



Bangladesh University of Engineering and Technology

ME 174: MECHANICAL ENGINEERING DRAWING AND CAD

Course Teachers:

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Lecturers

**Department of Mechanical Engineering
BUET**

Course Outcome

- **At the end of the course, the students will be able to:**
 - Understand the theory of projection. To improve the visualization skills.
 - Know and understand the conventions and the methods of engineering drawing.
 - Identify the orthographic views of a given 3D objects precisely.
 - Predict the isometric view of an object from the given orthographic views correctly.
 - Sketch auxiliary and sectional views of an object if needed.

Reference Book

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

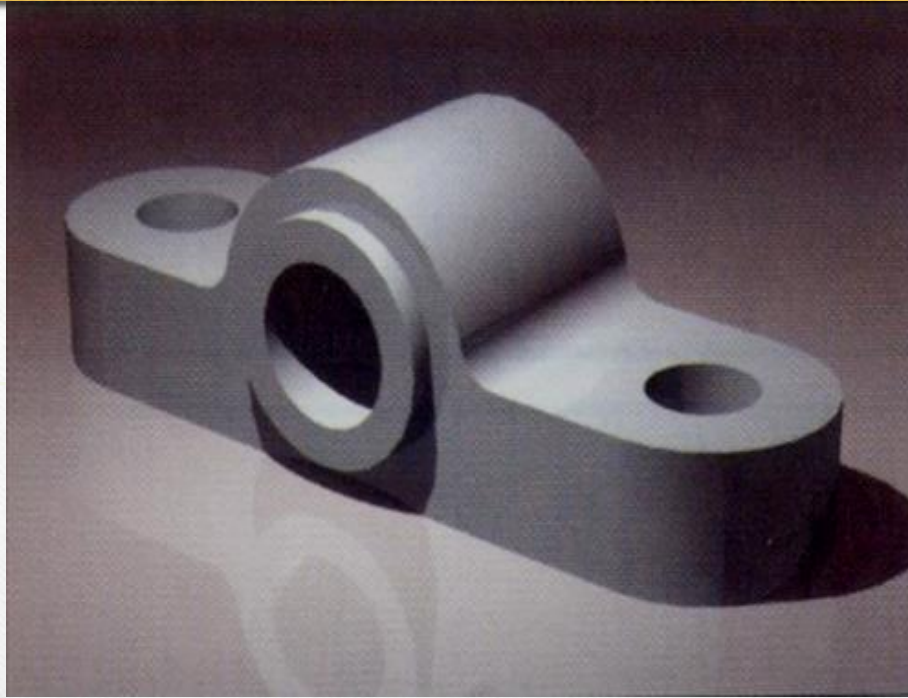
Marks Distribution

- **Total mark will be distributed as follows:**

➤ Attendance	10%
➤ Class Performance	40%
➤ Viva	10%
➤ Final Quiz	<u>40%</u>
Total	100%

- ❑ Students are given a task to draw in every class and it is evaluated and returned back in the next class. 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.

Why Mechanical Drawing



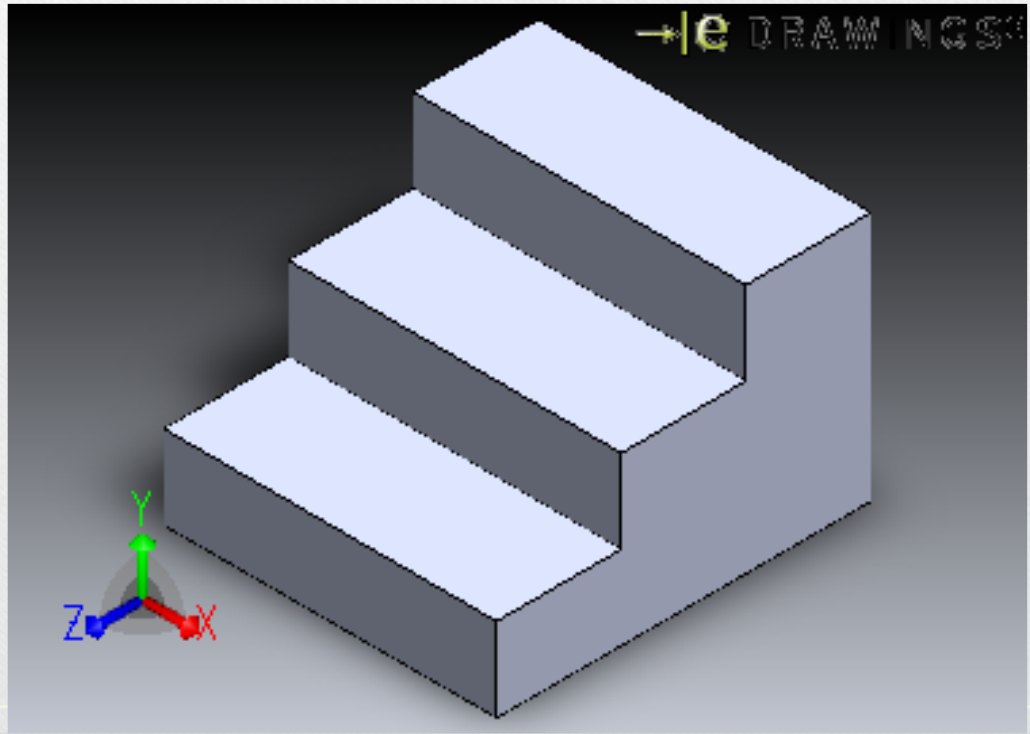
- Try to describe the object above to another person who has not seen it and see if he/she understands or not. You can easily realize that words are inadequate to describe the object completely.
- To build or manufacture any object, its complete information has to be provided to the manufacturer.
- Mechanical drawing of an object provides complete information of it.

Principal Views

Any object can be observed or seen from different angles. The views from different angles are different.

