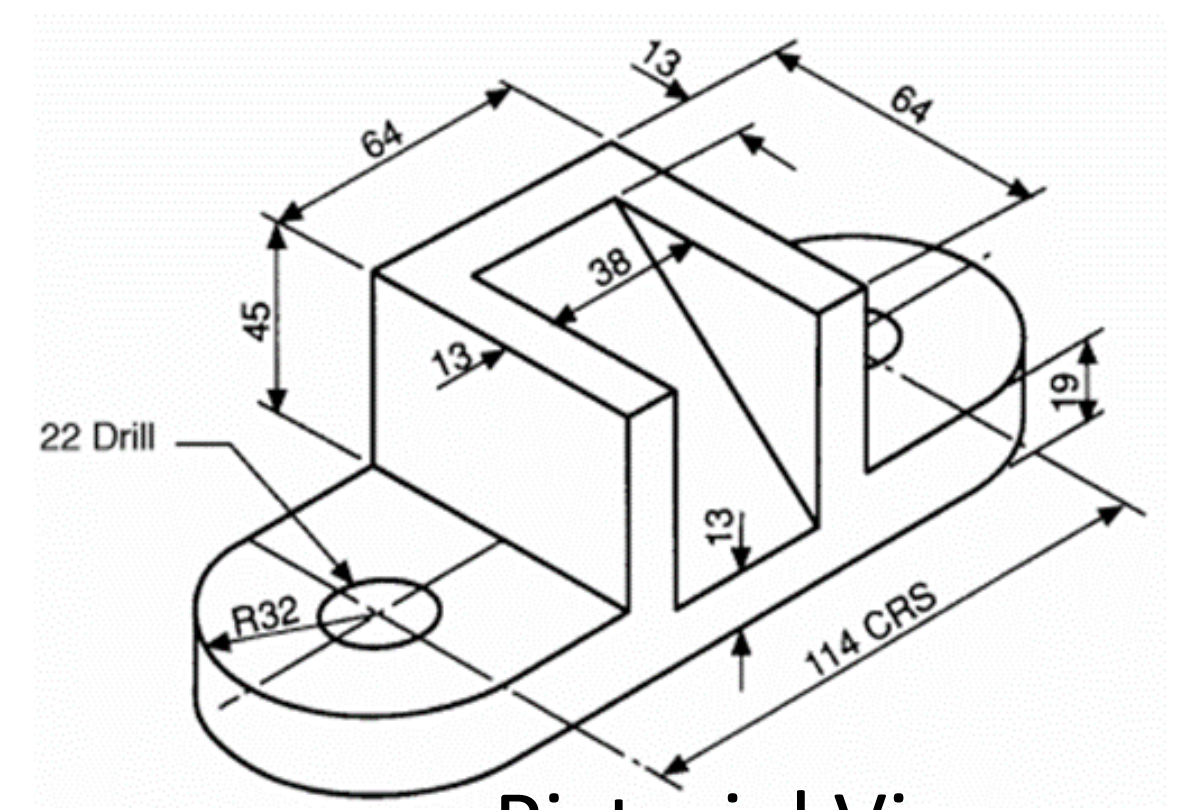
Center Line



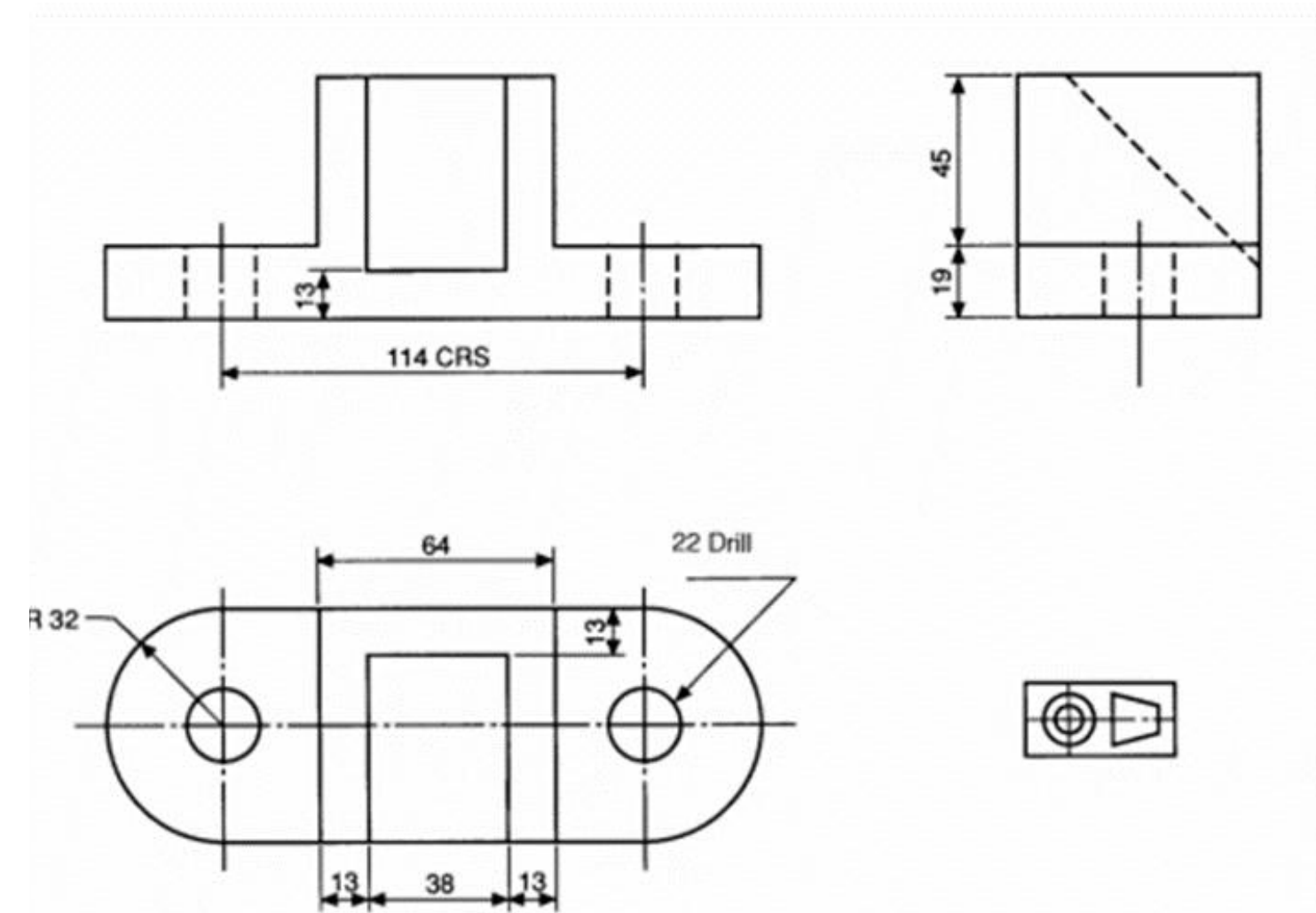
**Section Line or
Cutting Plane Line**

Short dashes are 3 mm, long dashes are 19-38 mm, gaps are 1 mm. **Thickness: 125%.**

Apart from these lines, there are hatchet,
extension and dimension lines with 25%
thickness.

