

ME 160

Mechanical Engineering Drawing - I

What is drawing?

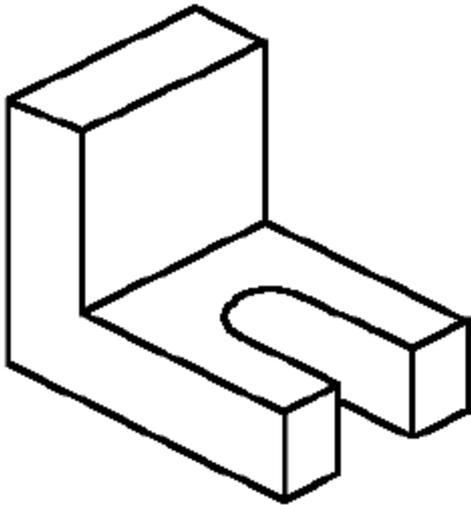
1. Graphical language that communicates ideas and information.

Difference between Drawing And Art?

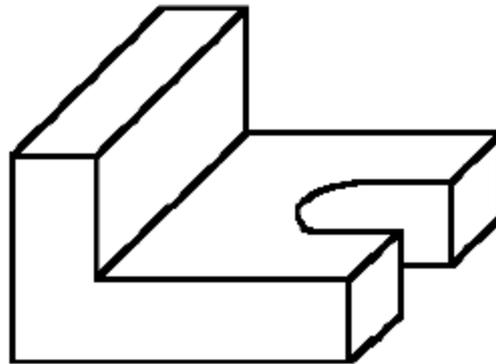
| Engineering Drawing | Artistic Drawing |
|--|---|
| Represents objective facts : Information. | Represents subjective impression : Emotions or Senses. |
| Only trained people can appreciate. | Anyone can appreciate. |
| Enable Communication with precision . | Yields ambiguous communication. |

Different Types of Views

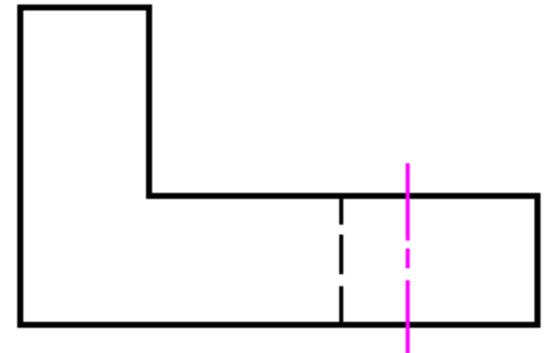
1. An object can be represented in many ways:



Isometric



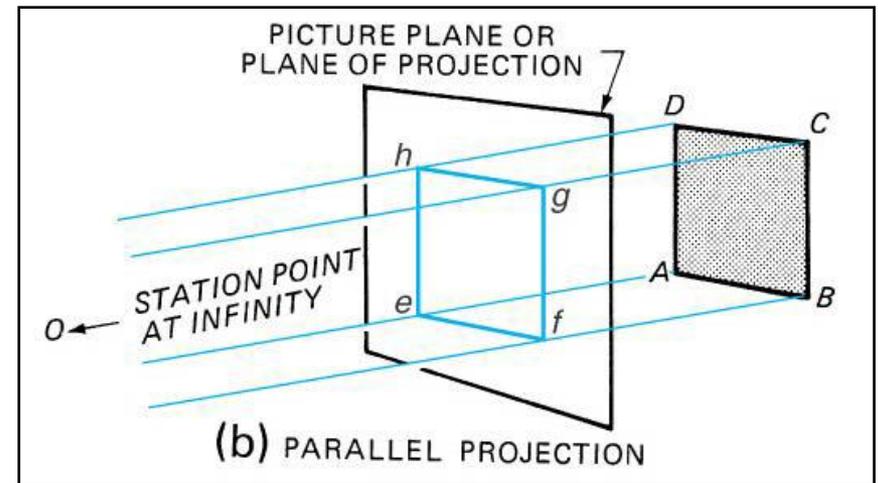
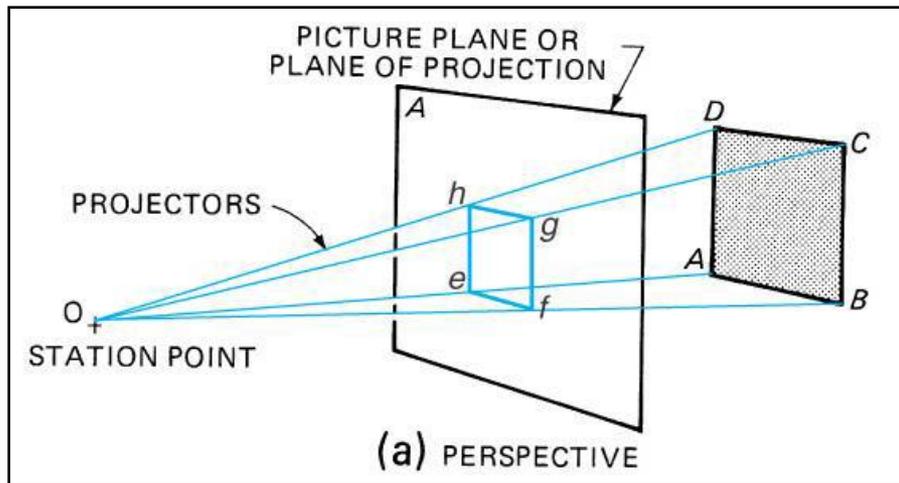
Oblique



Multiview

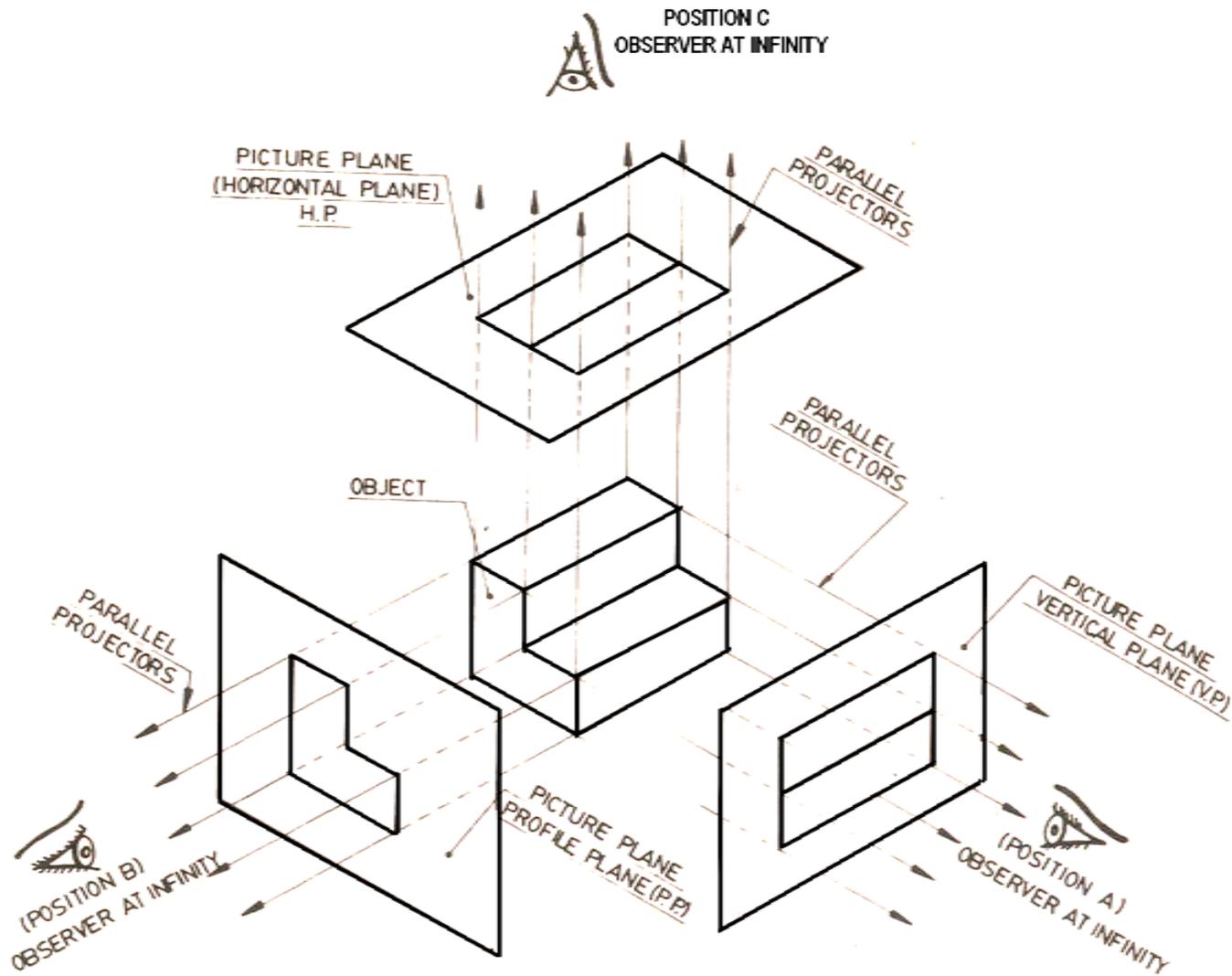
1. You will be briefed about all the drawings lately.