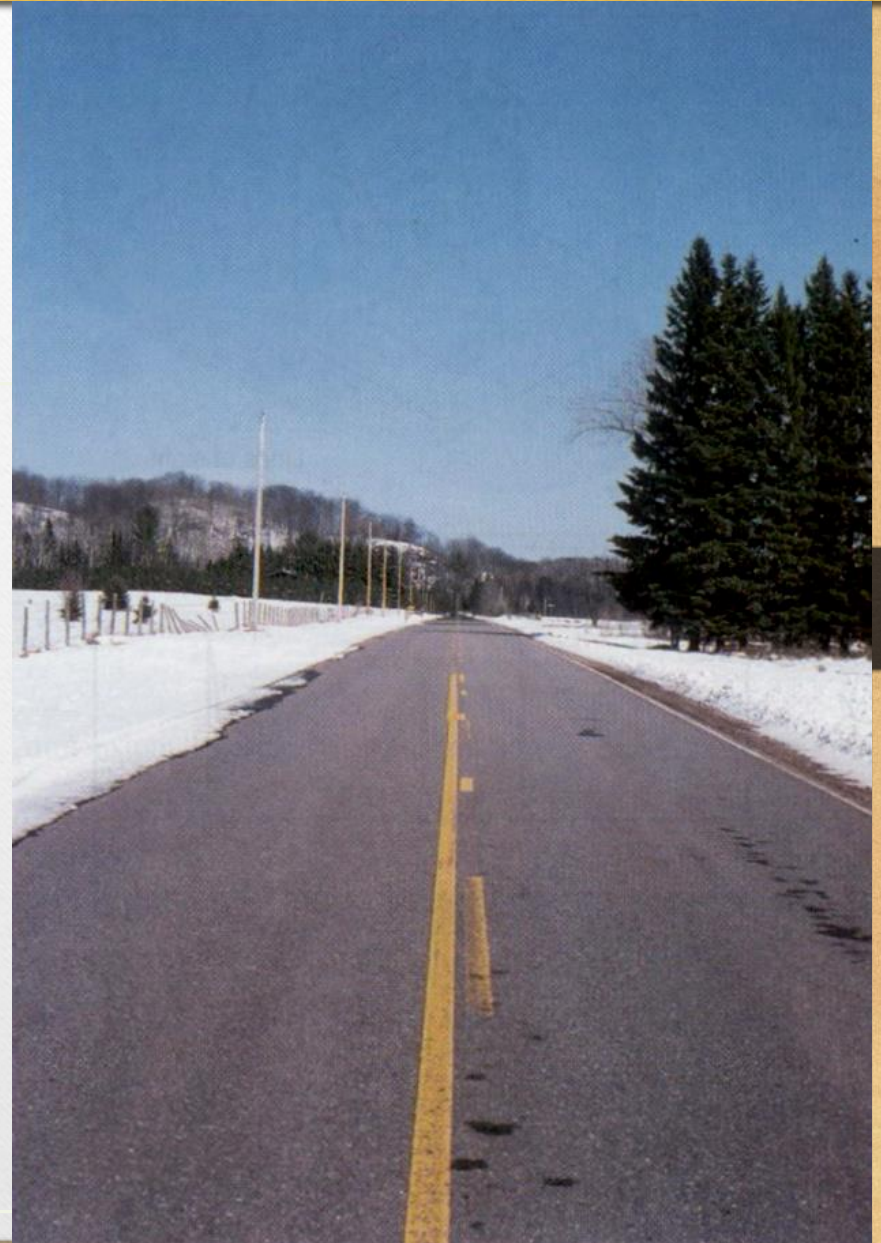
When an object is seen exactly perpendicular to its front face, the view is called FRONT VIEW. Similarly when the object is seen exactly perpendicular to its right face, the view is known as RIGHT SIDE VIEW. Thus the following principal views exist:

- Front View
- Top View
- Right Side View
- Left Side View
- Rear View
- Bottom View



Concept of Perspective

- The concept of perspective includes the change of apparent dimension with distance.
- It seems that the road is narrower in the distant part but actually it is not.
- Distant part of an object creates a smaller “view angle” at the point of observation. So, it looks smaller.



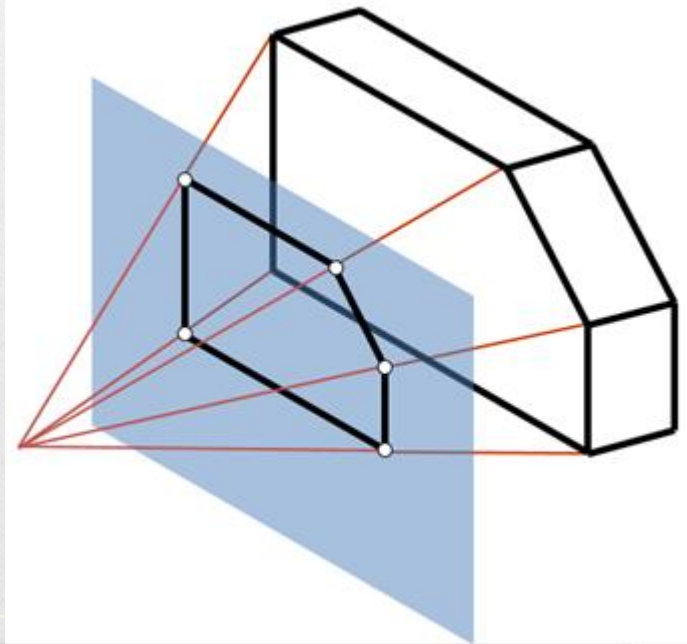
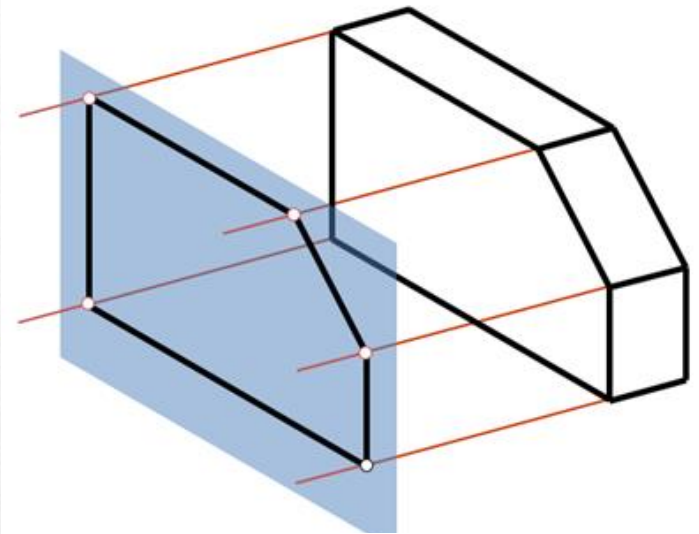
Parallel Projection and Perspective Projection

Parallel Projection:

- The lines of sight are parallel
- Parallel lines remain parallel
- Good for exact measurement
- Less realistic looking