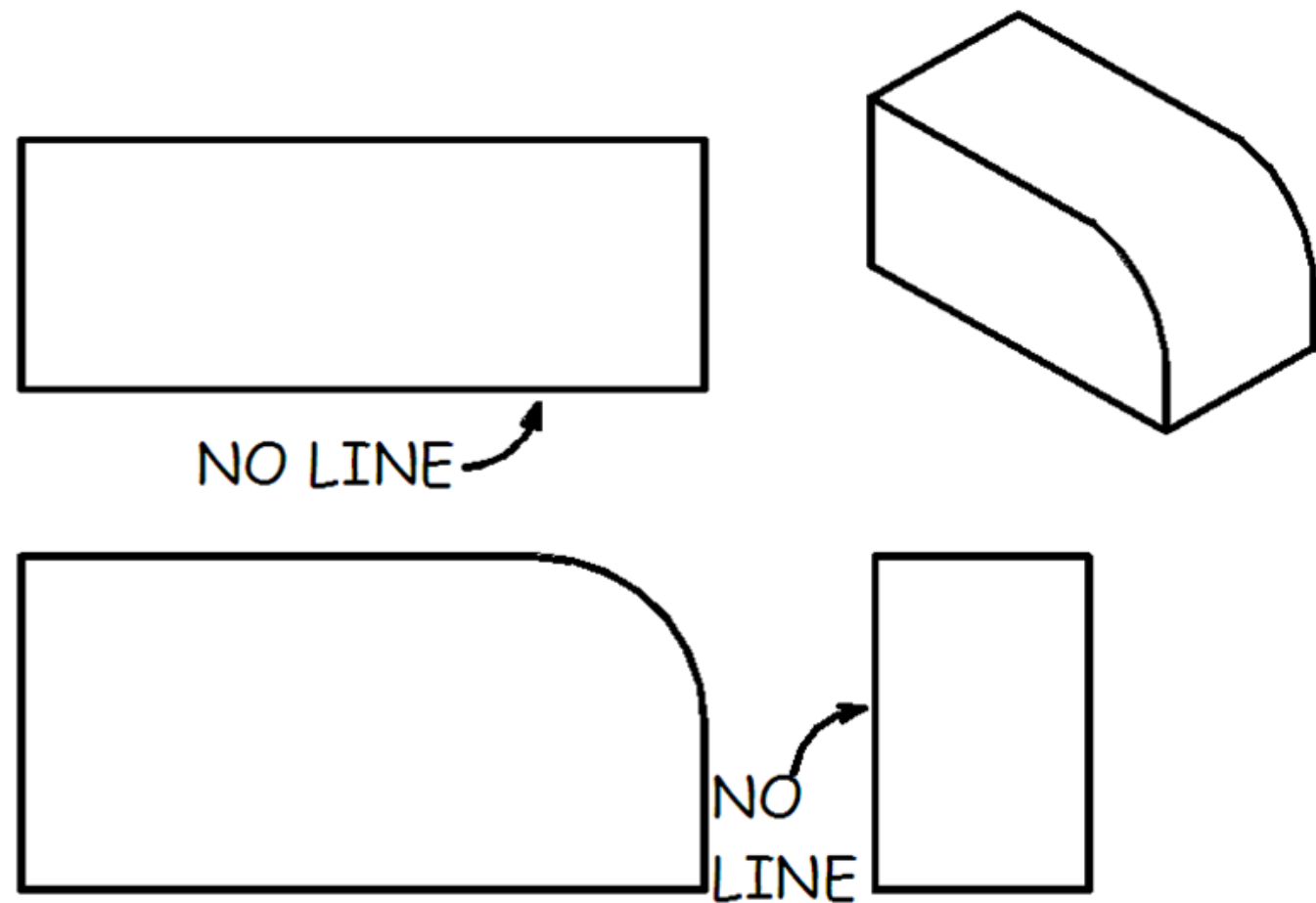


Pictorial View

