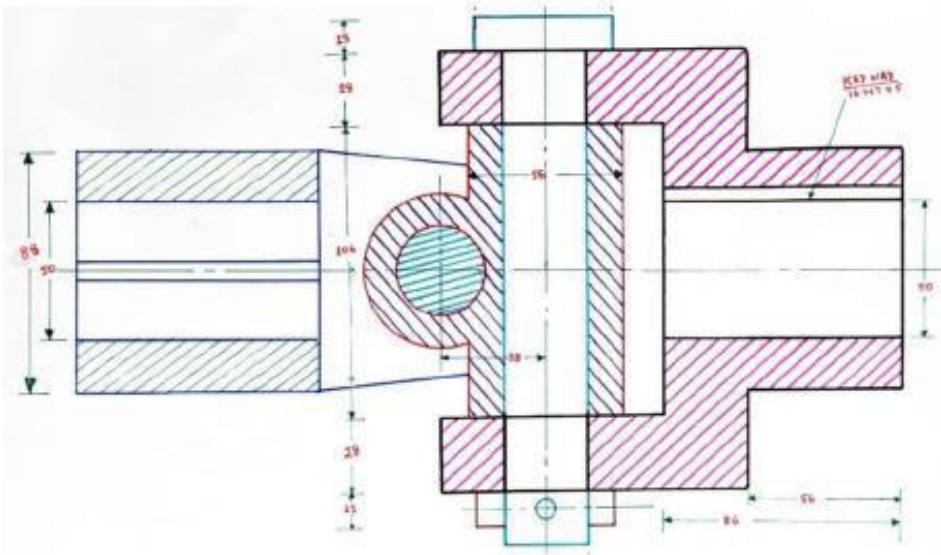


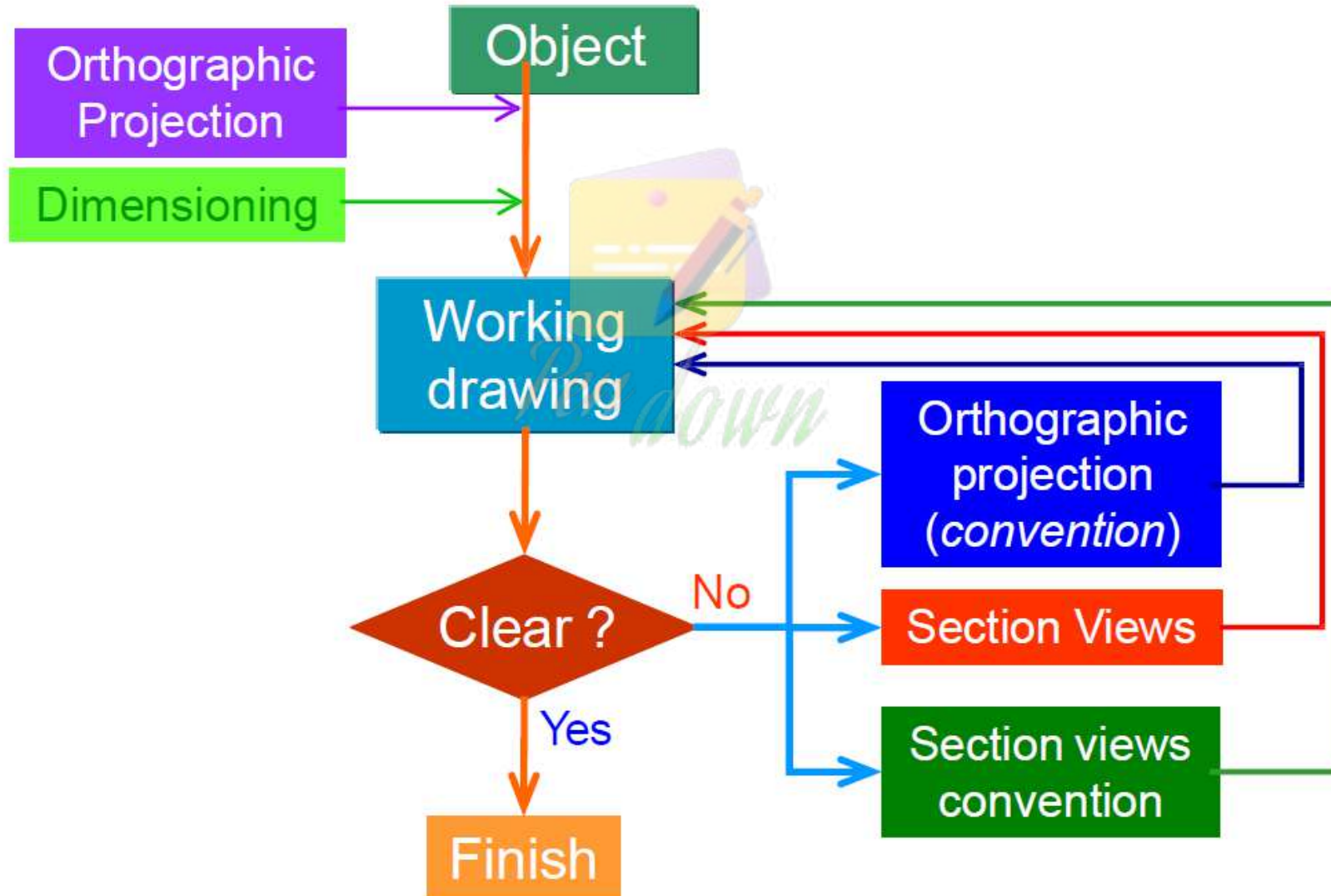
# Engineering Graphics



# TOPICS

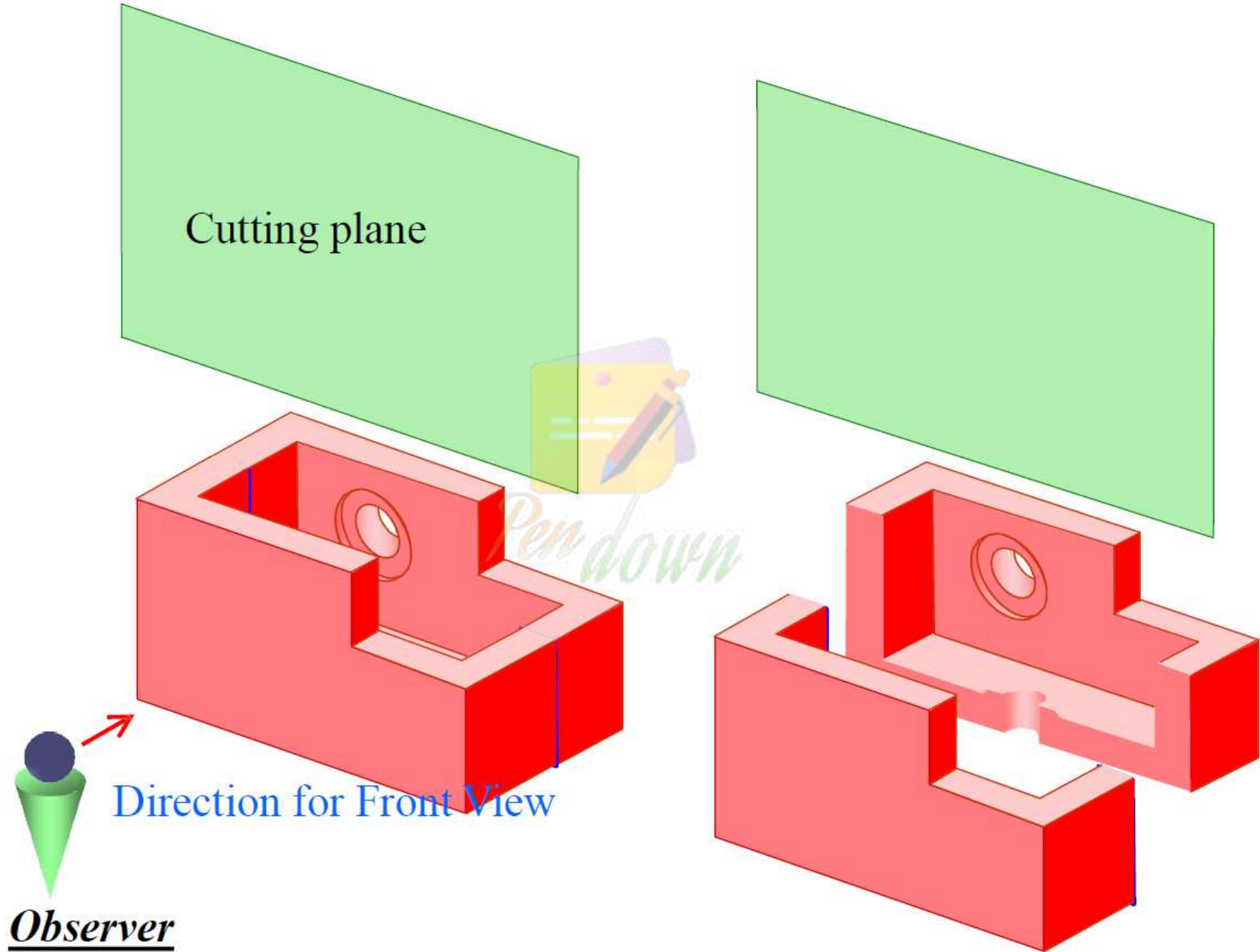
- Introduction
- Terminology & common practices
- Kind of sections
- Dimensioning