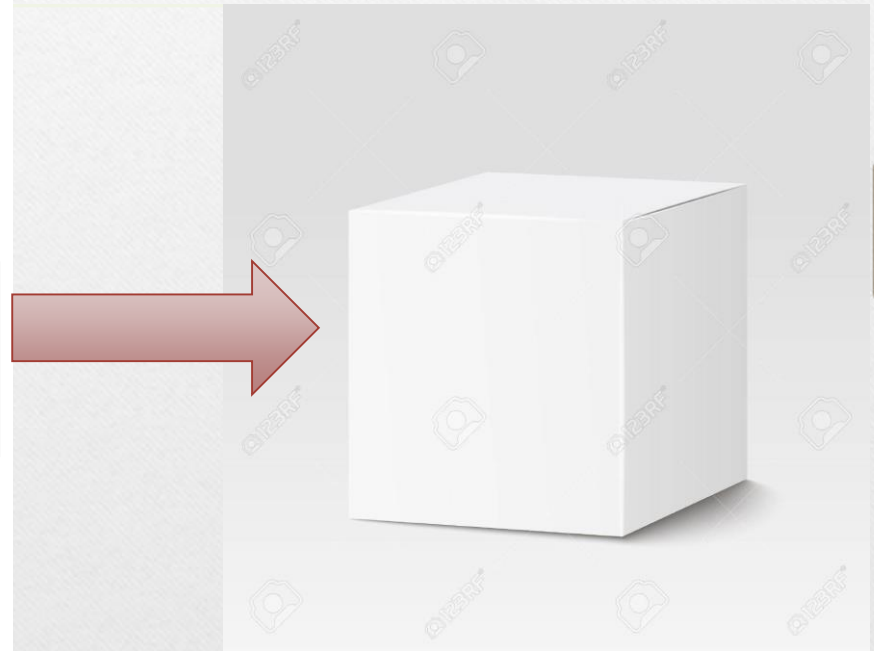
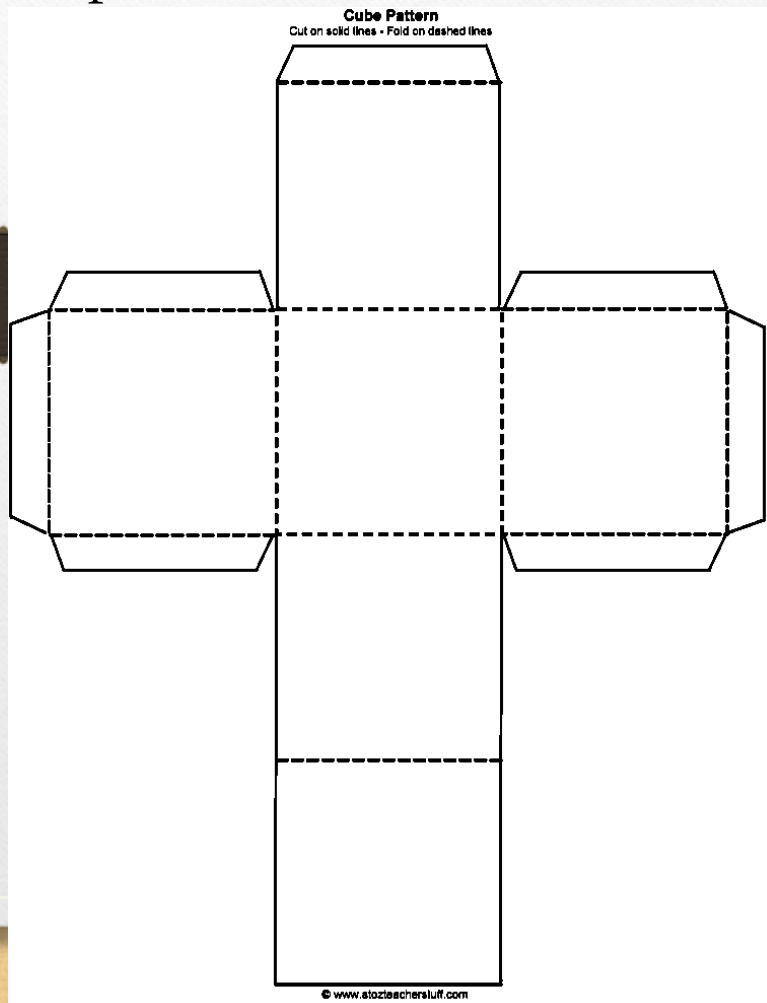
Perspective Projection:

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



First Angle and Third Angle Projections

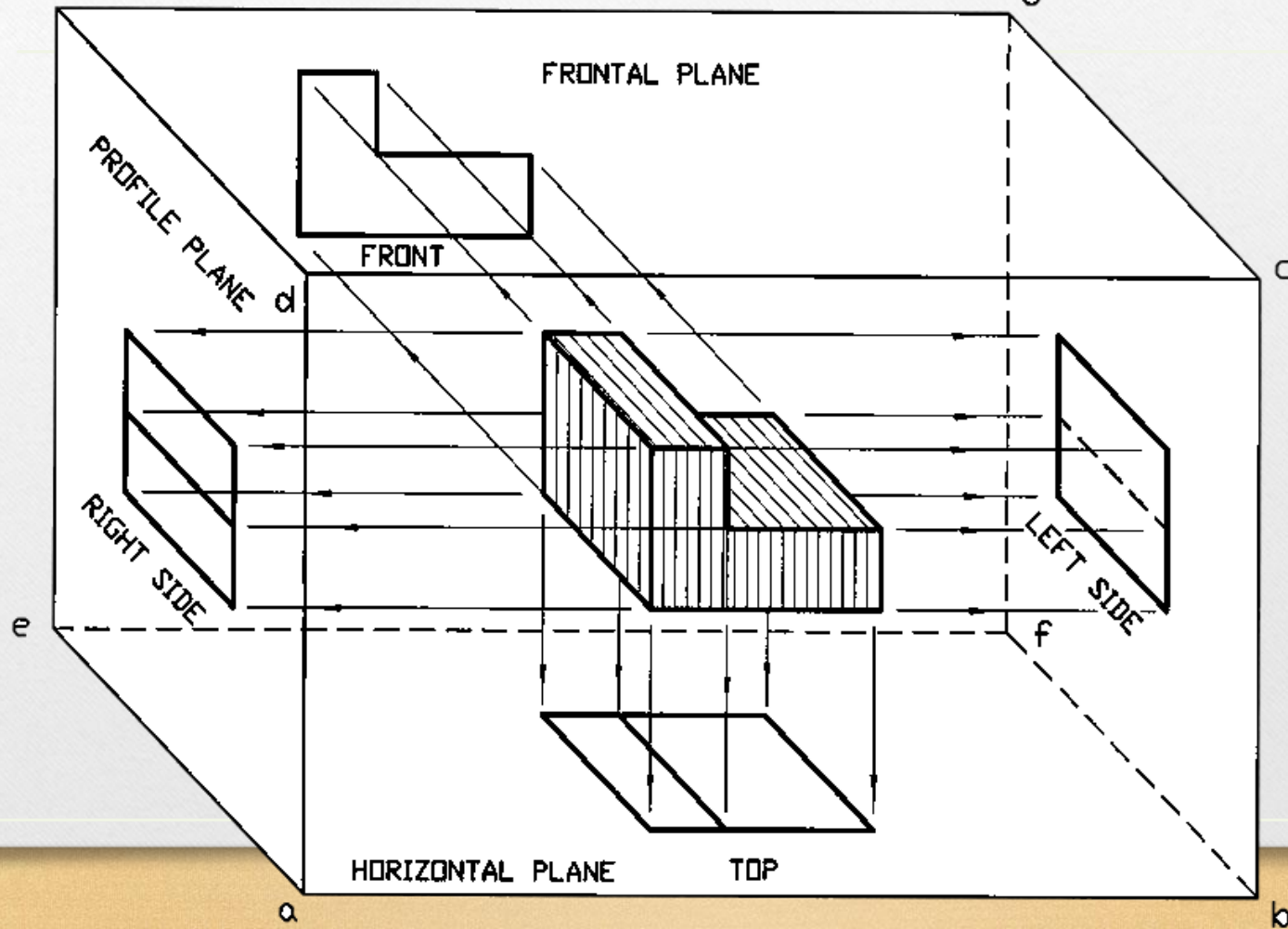
- Cut your art paper as shown below and fold it to form a box. (Don't cut in real, just imagine that you have done it.)
- You have to draw different views of the object on different planes of the box.