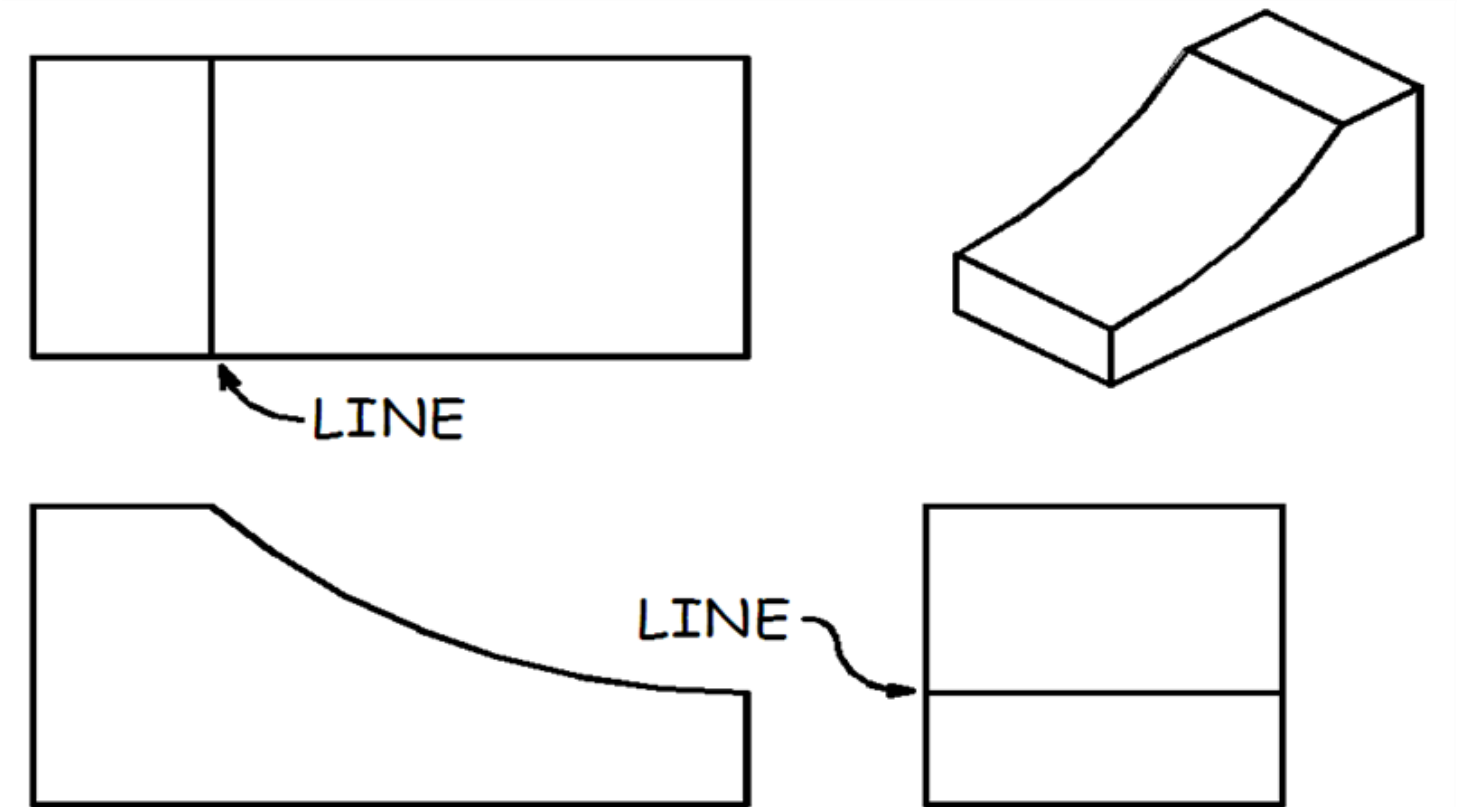


Orthographic View (3rd Angle
Projection)