Two Basic Projection Types

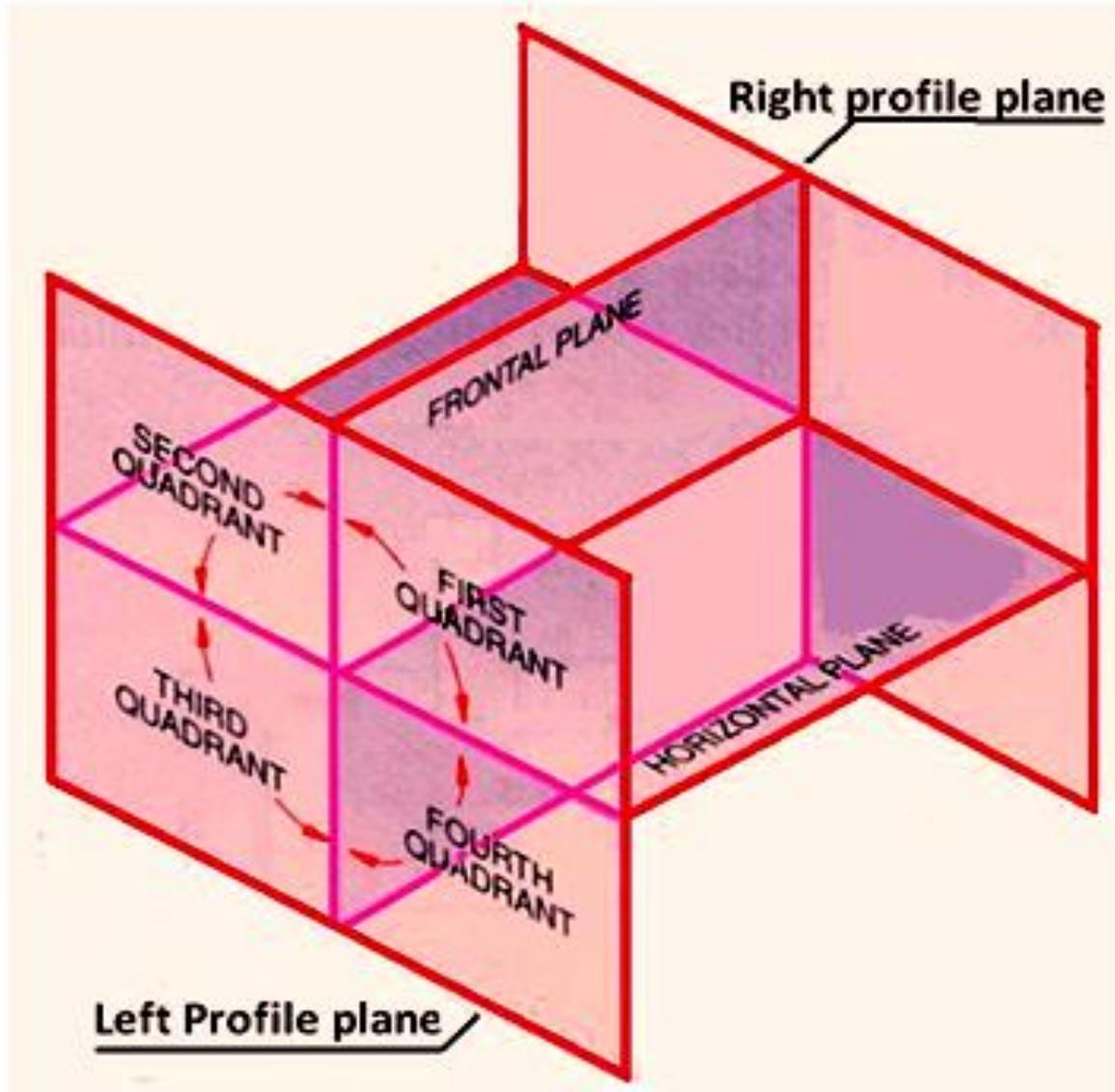


**** Throughout our ME 160 course we will follow Parallel Projection.**

Projection on Planes

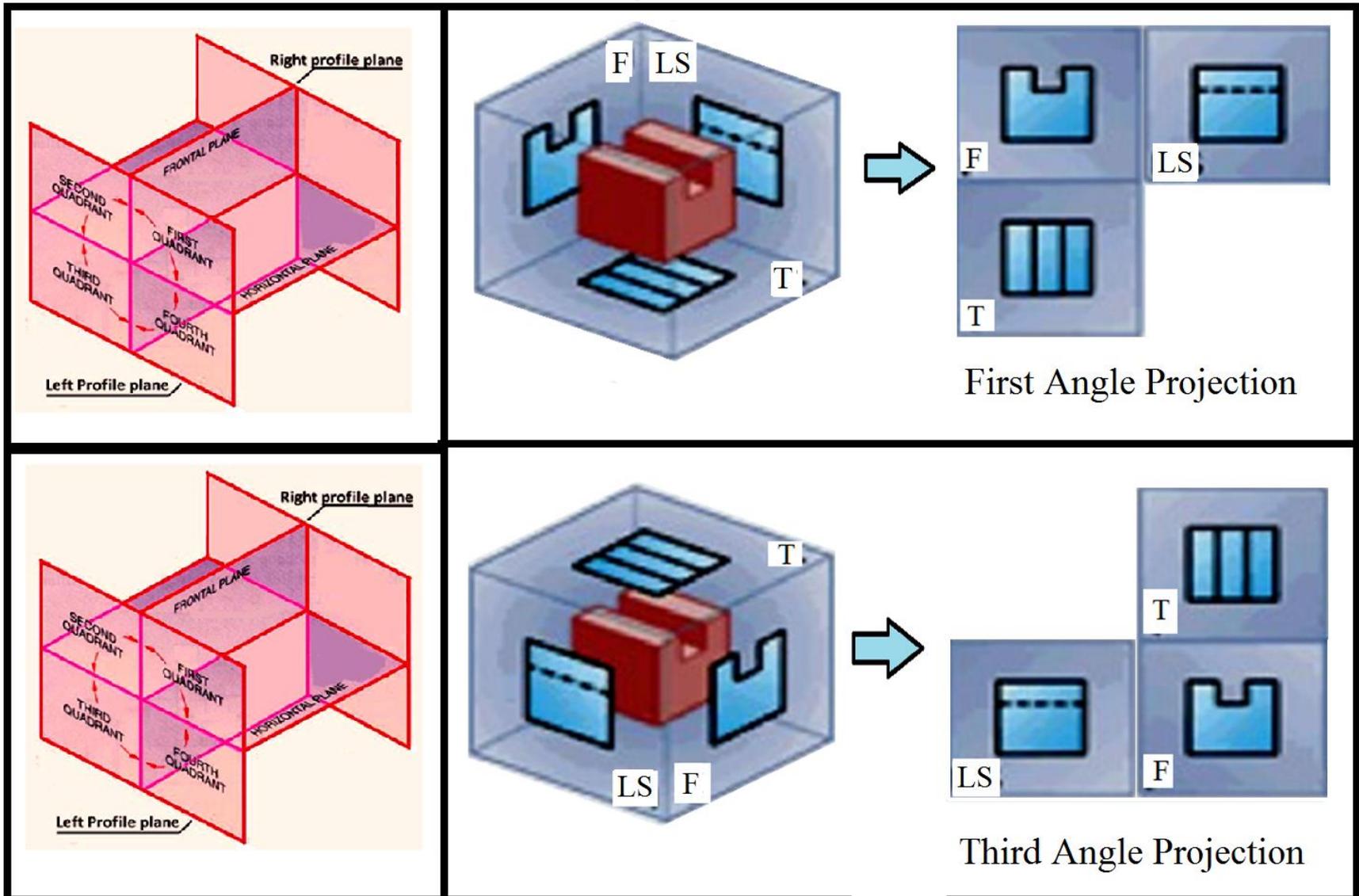


Planes For Drawing

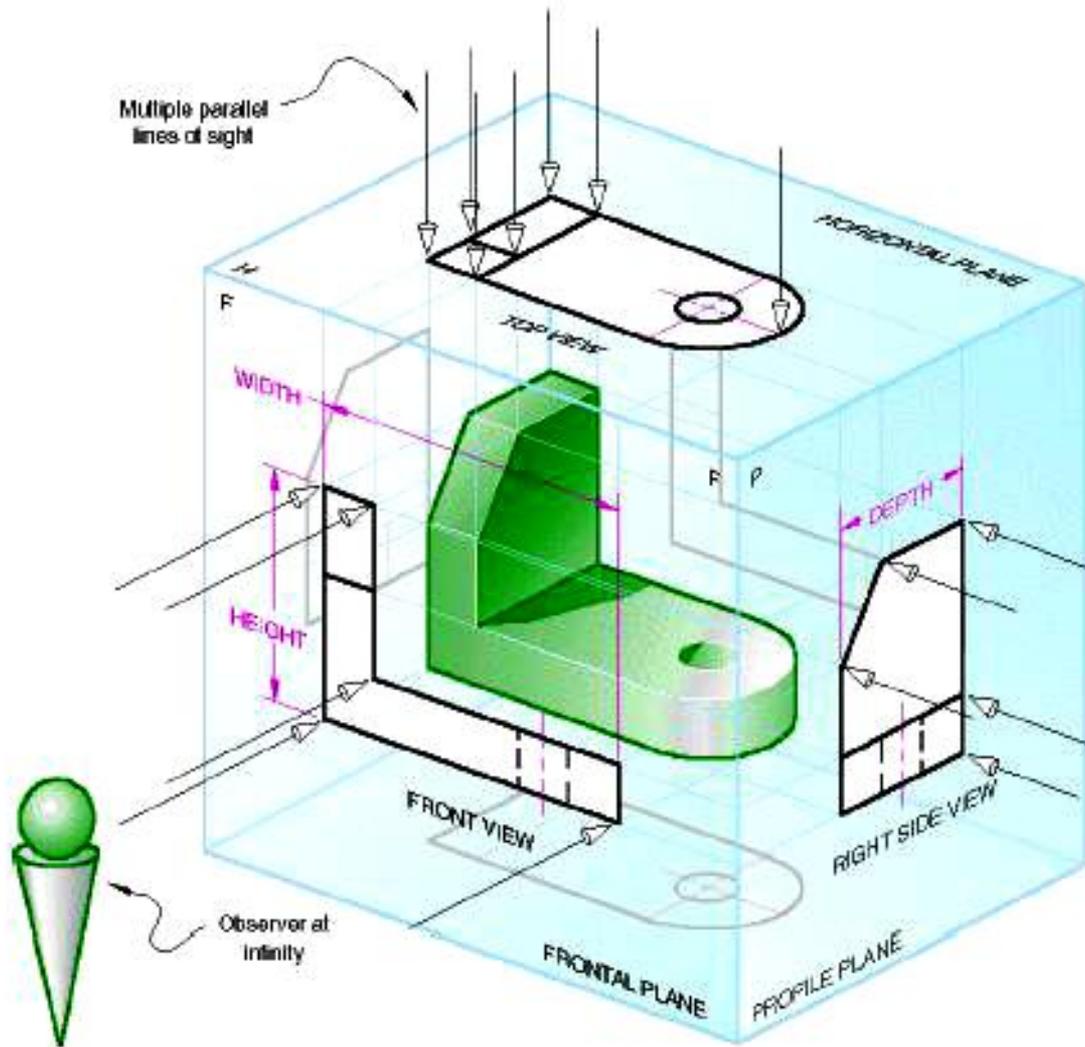


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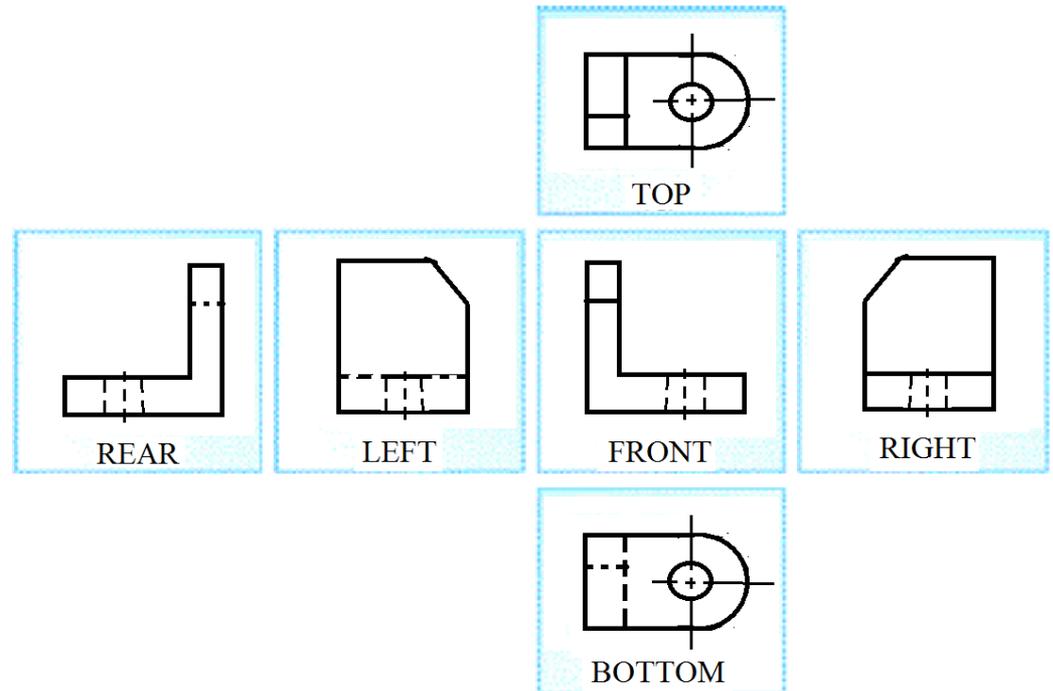
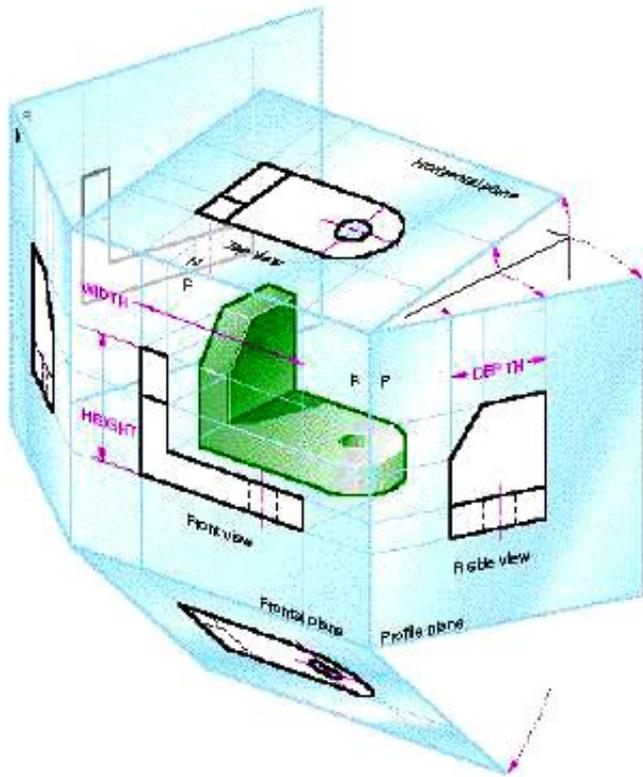
Different Projection Approach



3rd Angle Projection

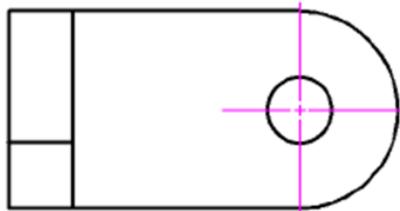


Relative position of views

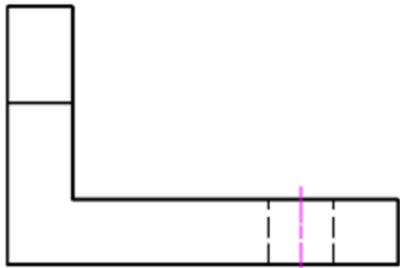