# GRAPHICS COMMUNICATION WITH ENGINEERING DRAWING

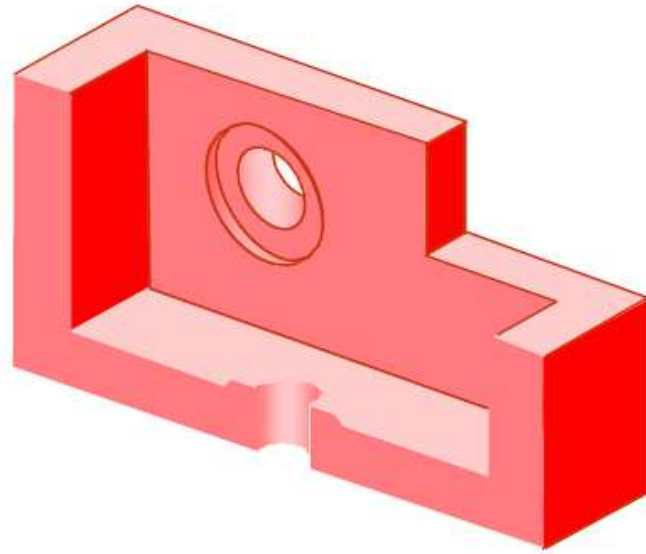


# PURPOSES OF SECTION VIEWS

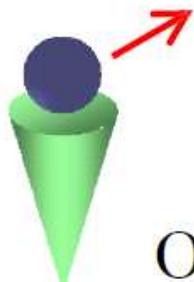
- Clarify the views by
  - ❖ reducing or eliminating the hidden lines.
  - ❖ revealing the cross sectional's shape.
- Facilitate the dimensioning.