Sharp Edge vs Curved Edge

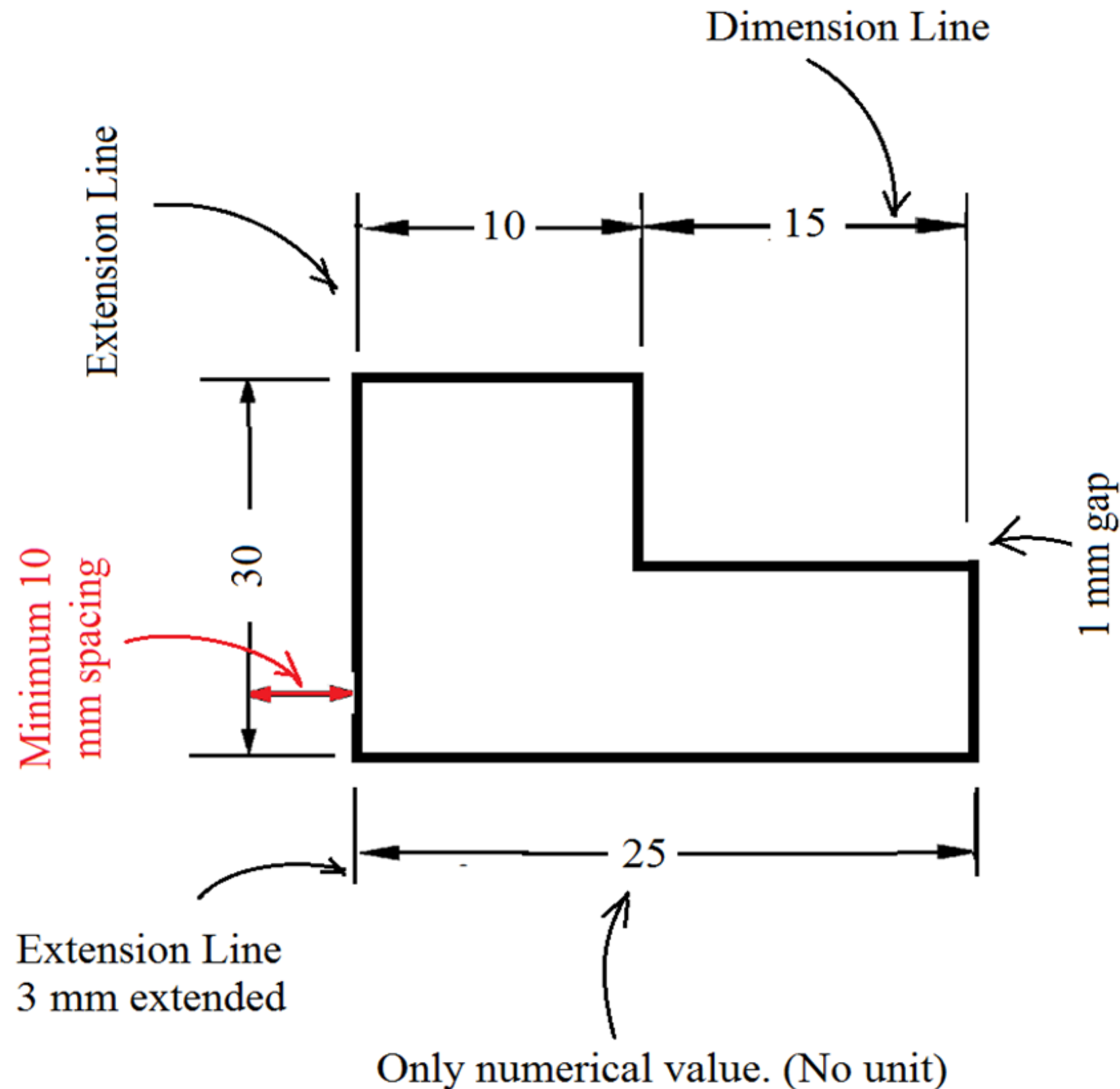


If a curved surface is tangent to a plane surface, no edge is formed.
So, there will be no line.