3rd Angle Approach

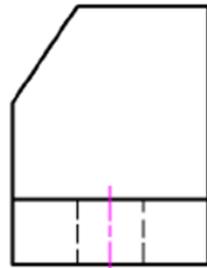
Sample Orthographic View



TOP VIEW



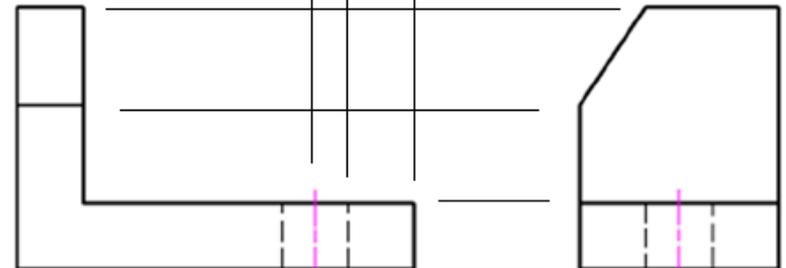
FRONT VIEW



R H S VIEW



TOP VIEW



FRONT VIEW

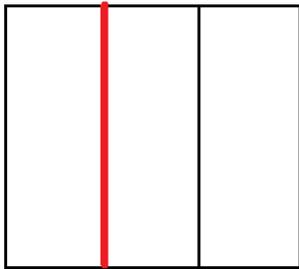
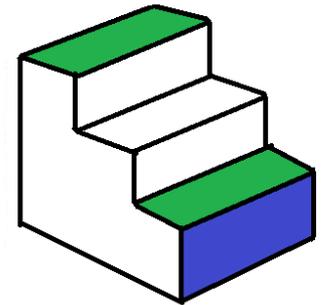
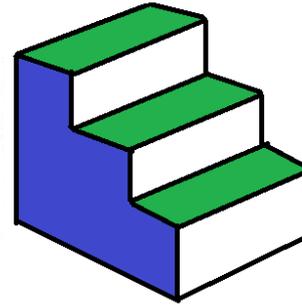
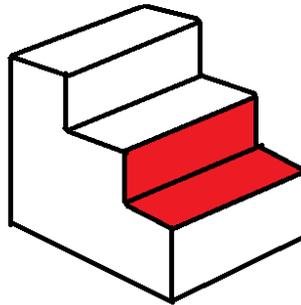
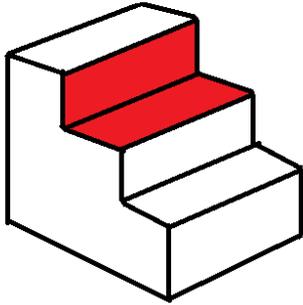
R H S VIEW

**** All views must be aligned with respect to each other – feature to feature.**

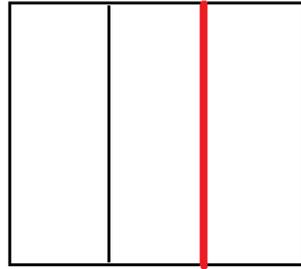
Where to draw line?