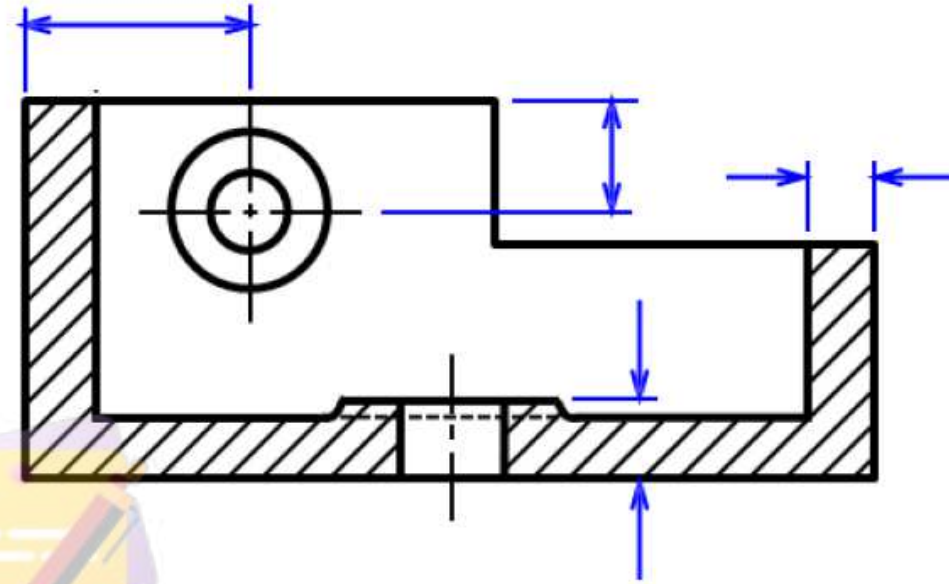




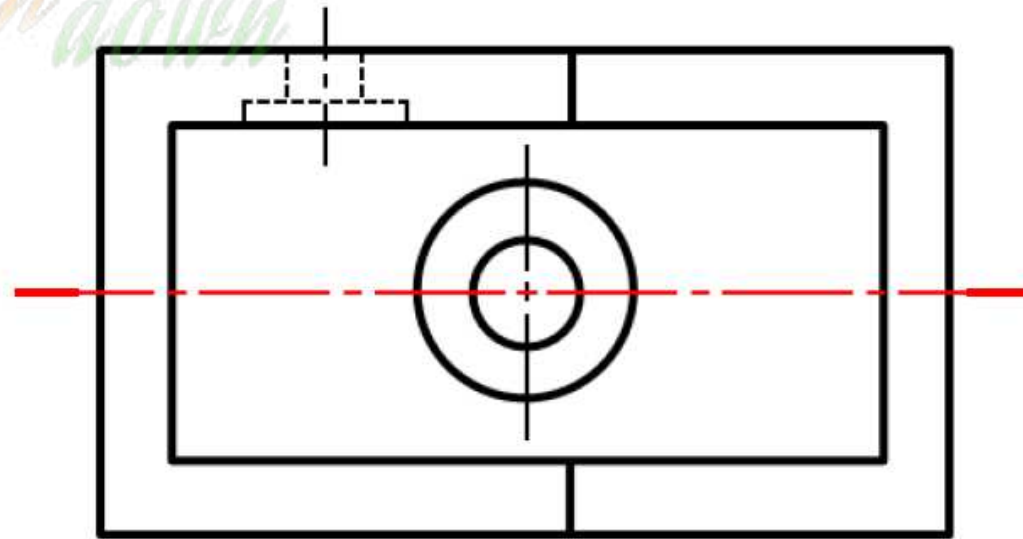
Full section to see the front view



Observer



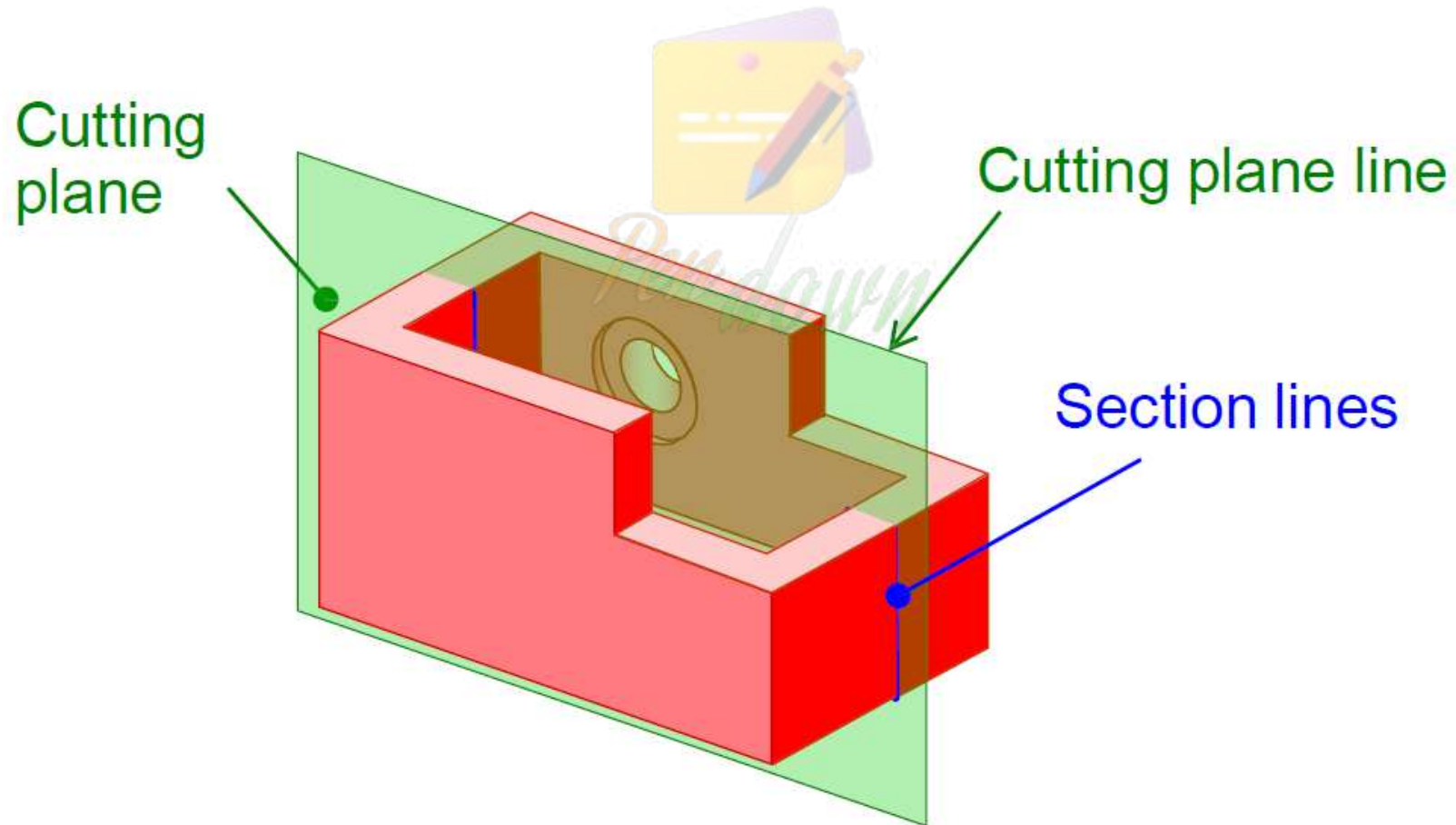
Front view full in section



Top view

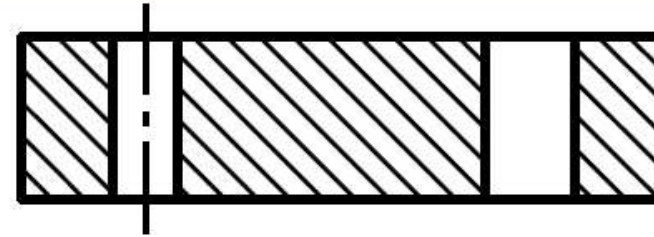
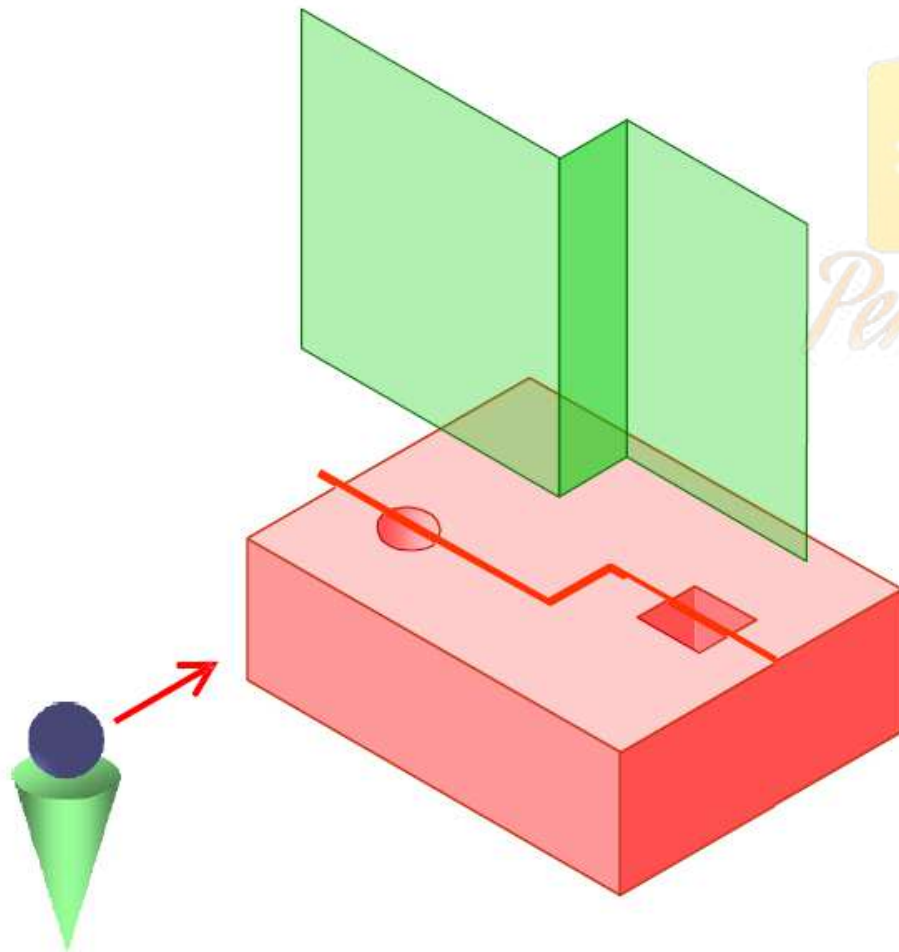
# CUTTING PLANE

***Cutting plane*** is a plane that ***imaginarily cuts*** the object to reveal the internal features.

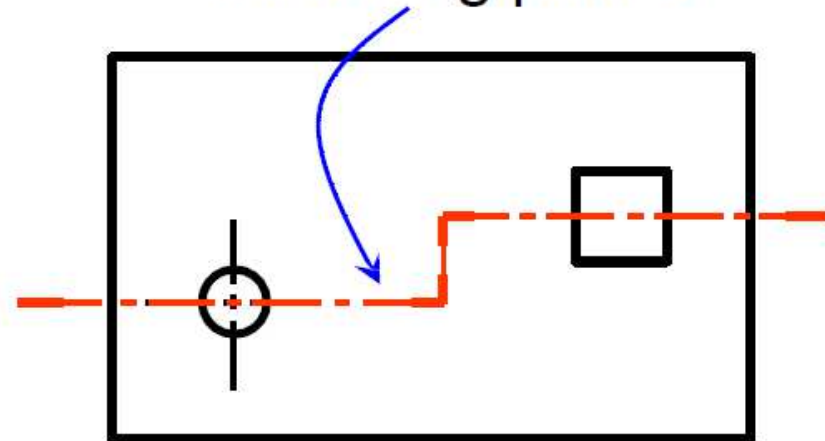


# CUTTING PLANE LINE

*Cutting plane line* is an *edge view* of the cutting plane.