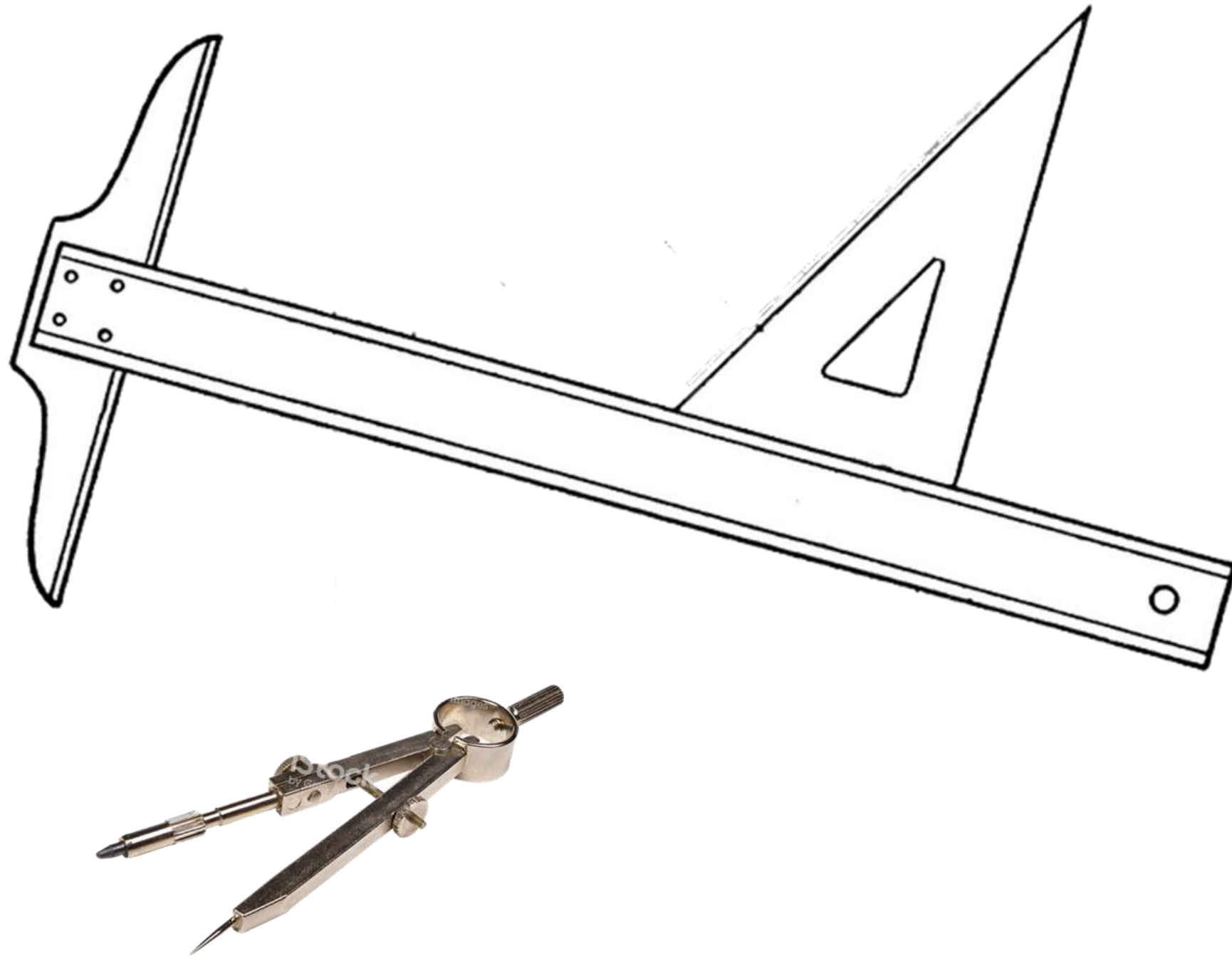
But if a curved surface intersects with a plane surface, an edge is formed.
So, there should be a line in the views.

Dimensioning Guidelines



1. Dimension and extension lines must be either horizontal or vertical.
2. No dimension/extension line can cross over another dimension/extension line.
3. There must be one arrowhead at each end of dimension line.
4. The thickness of both extension and dimension line is 25%.
5. No dimensioning is allowed inside the object.

Instruments



Drawing Sheet/Paper (724mm x 585mm)

Pencil (2B), eraser and sharpener

T-square/T-scale (1 m)

Set-squares/triangles (large)