1. When there is an intersection of planes.
2. When there is a plane parallel to eye.
3. When the angle between the tangent planes of intersecting planes is not 0° or 180° .
4. When the tangent plane of a surface is parallel to eye.

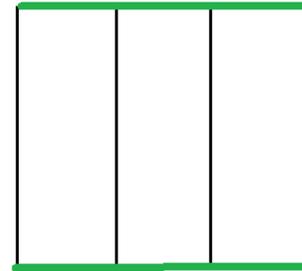
Where to draw a line?



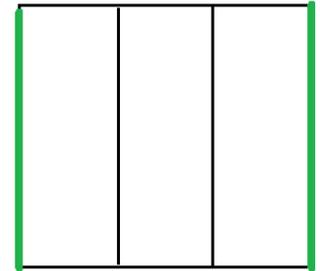
TOP VIEW



TOP VIEW



TOP VIEW

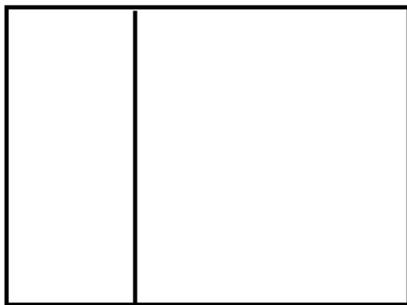
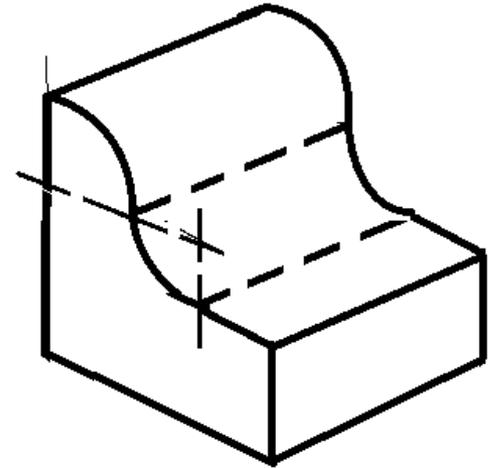
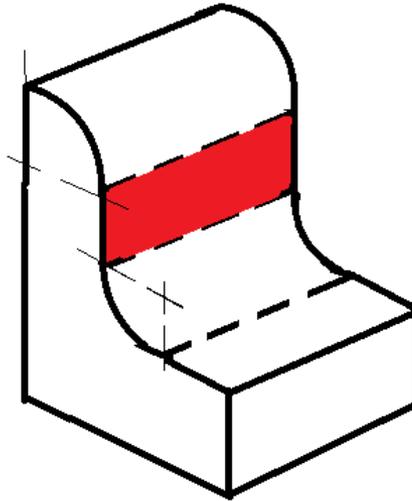
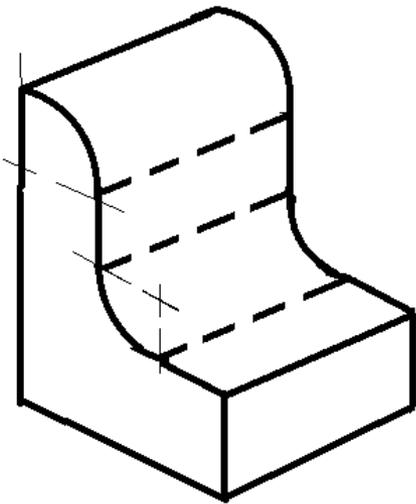


TOP VIEW

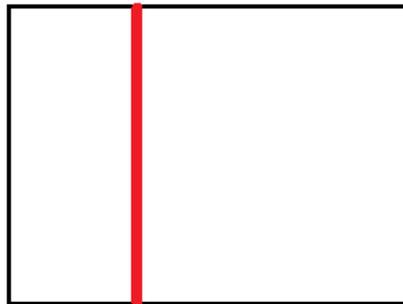
Red Line is due to the intersection of two red planes shown in the isometric view.

Each segment of green line is due to the intersection of blue plane and green planes

Where to draw a line?



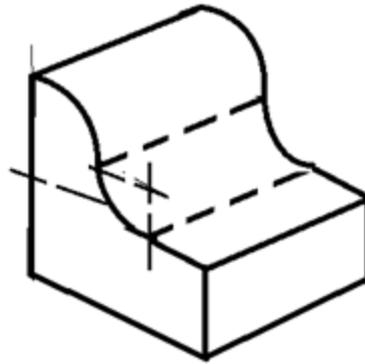
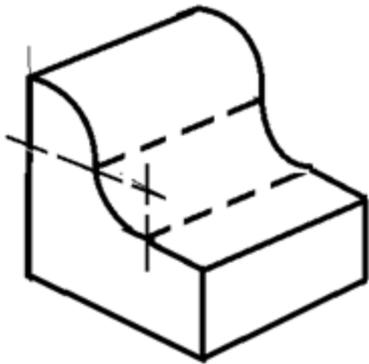
TOP VIEW



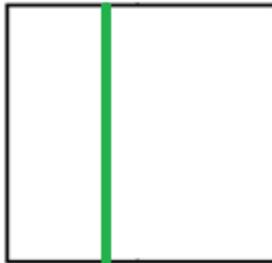
TOP VIEW

The red line is due to the parallel plane shown in isometric view (Red Plane)

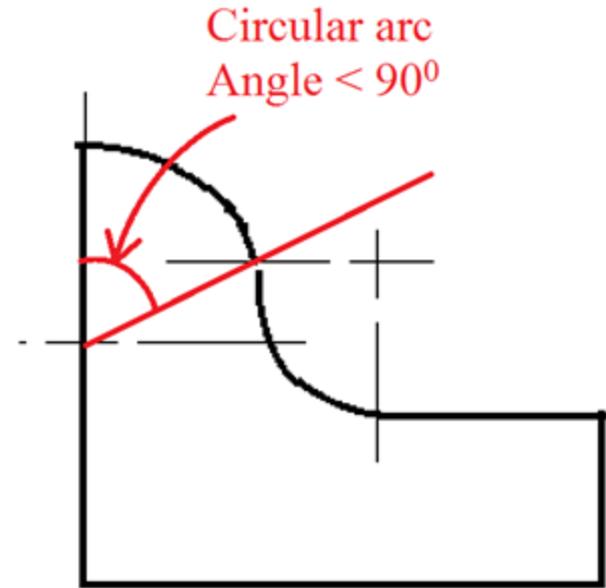
Where to draw a line?



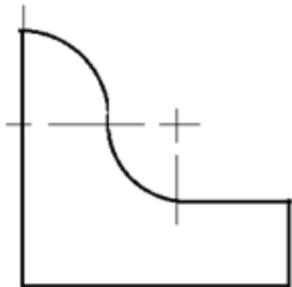
TOP VIEW



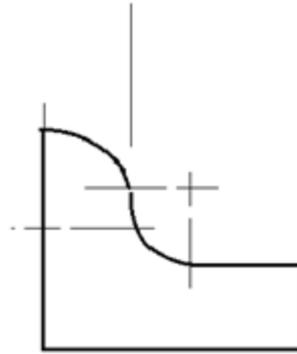
TOP VIEW



FRONT VIEW



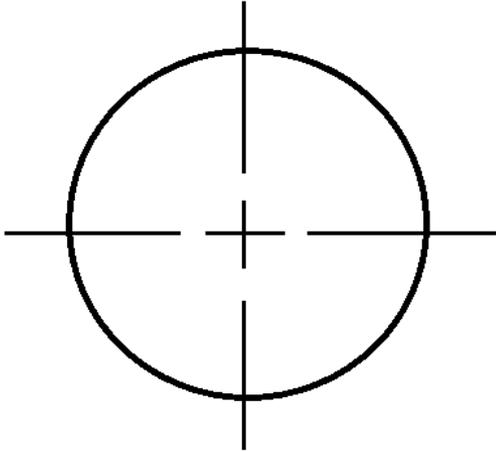
FRONT VIEW



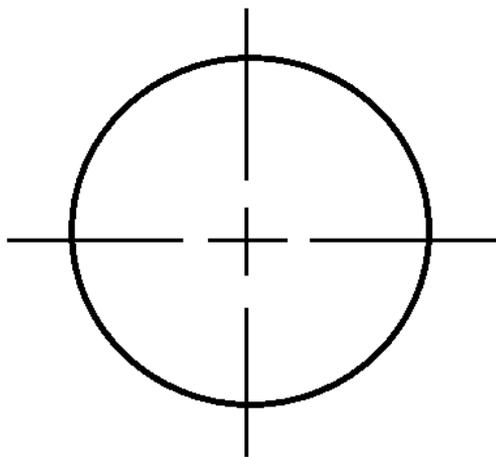
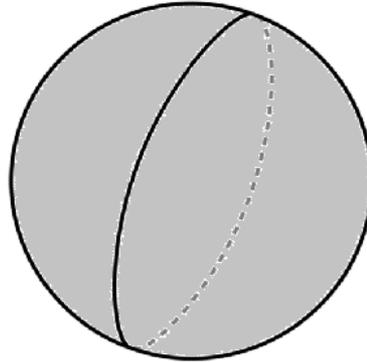
FRONT VIEW

Green line is because the angle between the tangents of the two intersecting planes are neither 0° nor 180° .