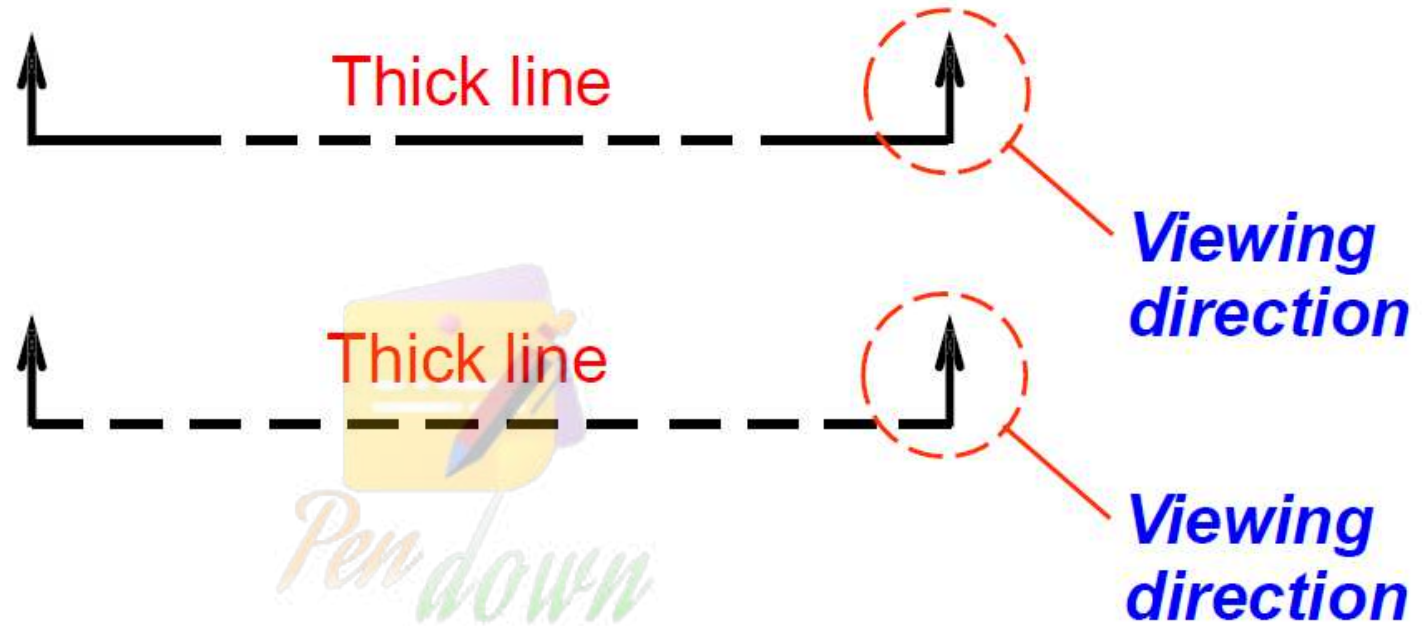
Indicate the *path* of cutting plane.