30 degrees

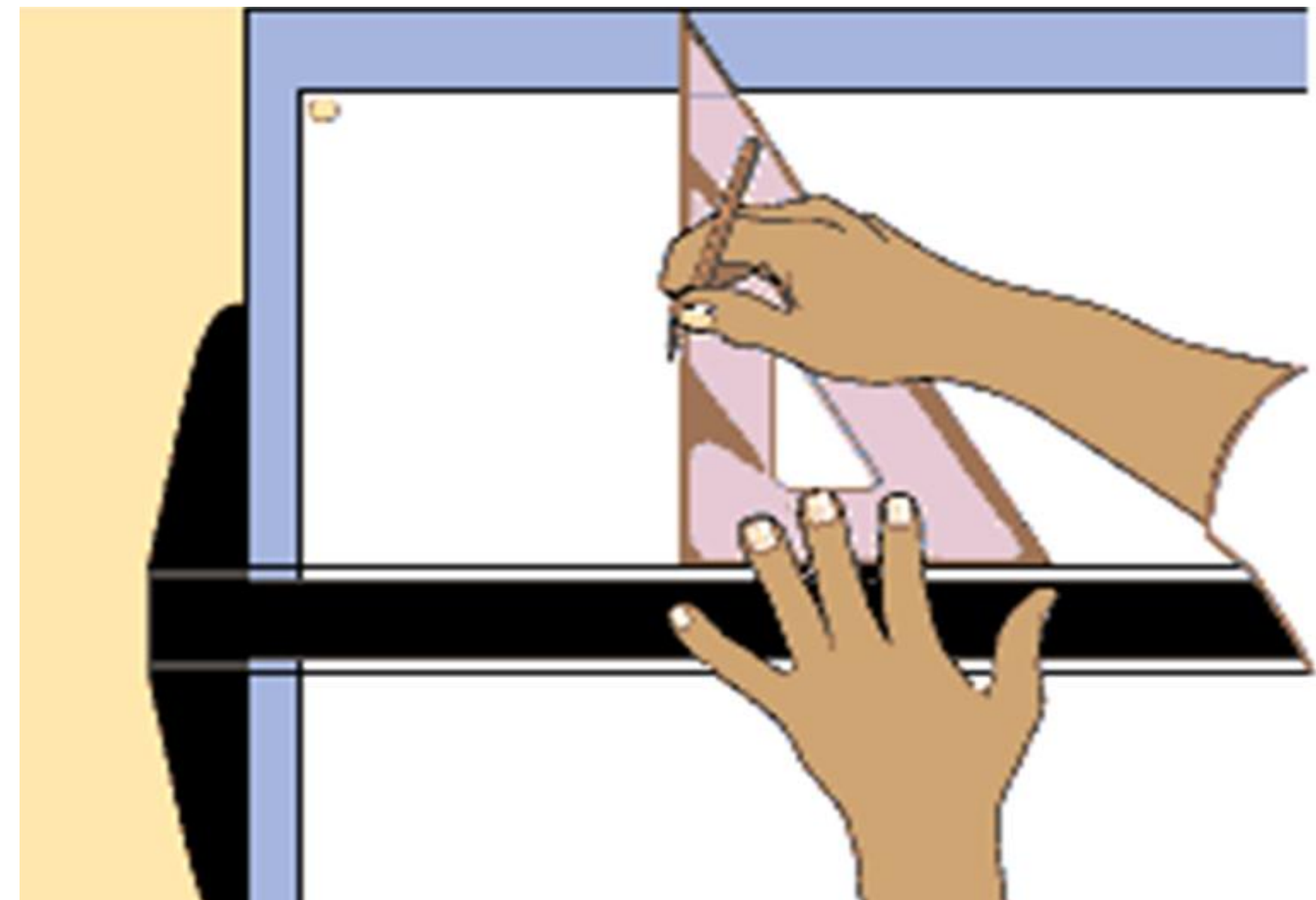