First Angle and Third Angle Projections

First Angle Projection:

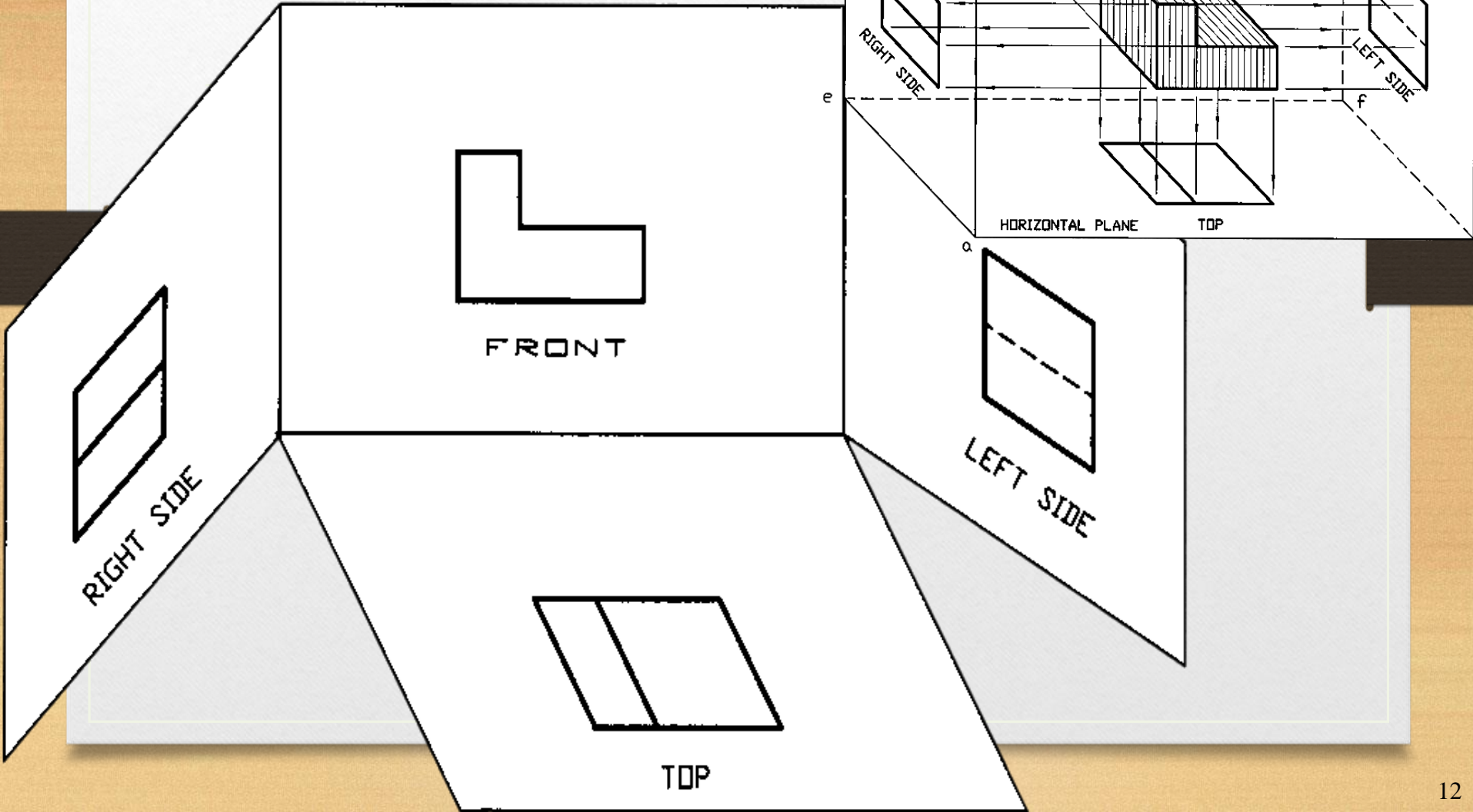
- The object is placed between the observer and the plane of projection. i.e. between you and the drawing plane. Each face of the box contains the view that satisfies the above condition.



First Angle and Third Angle Projections

First Angle Projection (Cotd.):

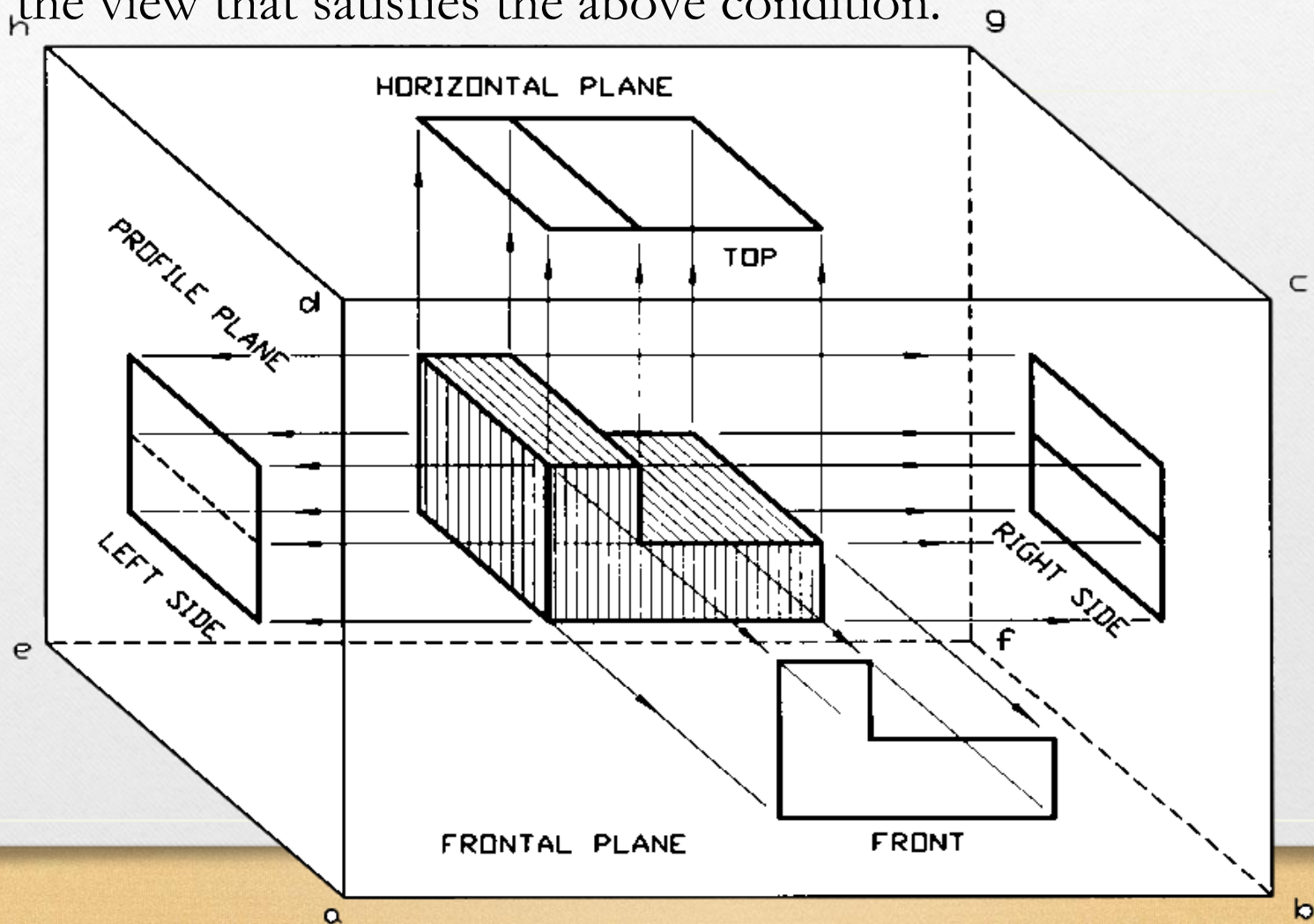
- Then unfold the box. You will get something as follows.



First Angle and Third Angle Projections

- **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.