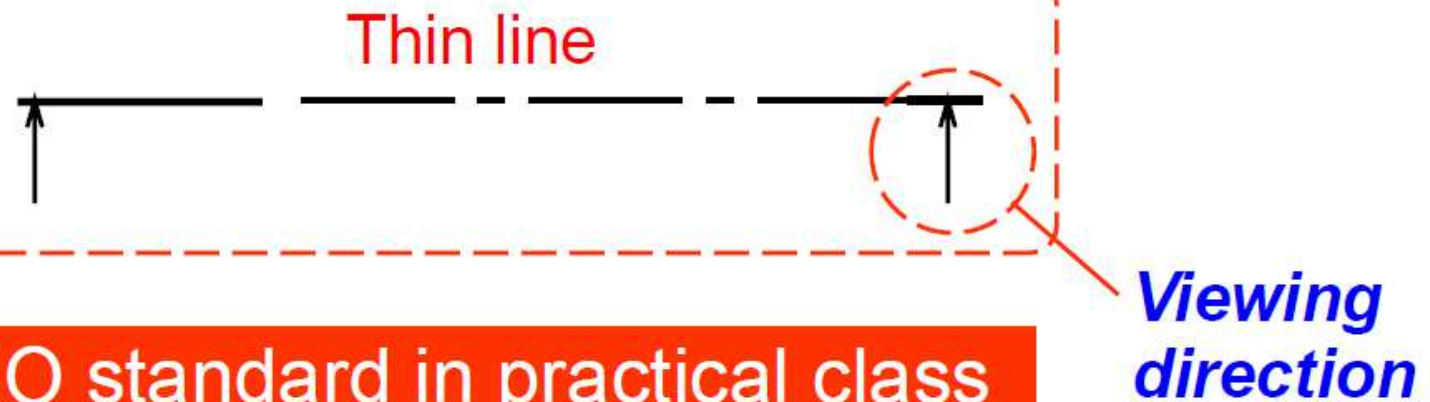


# CUTTING PLANE LINESTYLES

ANSI  
standard

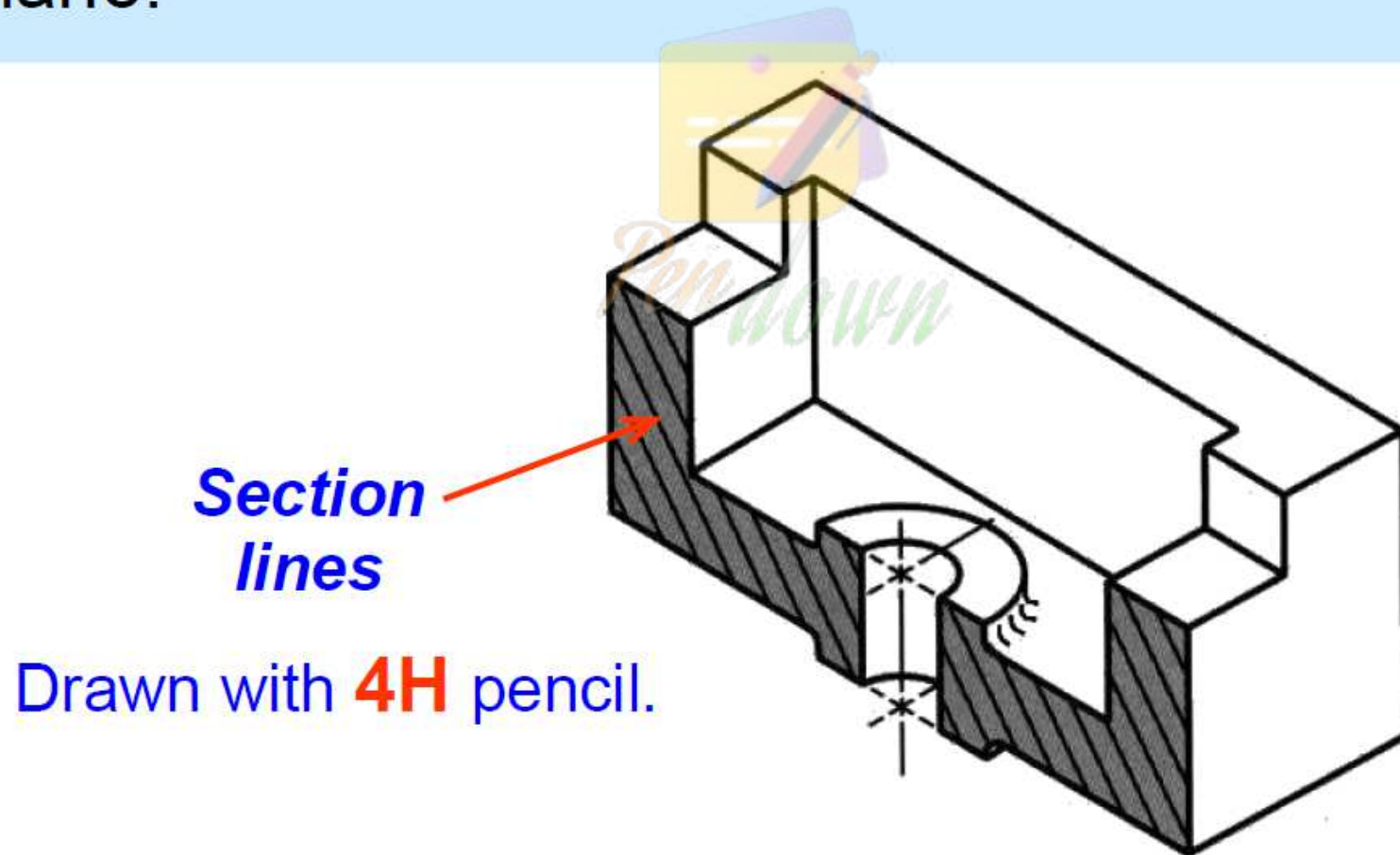


ISO  
standard



# SECTION LINING

**Section lines** or **cross-hatch lines** are used to *indicate the surfaces that are cut by the cutting plane.*



# KIND OF SECTIONS



1. Full section

2. Half section



3. Offset section

4. Broken-out section

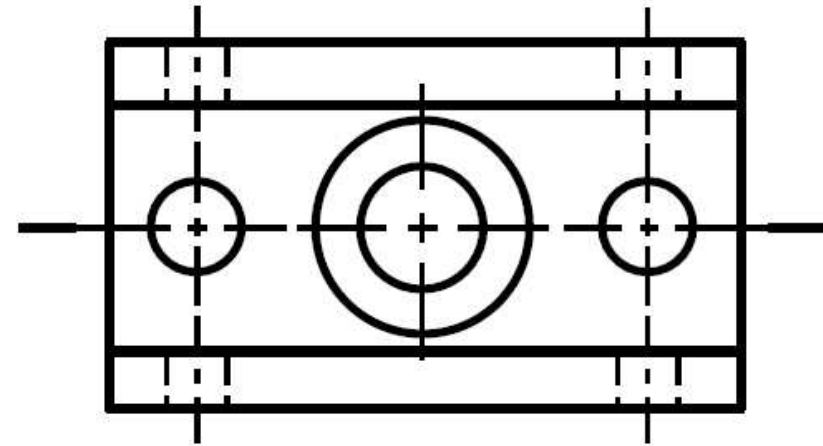
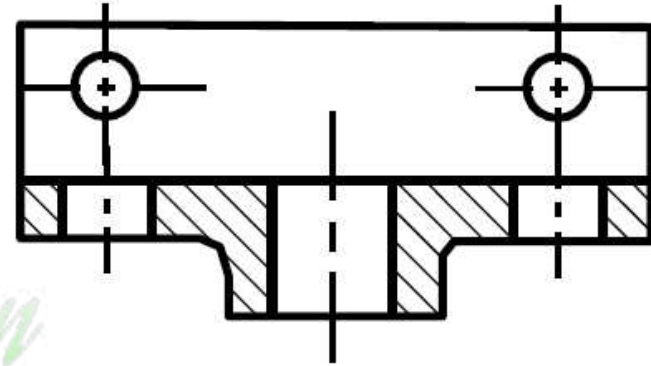
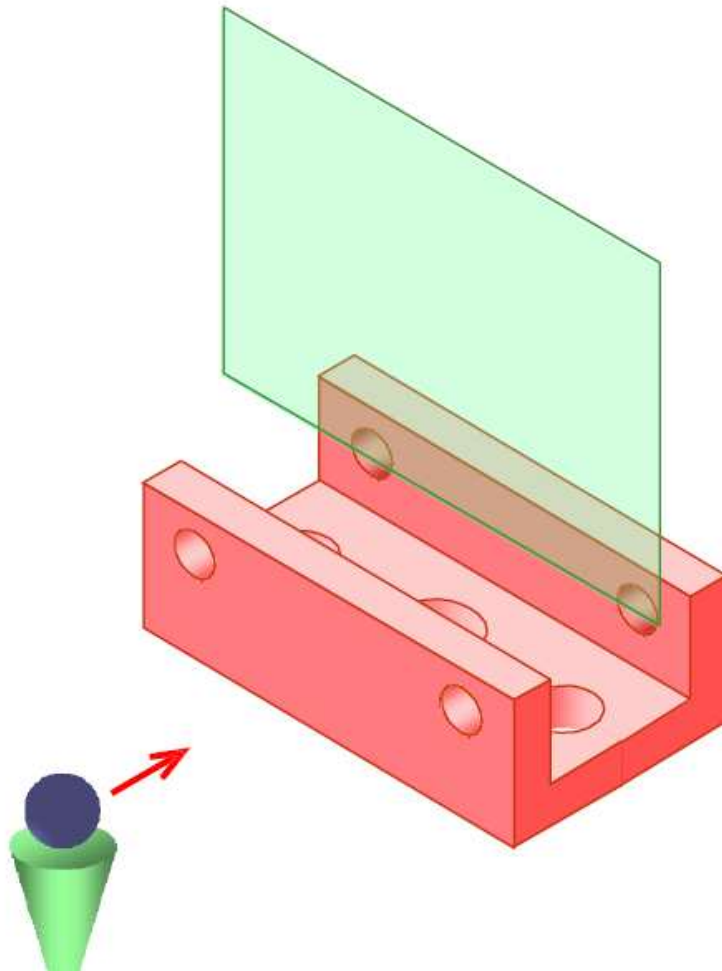
5. Revolved section (aligned section)