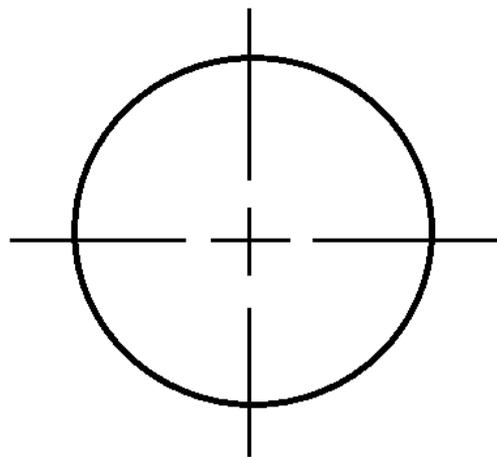
Where to draw a line?



TOP VIEW



FRONT VIEW



RHS VIEW

The circular views are due to the tangent of the curved surface that is parallel to the eye when seen from each side.

Different Types of Lines



Object Line



Hidden Line



Center Line



**Section Line or
Cutting Plane Line**

Line Specifications



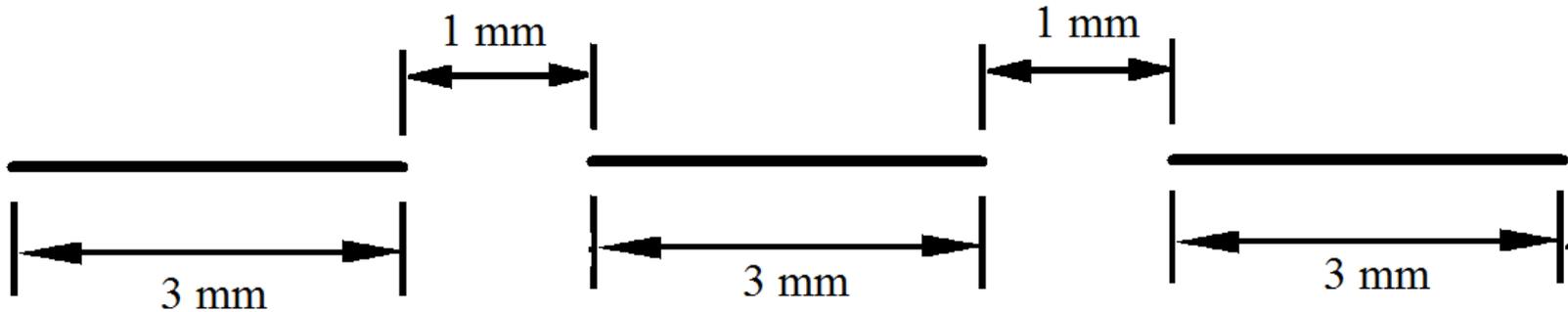
Thickness: 100 %

Object Line



Thickness: 50 %

Hidden Line

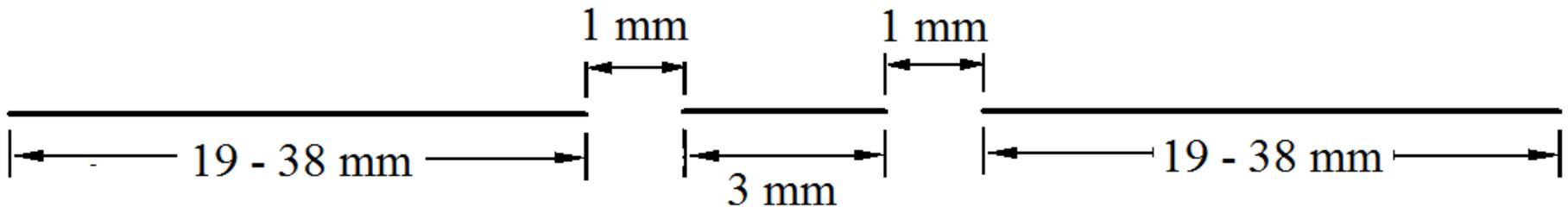


N.B.: All Percentages are with respect to the object line

Line Specifications

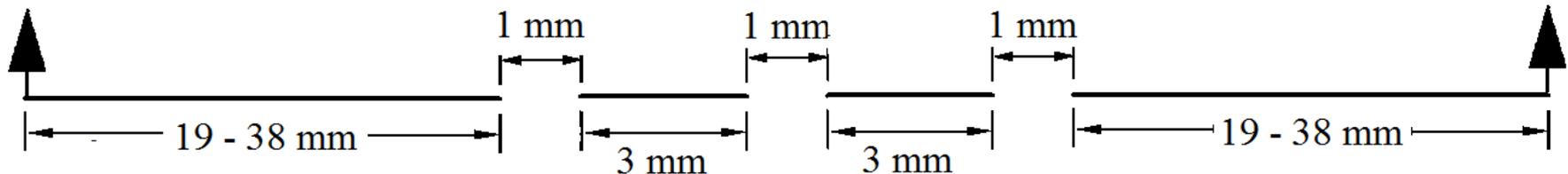
Center Line

Thickness: 50 %



Section Line

Thickness: 125 %

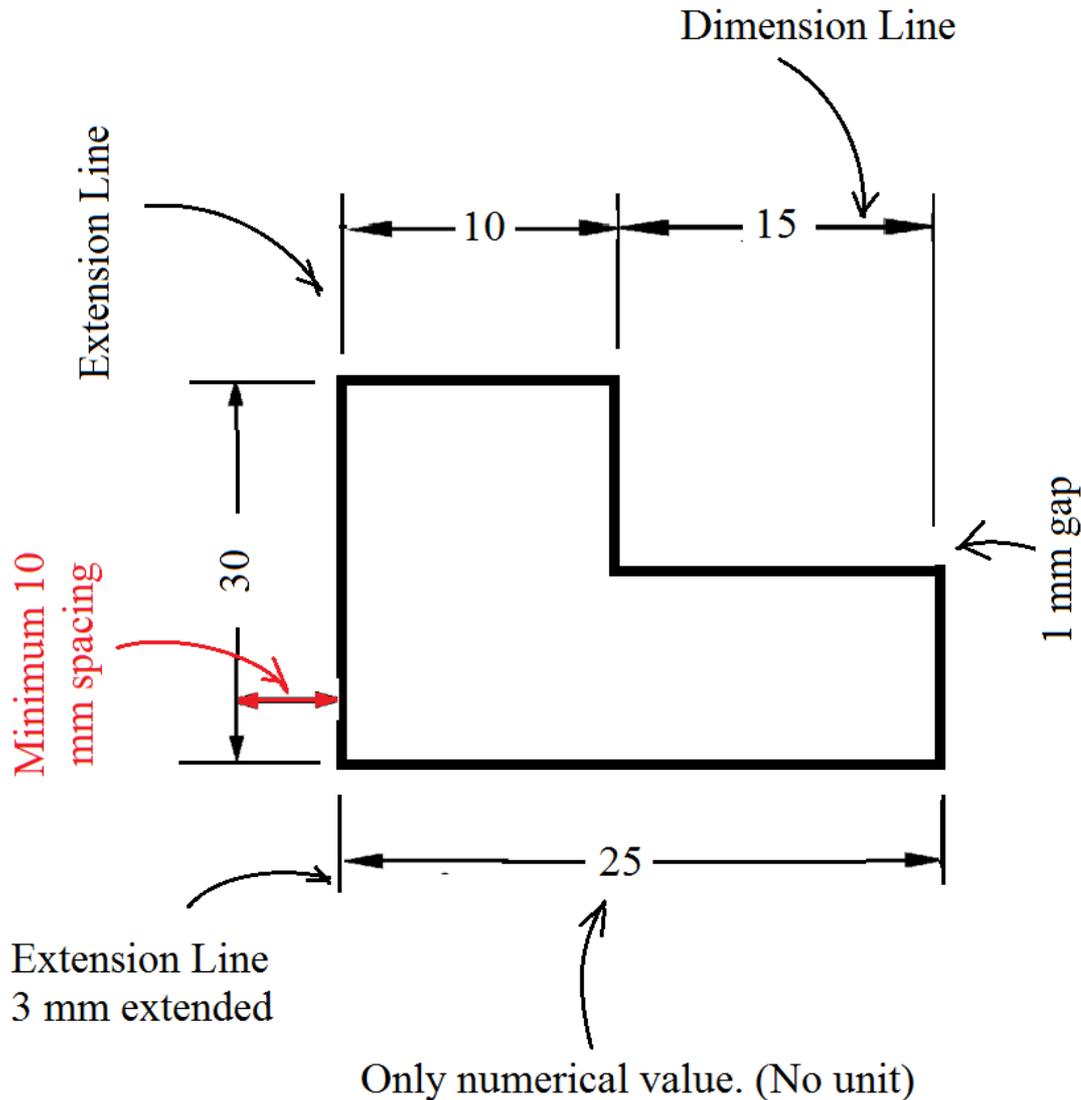


N.B.: All Percentages are with respect to the object line

Rules for Dimensioning

- ** Two types of lines are used for dimensioning in orthographic views:
 - (a) Extension Line
 - (b) Dimension Line
- ** Generally two Types of dimensioning is used in Mechanical Engineering Drawing:
 - (a) Linear
 - (b) Circular
- ** All the dimensions must be presented in ‘mm’.
- ** All the numerical values must be center aligned.