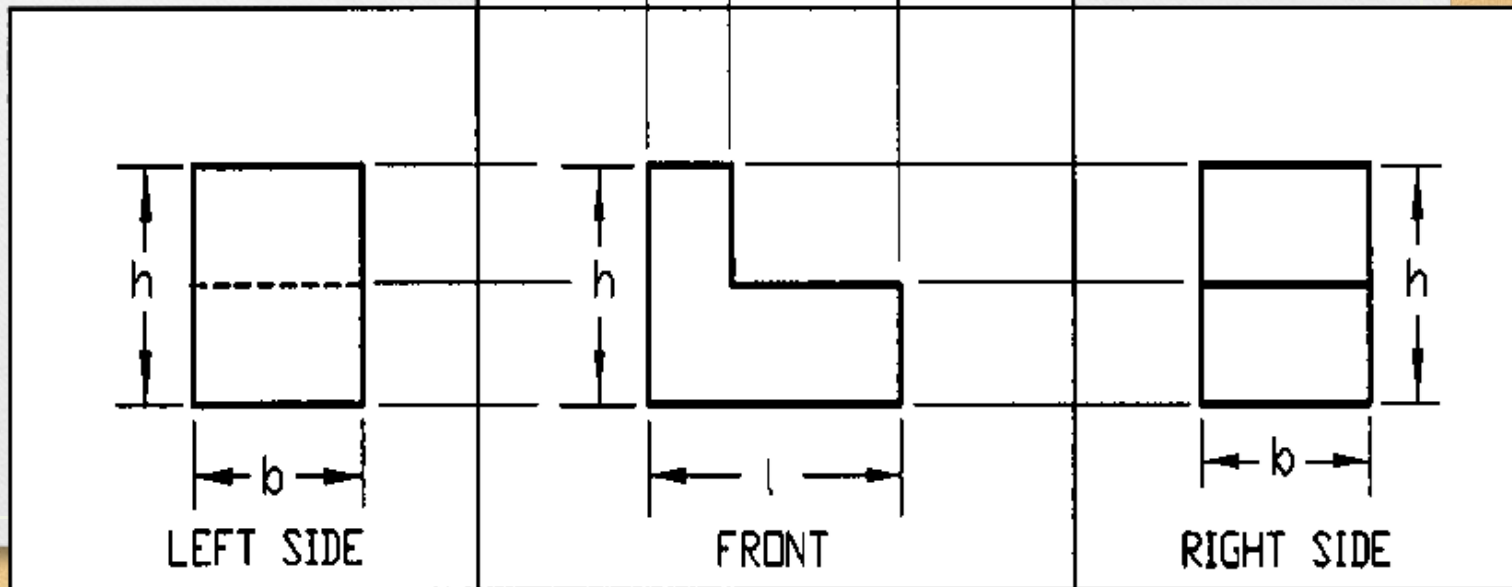
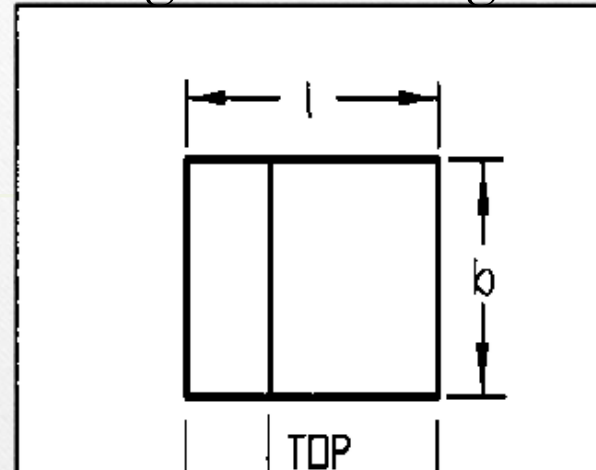


First Angle and Third Angle Projections

- **Third Angle Projection (Cotd.):**

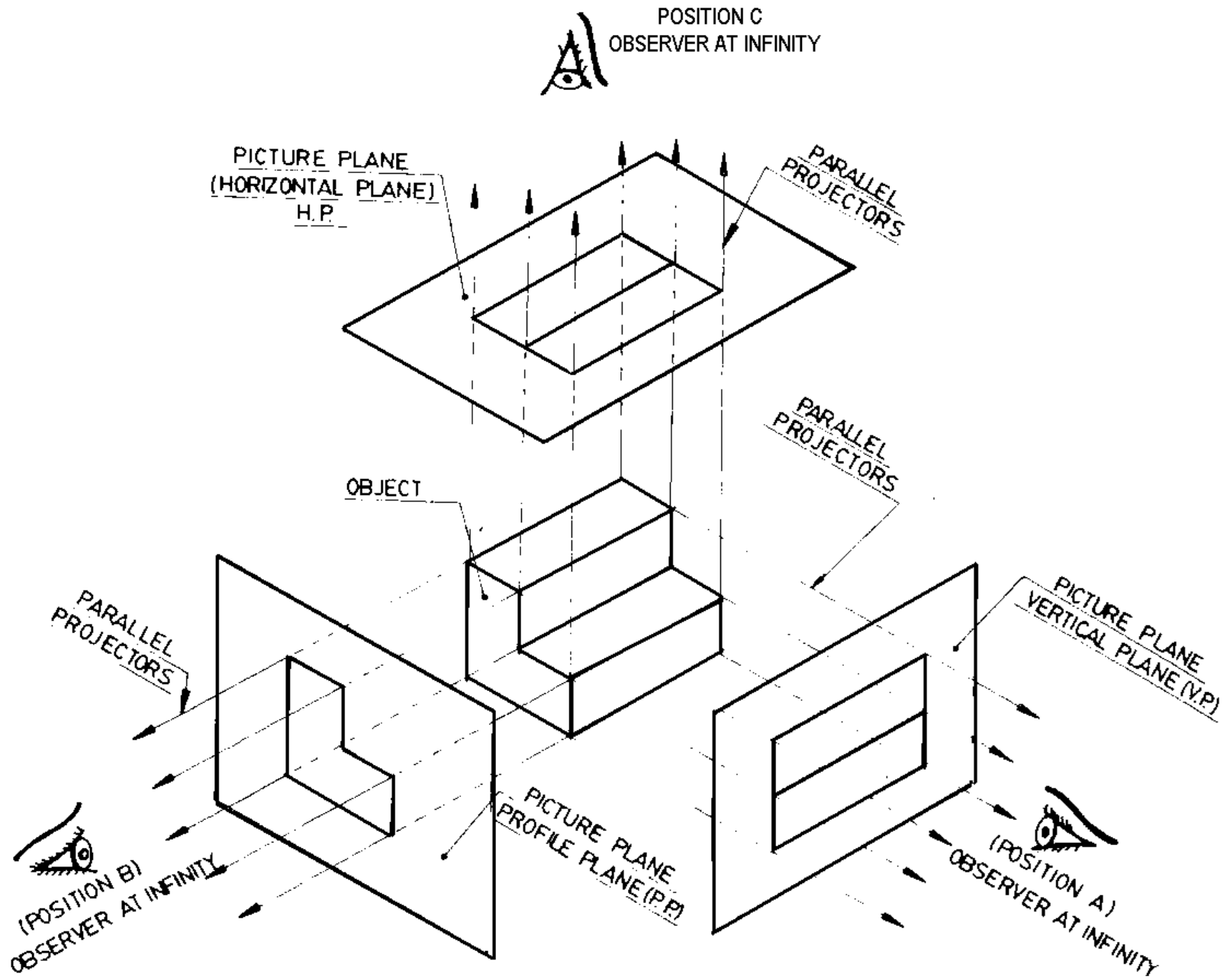
- Then unfold the box. You will get something as follows.