6. Removed section (detailed section)

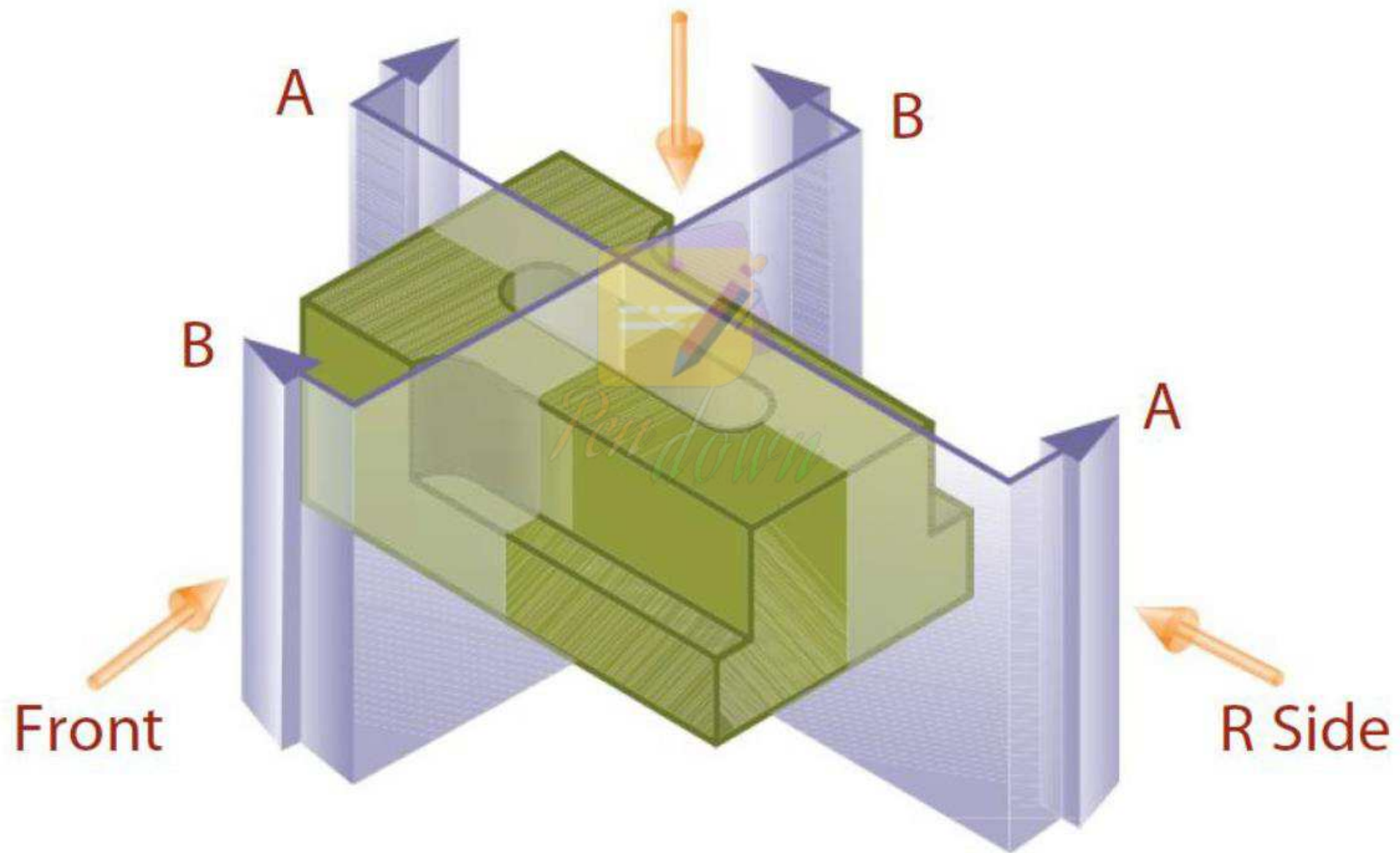


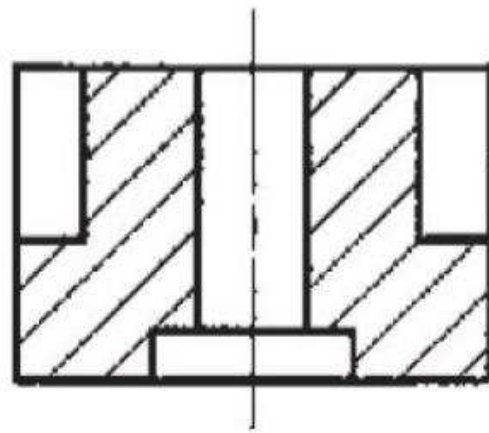
# FULL SECTION VIEW

The view is made by passing the *straight* cutting plane *completely through* the part.

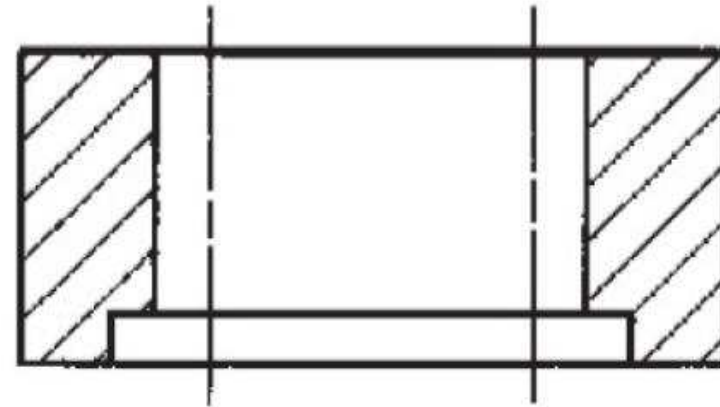




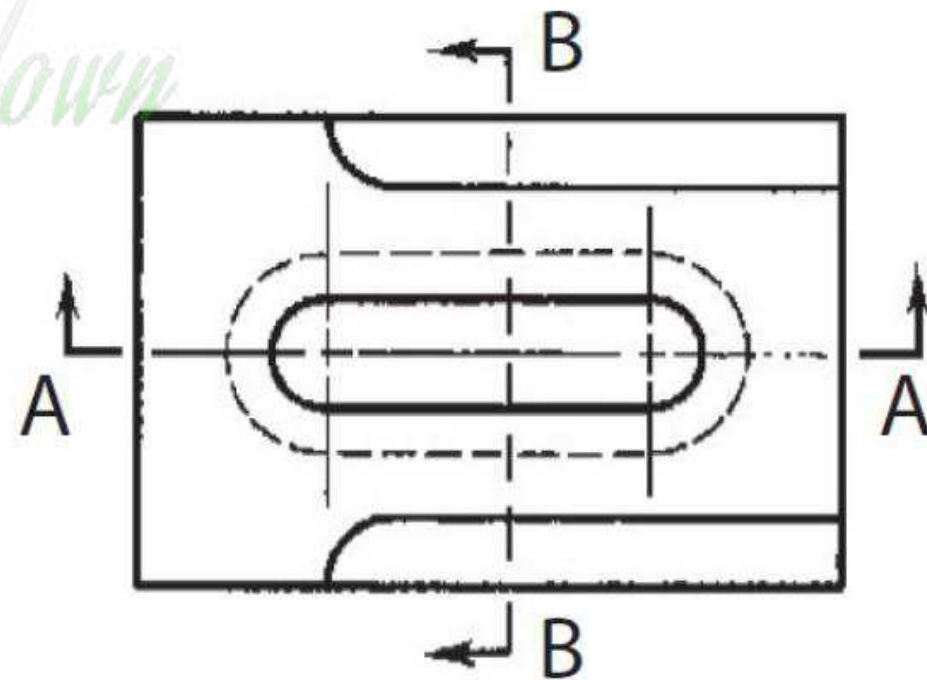




Section B-B

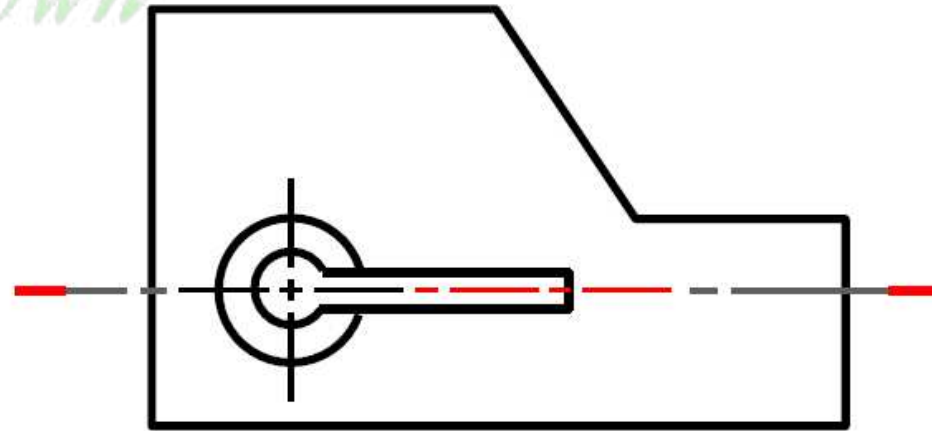
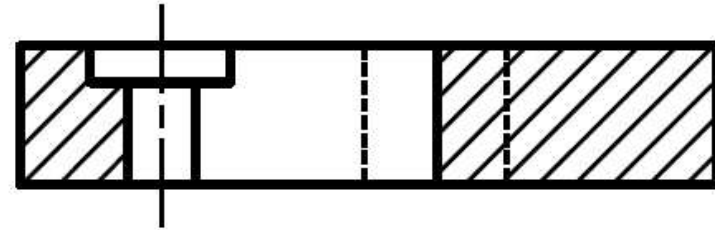
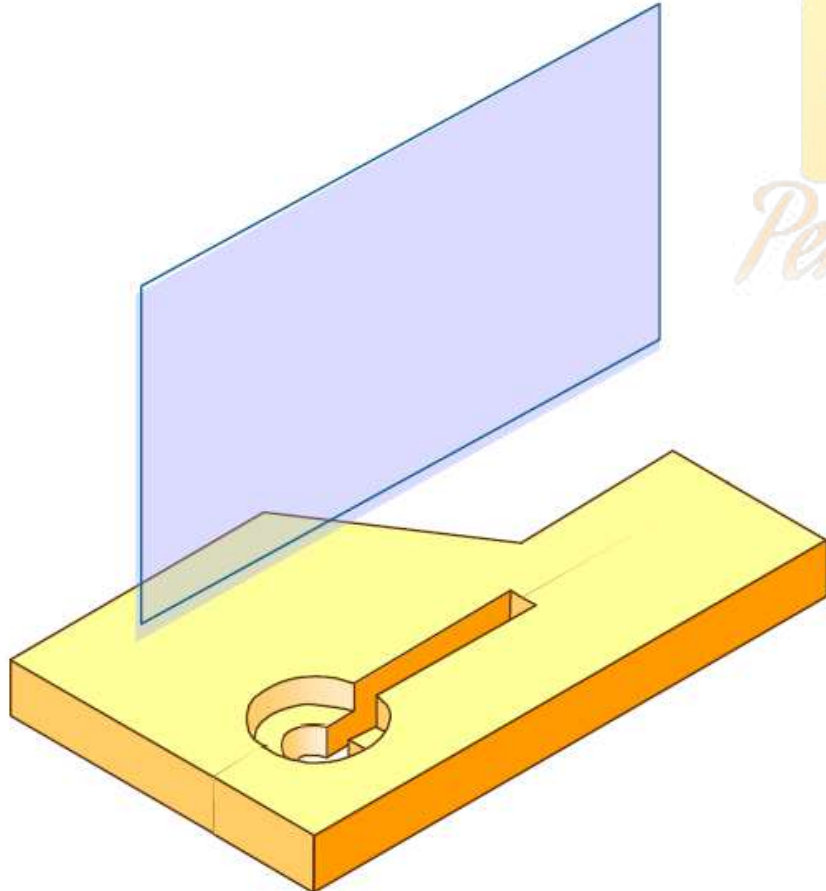