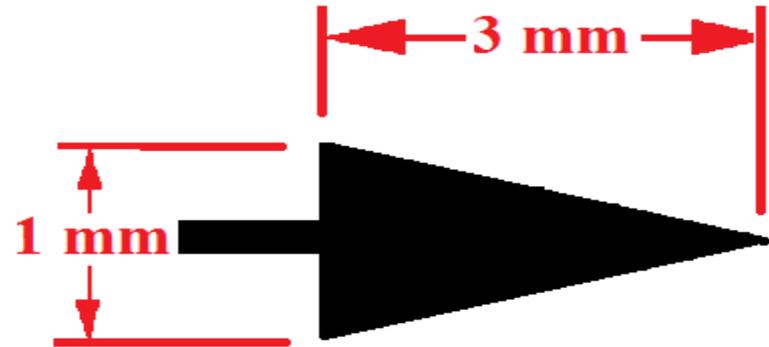
Linear Dimensioning



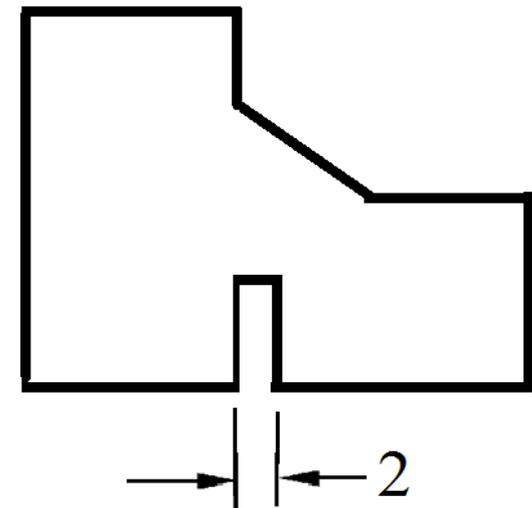
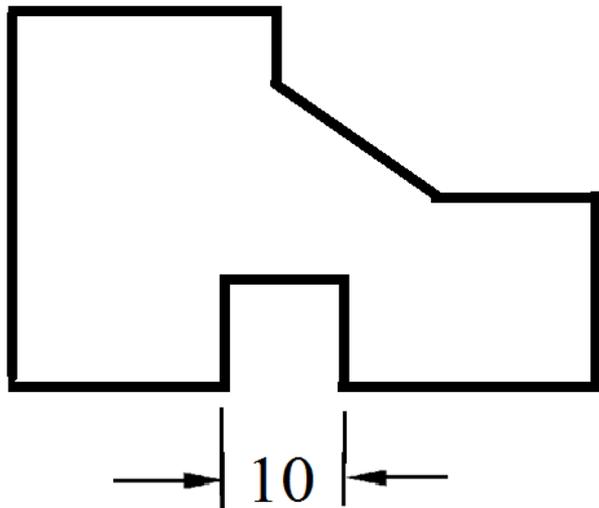
1. Dimension and extension lines must be either horizontal or vertical.
2. No dimension/extension line can cross over another dimension/extension line.
3. There must be one arrowhead at each end of dimension line.
4. The thickness of both extension and dimension line is 25%.
5. No dimensioning is allowed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

Arrowhead

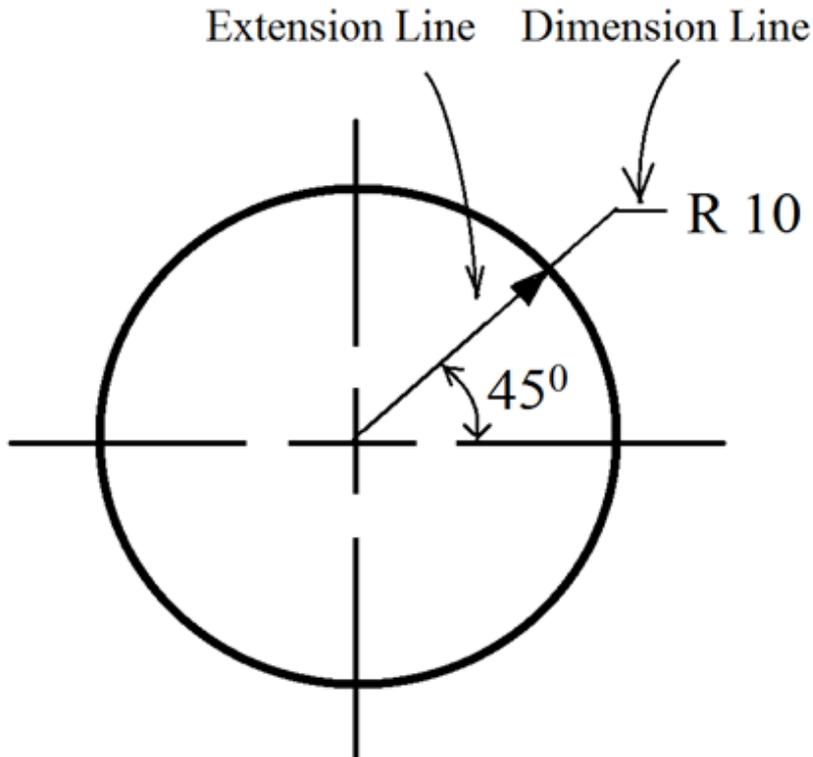
- ** Must be filed.
- ** Length to width ratio is 3:1.



Narrow Dimensioning



Circular Dimensioning



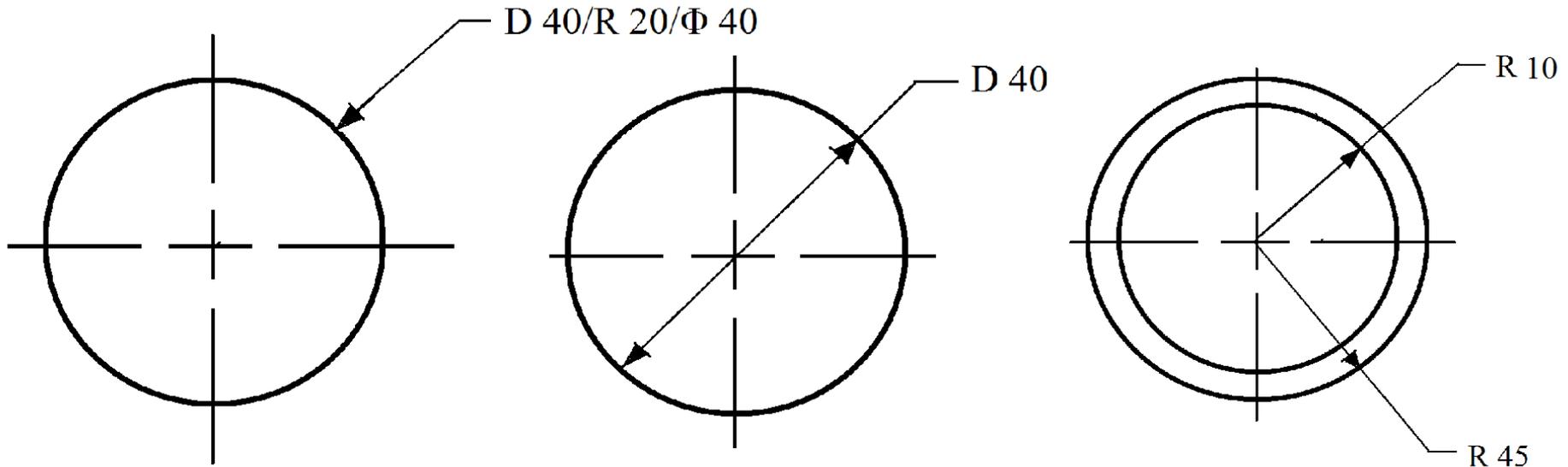
Length of dimension line 3 - 6 mm

R 10 represents Radius = 10

Before dimensioning Centerline
must be drawn.

1. Dimension lines must be either horizontal or vertical.
2. Extension line preferably be inclined at an angle of $45^{\circ}/135^{\circ}/225^{\circ}/315^{\circ}$.
3. No dimension/extension line can cross over another dimension/extension line.
4. There must be one arrowhead on the extension line.
5. The thickness of both extension and dimension line is 25%.
6. No dimensioning is allowed inside the object.
7. The arrowhead must touch the circle whose dimension is being shown.