- Unlike first angle projection, you will get the top view on top of the front view, left side view on left and right side view on the right.

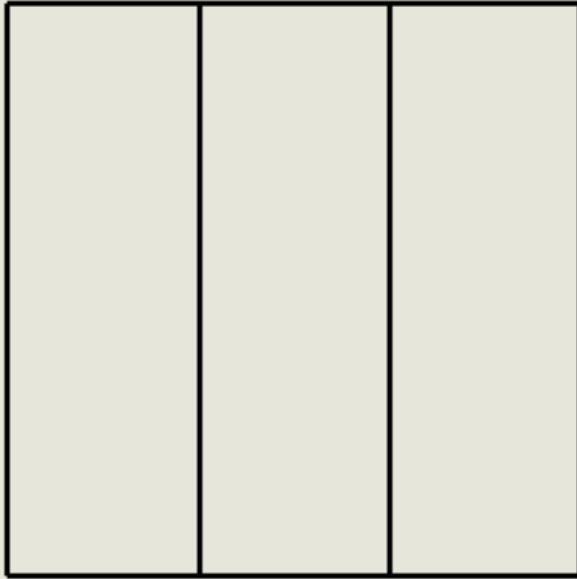


We will follow this method.

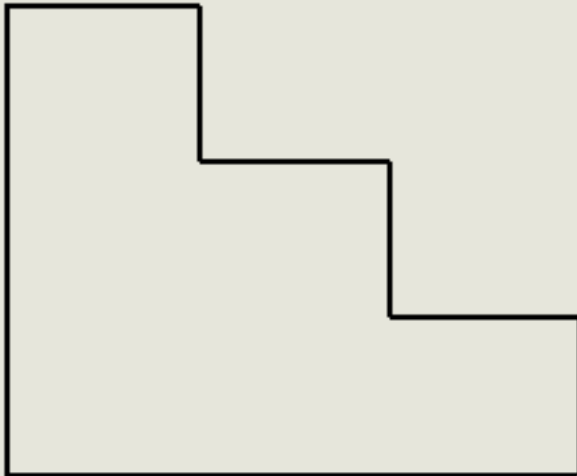
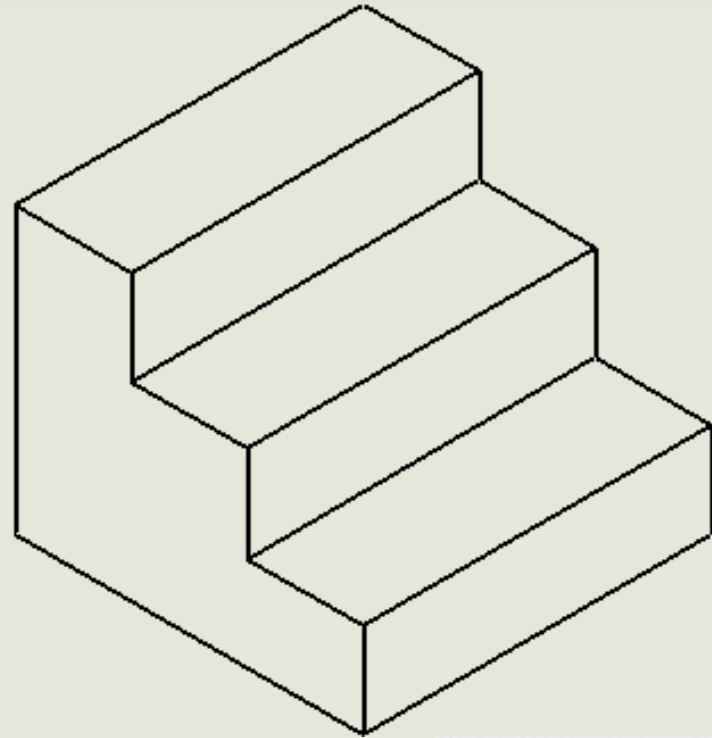
Basics of Orthographic Views



Basics of Orthographic Views



TOP VIEW

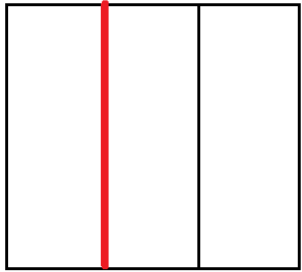
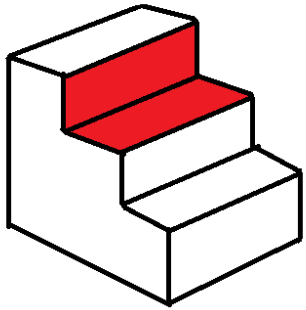


FRONT VIEW

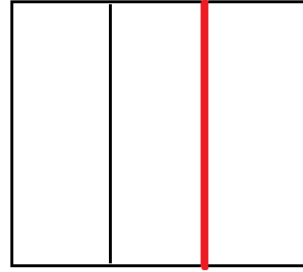
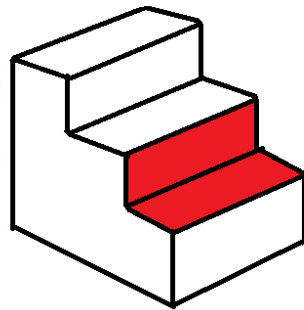


RIGHT SIDE VIEW

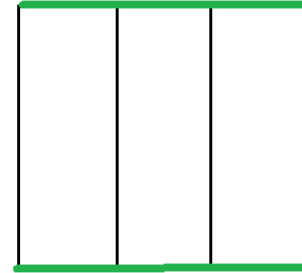
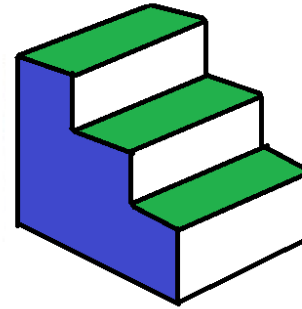
Where to Draw a Line