Section A-A



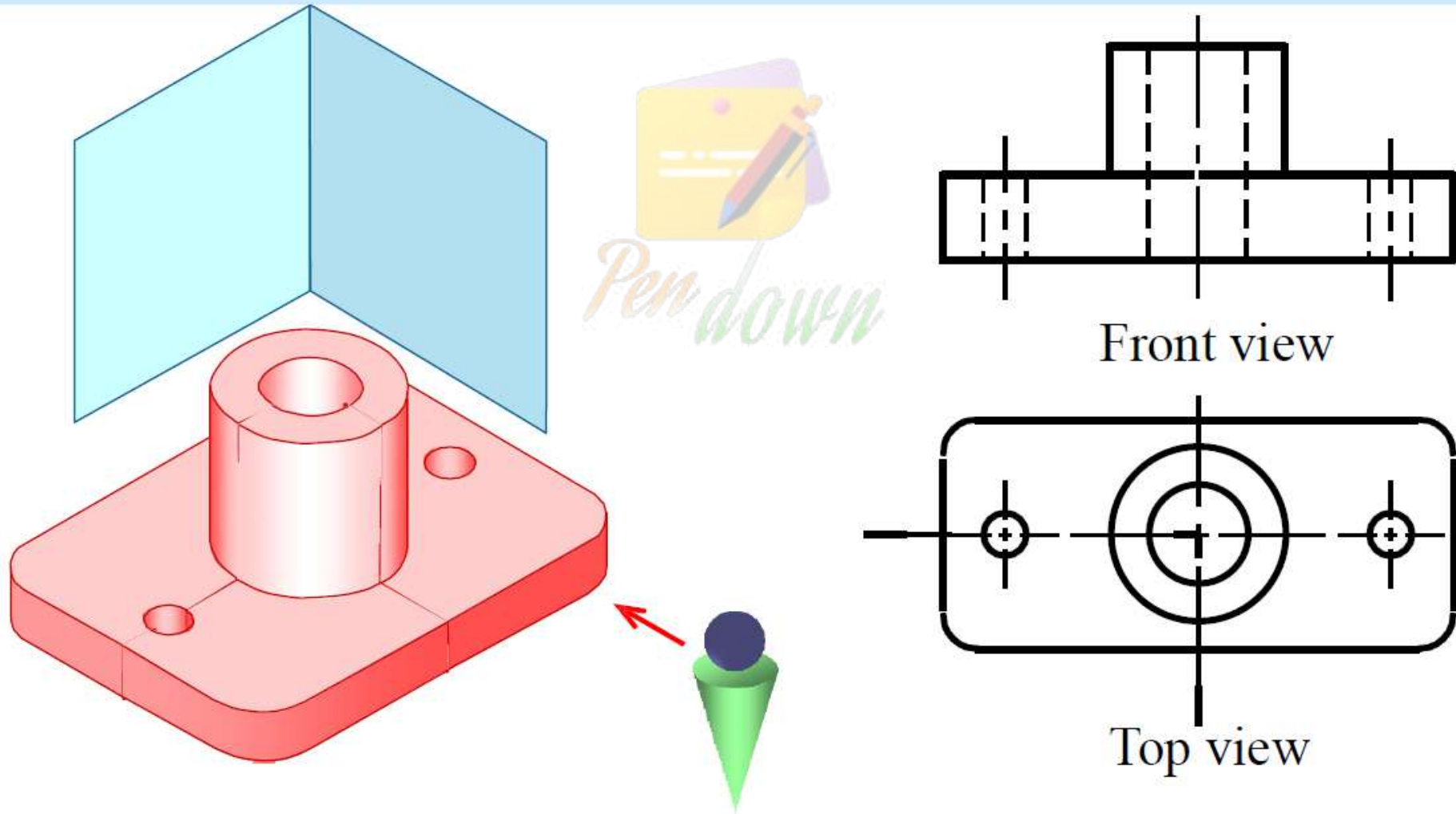
# TREATMENT OF HIDDEN LINES

- Hidden lines are *normally omitted* from section views.



# HALF SECTION VIEW

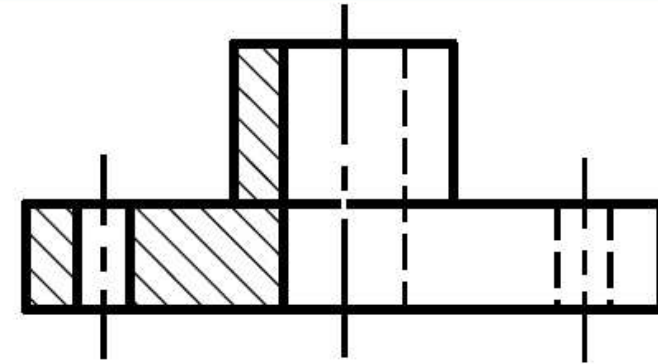
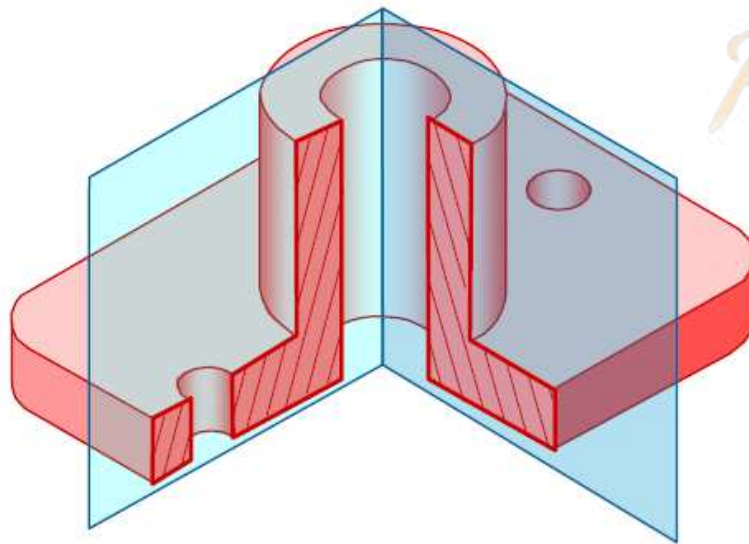
The view is made by passing the cutting plane *halfway* through an object and remove a *quarter* of it.