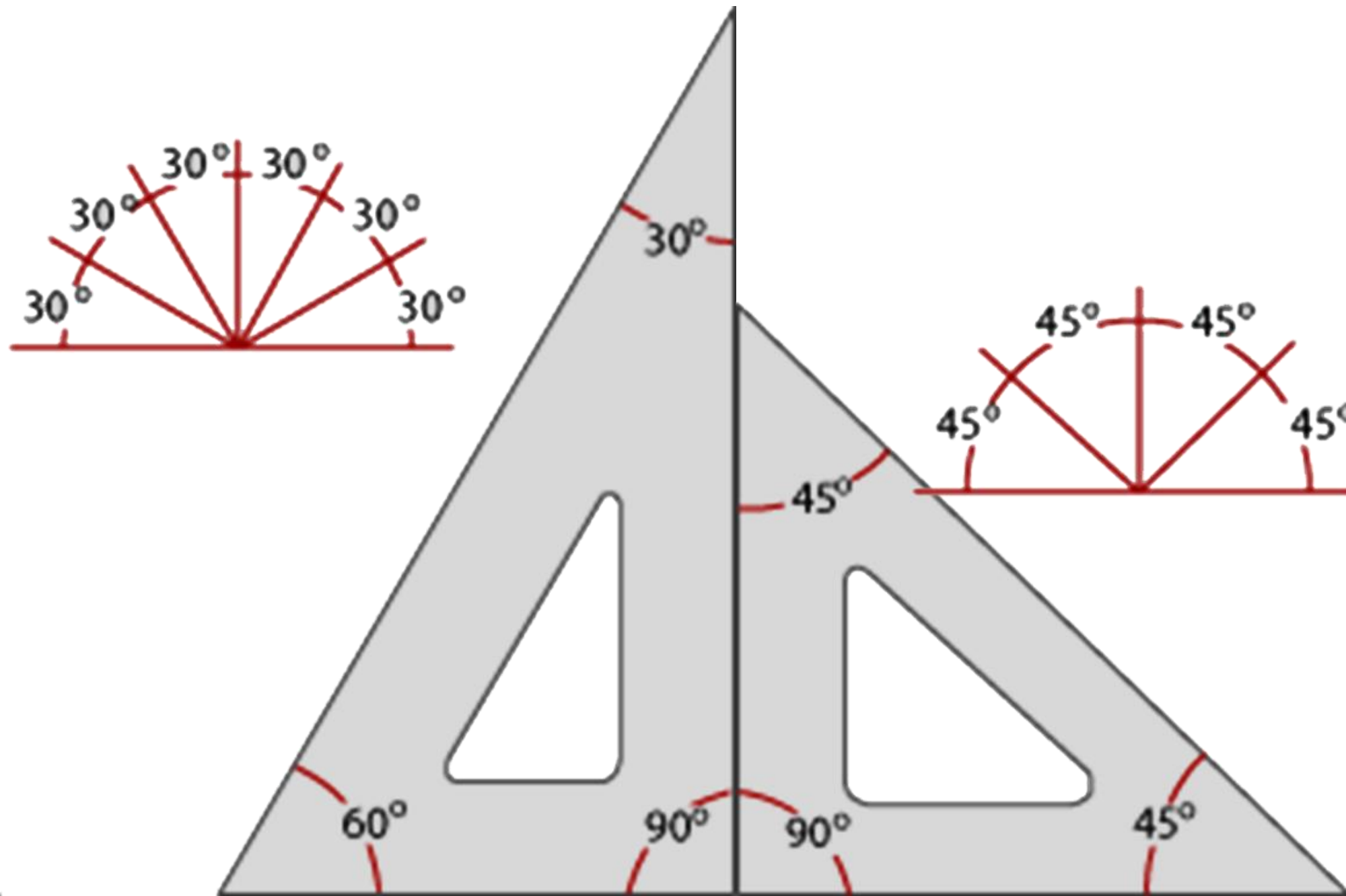
45 degrees