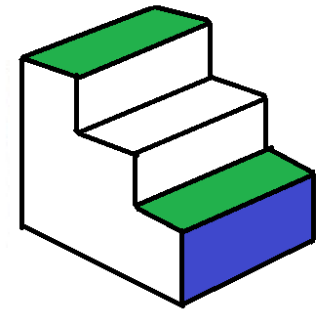
TOP VIEW



TOP VIEW



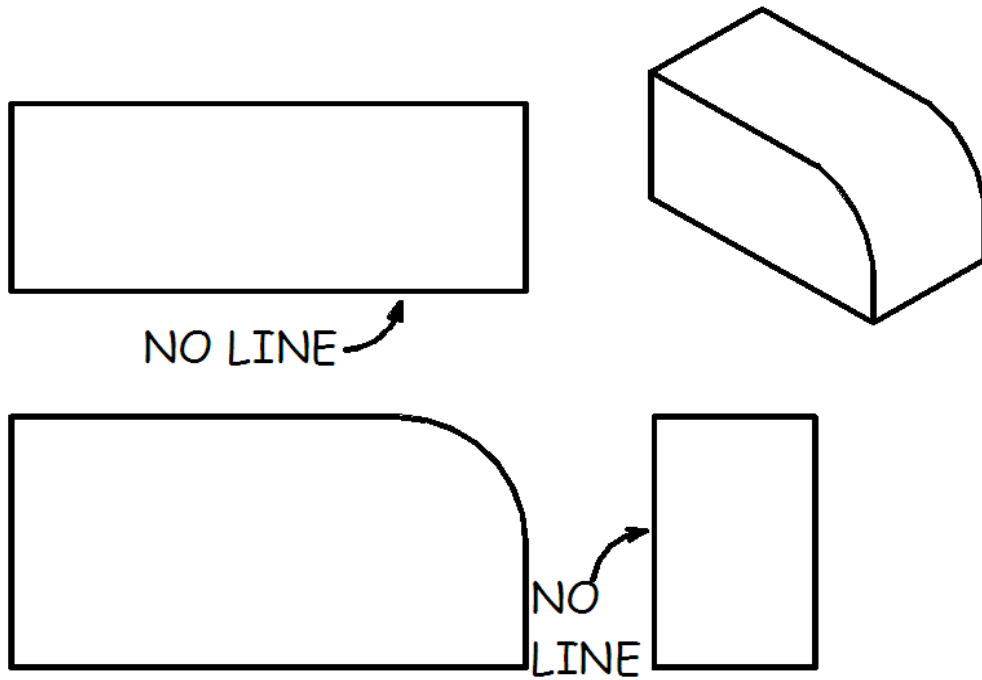
TOP VIEW



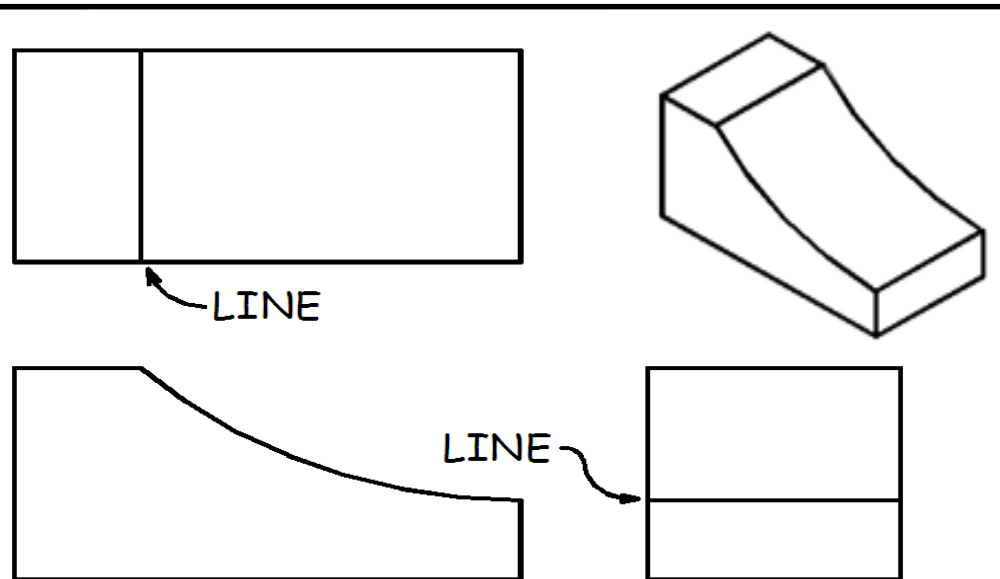
TOP VIEW

- At the intersection of two planes, an edge is formed. Lines are drawn to represent these edges
- Red Line is due to the intersection of two red planes shown in the isometric view
- Each segment of green line is due to the intersection of blue plane and green planes

Where to Draw a Line



➤ 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.

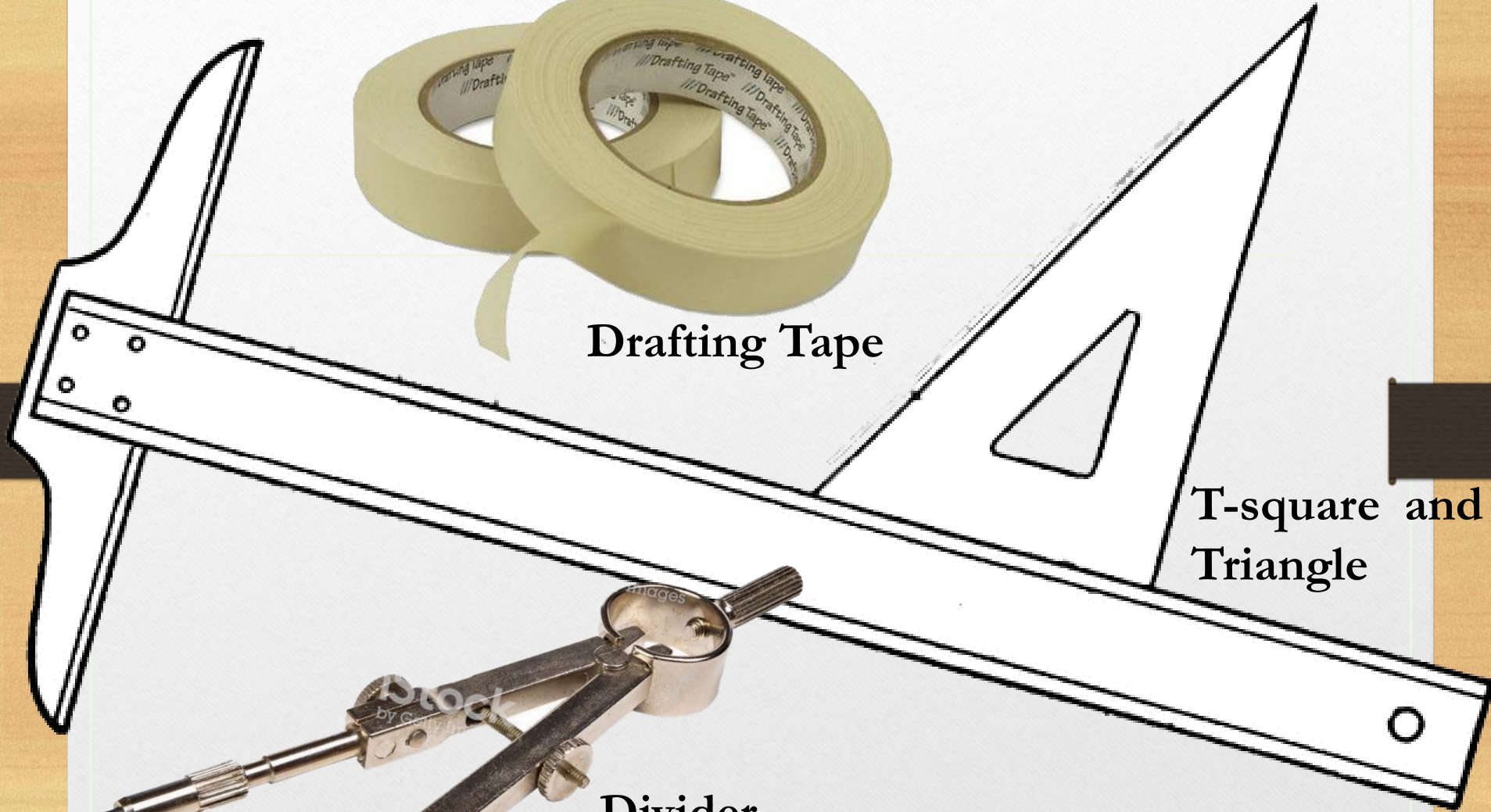
Necessary Instruments

- **What you have to bring everyday:**
 - 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