Circular Dimensioning



D = Diameter;

R = Radius;

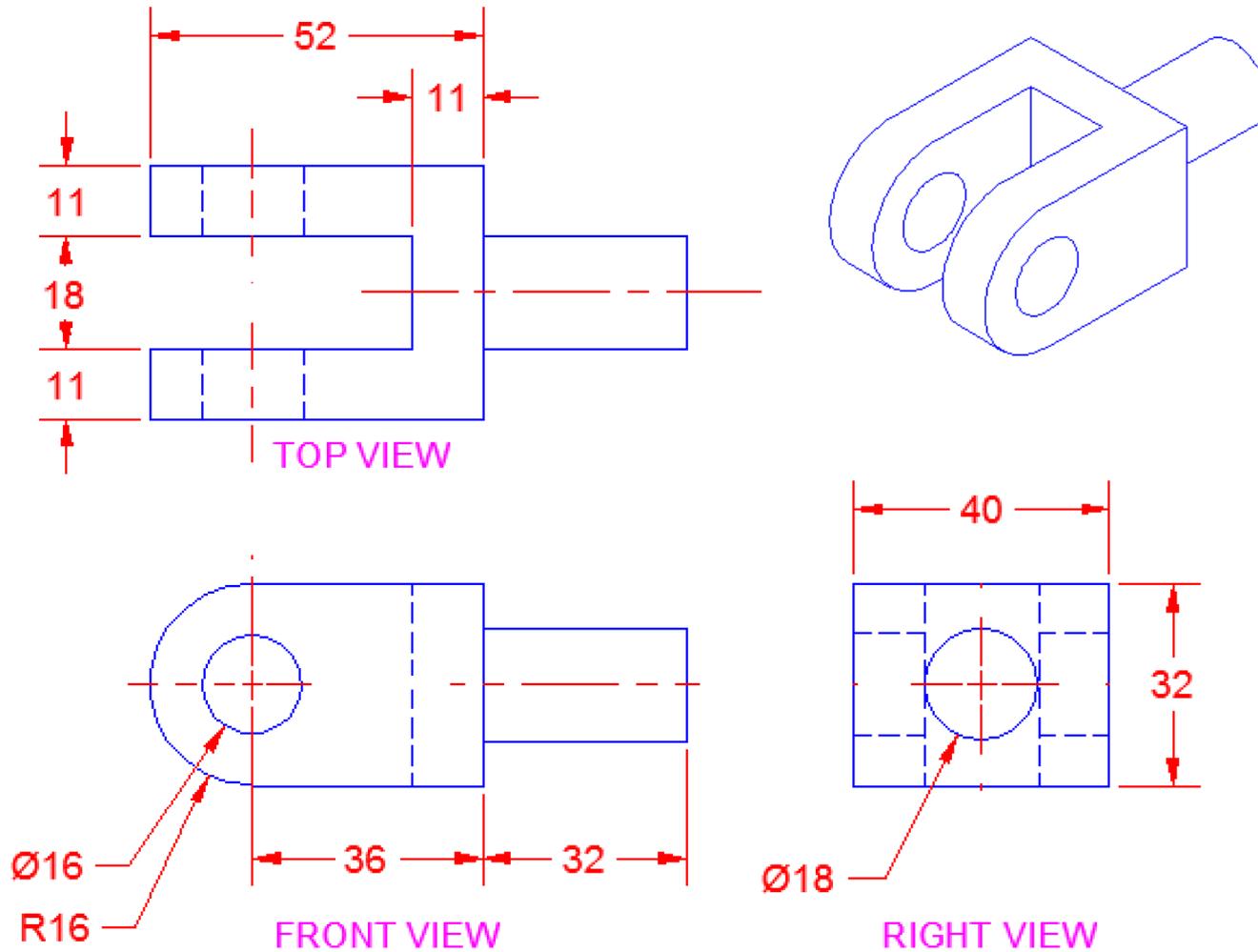
Φ = Diameter;

DRILL = Diameter;

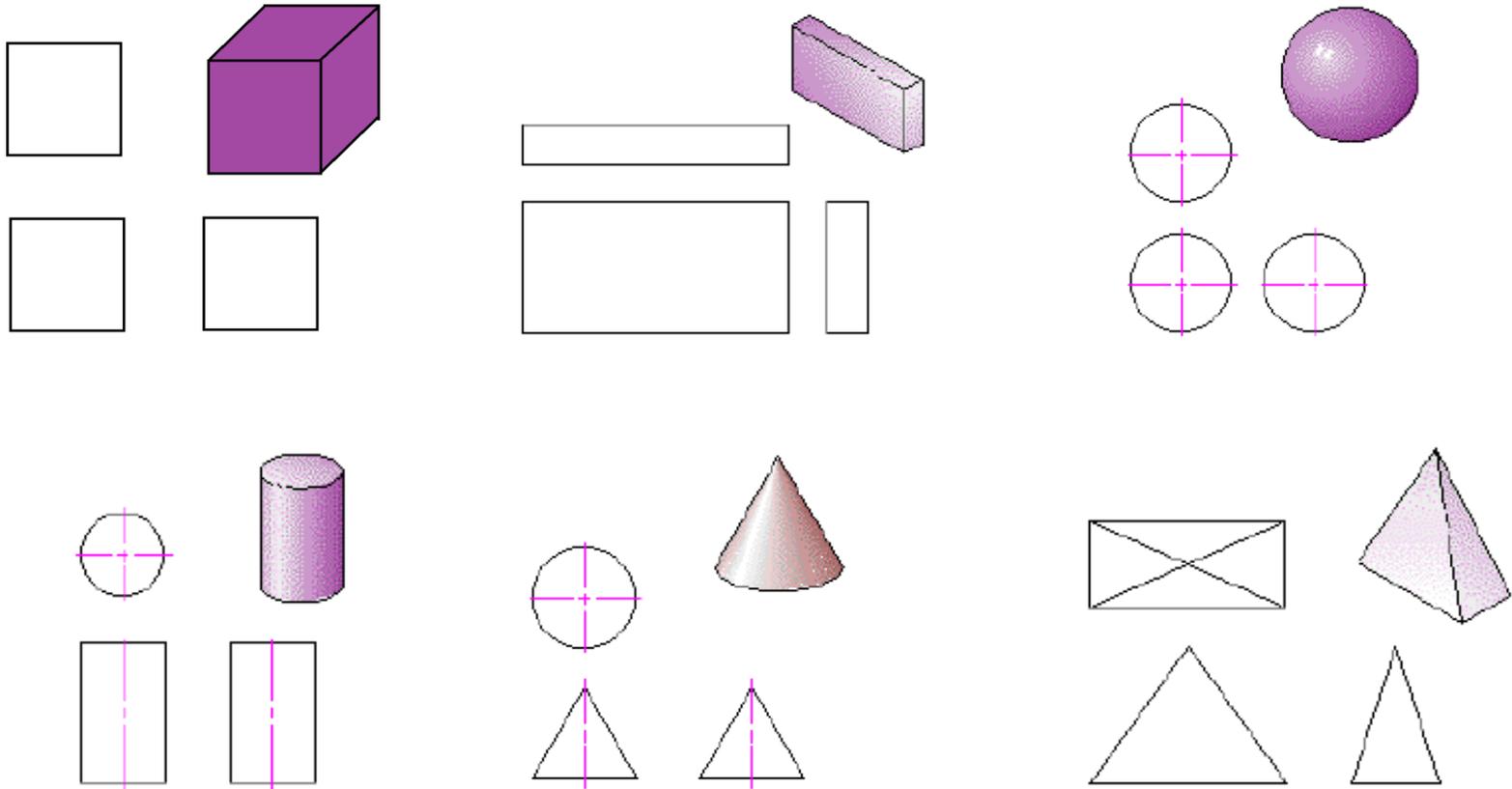
REAM = Diameter;

The projection of the extension line in first figure must go through the center of the circle

Complete Dimensioning

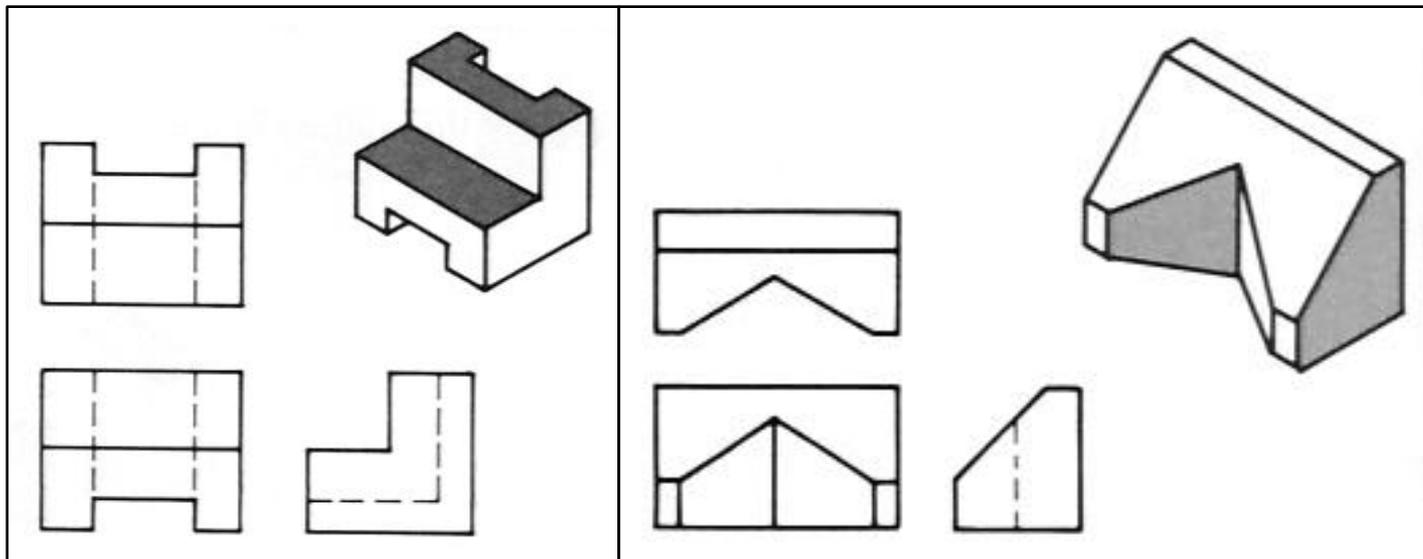
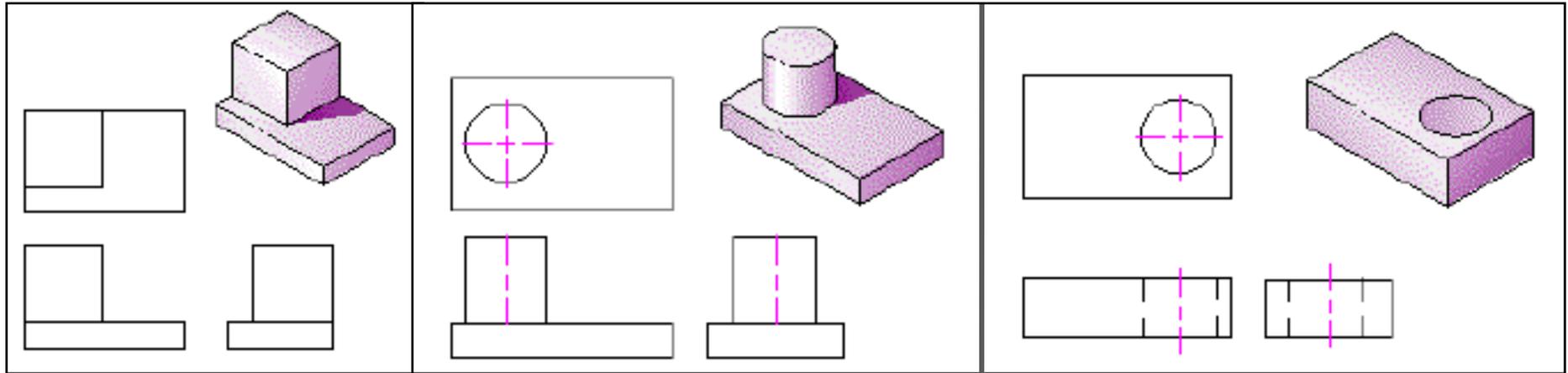