Divider

Drafting tape/Masking tape

How to use T-square and Triangles

The T extension at the end of the T-square should always remain aligned with the side of the drawing table. This will cause it to remain horizontal.



Daily Task

- Before the class starts:

Draw margins on your drawing sheet. Margins should be 10mm at all of four sides of the sheet.

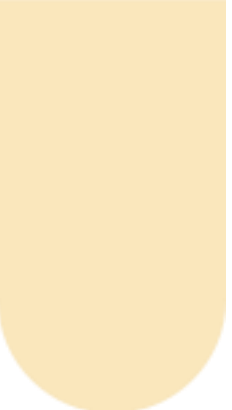

At bottom right corner, sketch the following

The diagram illustrates the standard layout and dimensions for a mechanical engineering drawing title block. The overall dimensions are 130 units wide and 75 units high. The title block is divided into several sections:

- Top Section:** Contains the title "MECHANICAL ENGINEERING DRAWING-I".
- Second Section:** Contains the label "TITLE:".
- Third Section:** Divided into two columns: "SCALE:" on the left and "MAT:" on the right.
- Fourth Section:** Contains the label "NAME:".
- Fifth Section:** Divided into two columns: "DEPT./ROLL:" on the left and "DATE:" on the right.

Dimensions are indicated by arrows and numbers:

- Overall Width:** 130
- Overall Height:** 75
- Section Heights (from top):**
 - Title: 4
 - Title Label: 7
 - Scale/Mat: 4
 - Name: 15
 - Dept./Roll/Date: 4



THANK YOU