Necessary Instruments



Drafting Tape



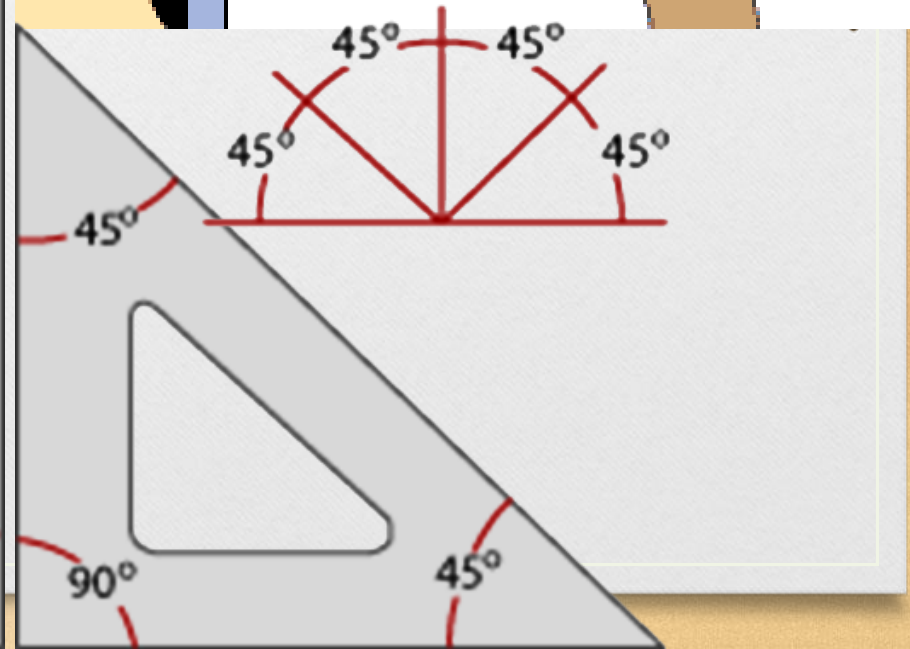
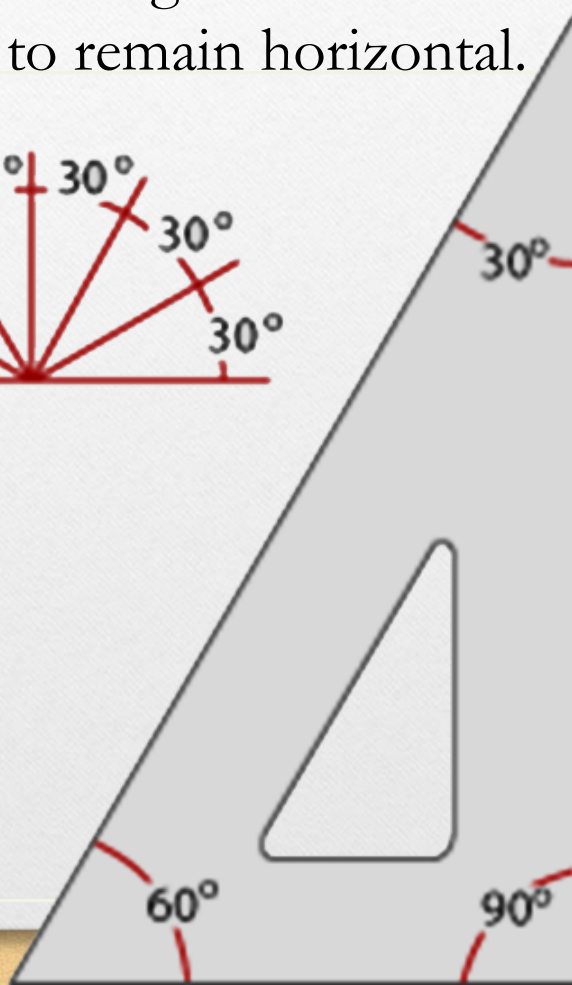
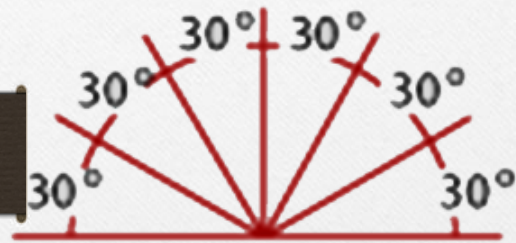
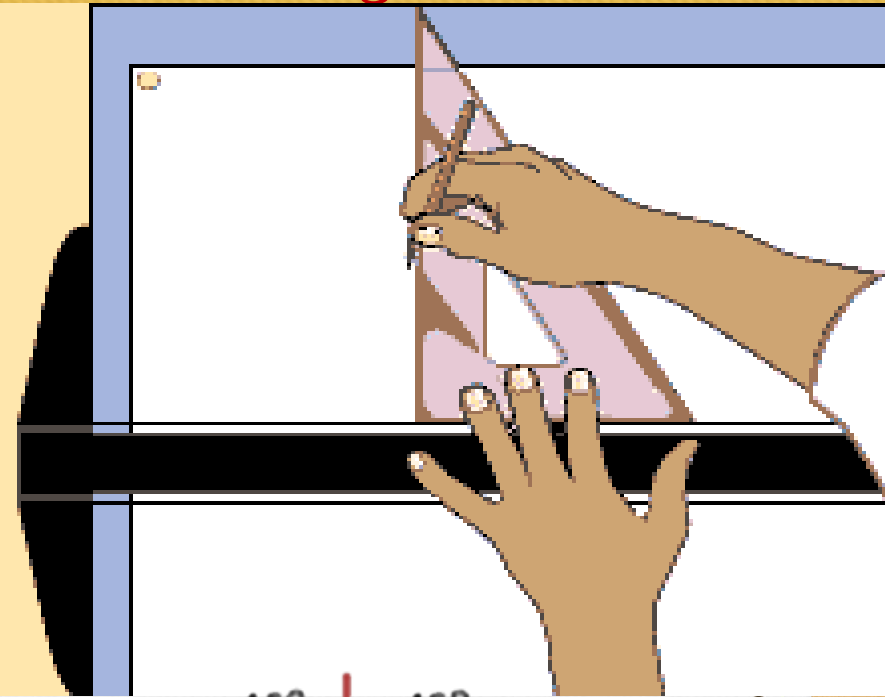
T-square and Triangle



Divider

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 shows a drawing sheet layout with the following dimensions and labels:

- Total width: 130
- Total height: 75
- Title bar height: 7
- Title bar text: **MECHANICAL ENGINEERING DRAWING-I**
- Title bar margin: 4
- Title bar padding: 4
- Title bar text: **TITLE:**
- Title bar padding: 4
- Title bar margin: 15
- Scale and Material row: **SCALE:** and **MAT:**
- Name row: **NAME:**
- Department and Date row: **DEPT./ROLL:** and **DATE:**

Daily Task

➤ So, your drawing paper looks like this.

MECHANICAL ENGINEERING DRAWING-I	
TITLE:	
SCALE:	MAT:
NAME:	
DEPT./ROLL:	DATE:

That's all for today.

Any queries?

http://taimullah.buet.ac.bd/course_materials.html

*Thank
you*