Different Types of Views

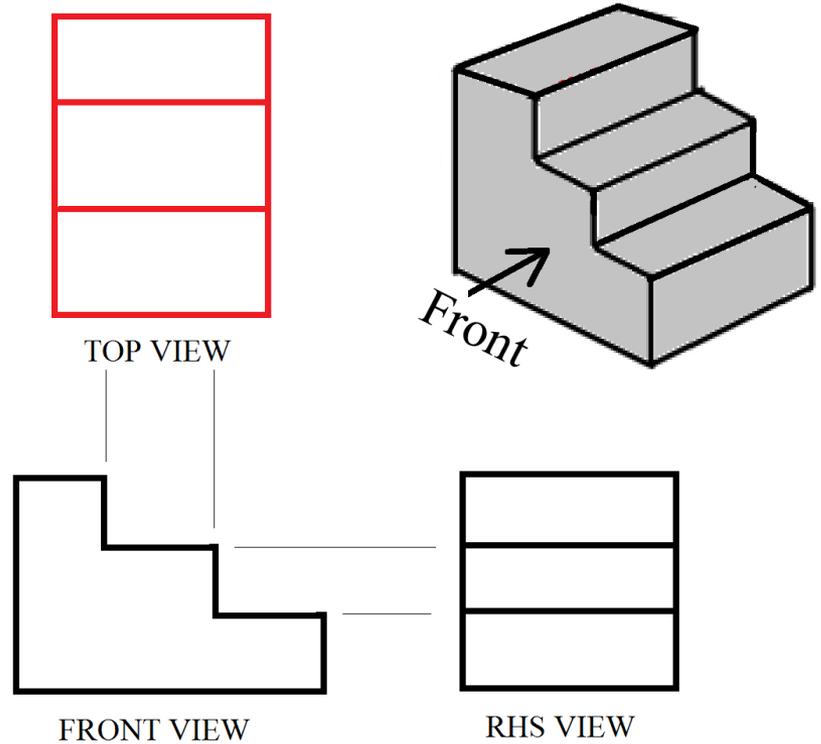
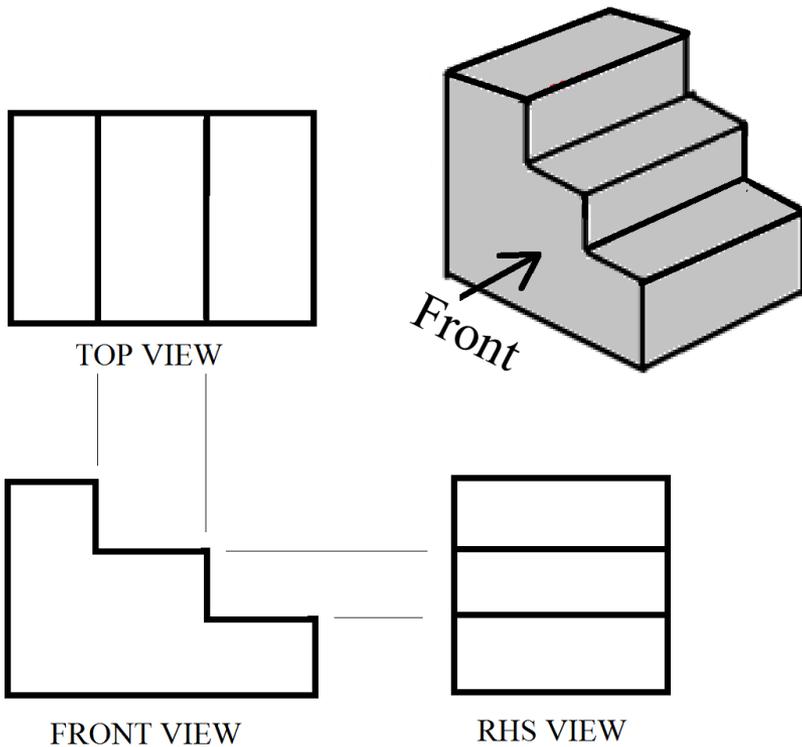


**** Some objects do not need all three of the orthographic views.**

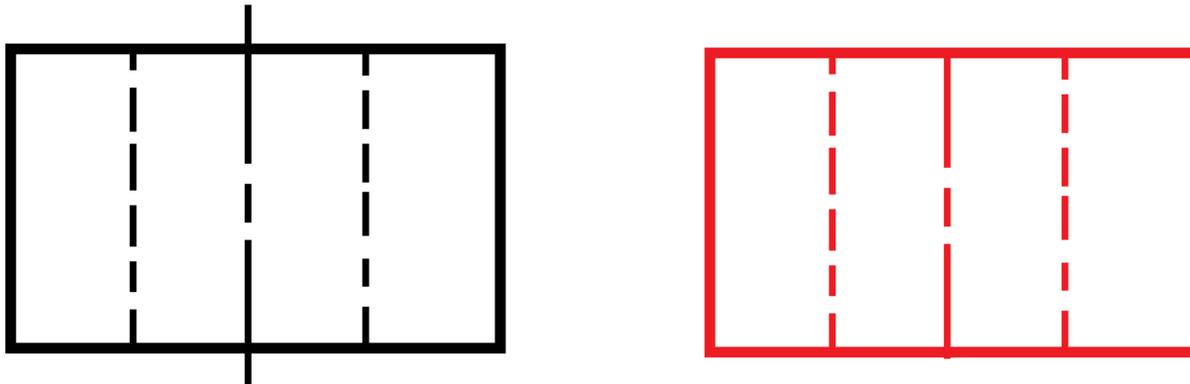
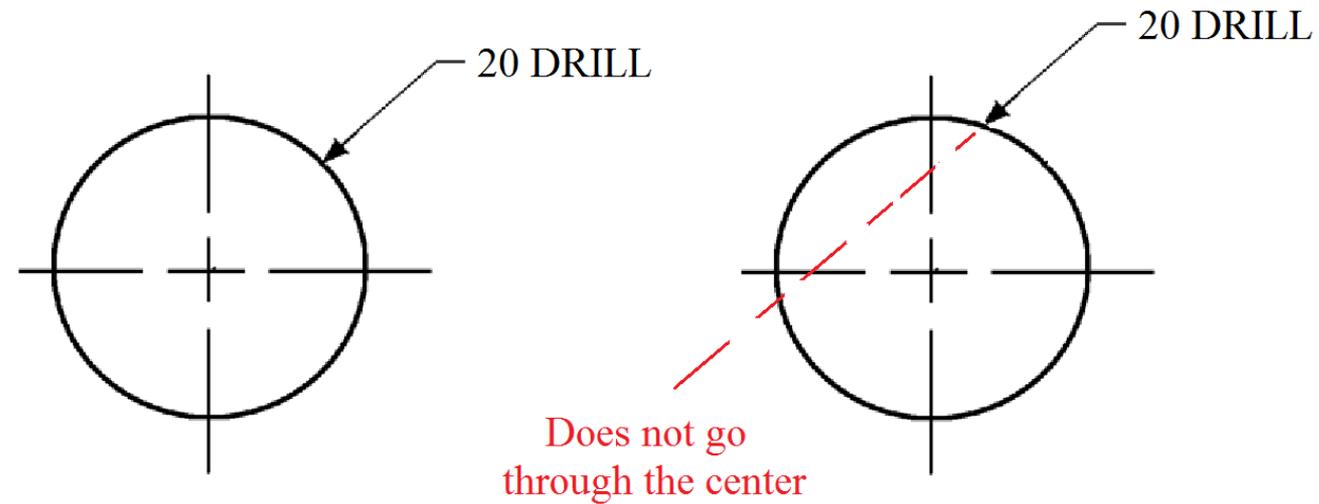
Sample of some orthographic Views



Some Common Mistakes



Some Common Mistakes



No extension for hidden line ; 3 - 6 mm extension for center line



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M M Alam, ME, BUET