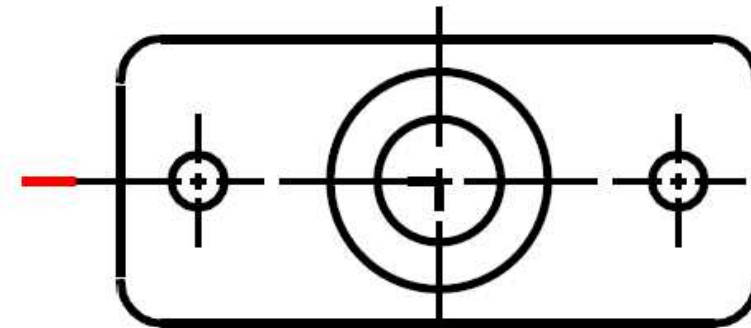


# HALF SECTION VIEW

- A **center line** is used to separate the sectioned half from the unsectioned half of the view.
- **Hidden line** is omitted in unsection half of the view.



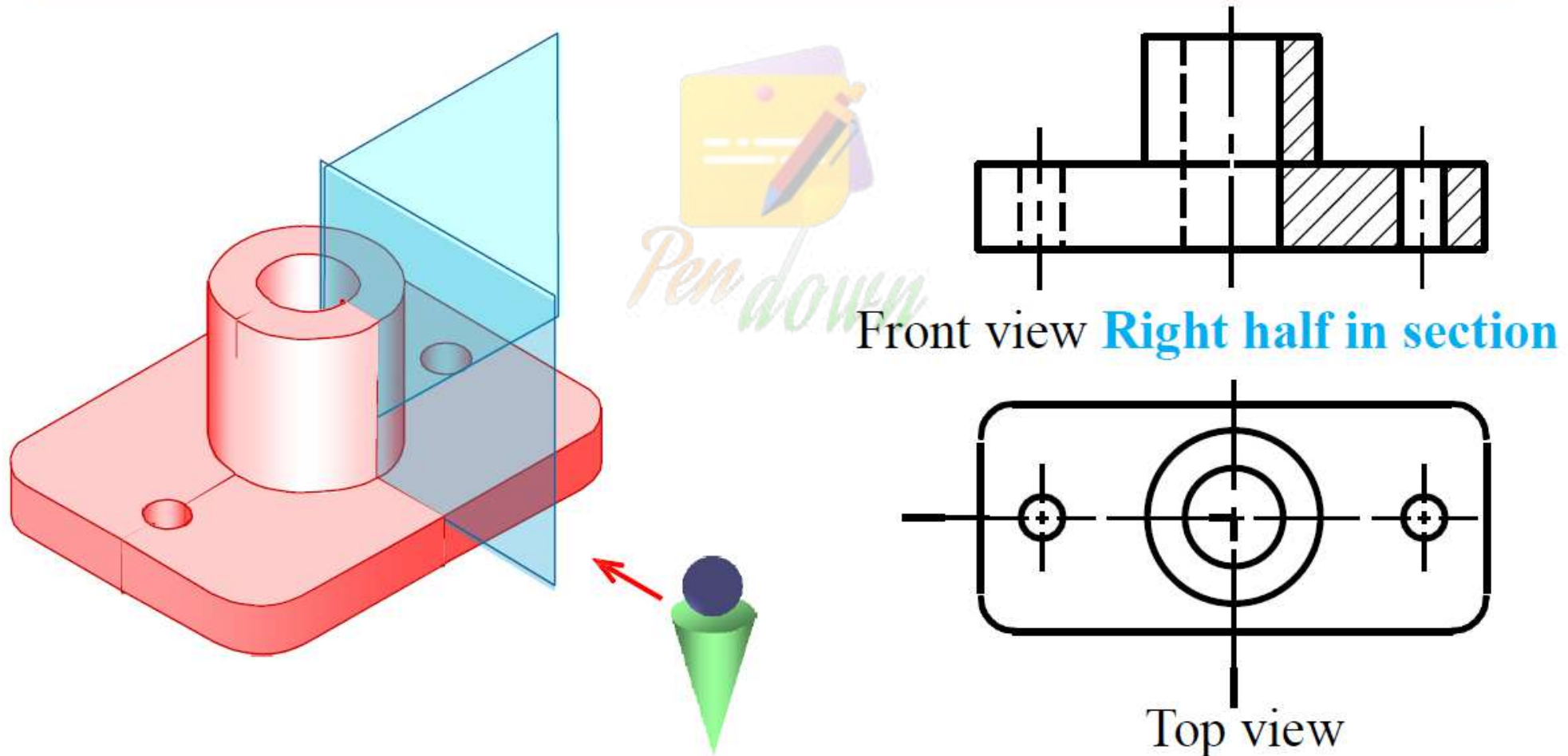
Front view **Left half in section**



Top view

# HALF SECTION VIEW

The view is made by passing the cutting plane *halfway* through an object and remove a *quarter* of it.



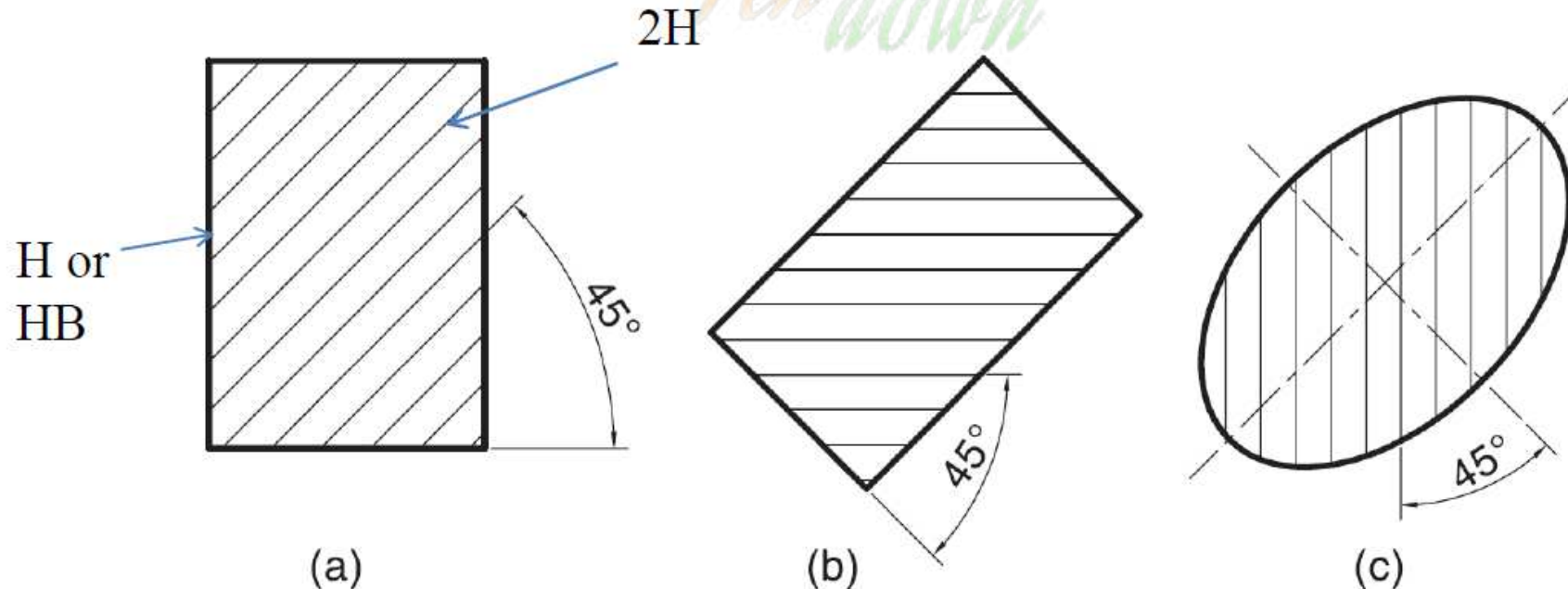
# Hatching of the Sections

The surface created by cutting the object by a section plane is called as *section*.

The section is indicated by drawing the hatching lines (section lines) within the sectioned area.

The hatching lines are drawn at  $45^\circ$  to the principal outlines or the lines of symmetry of the section.


The spacing between hatching lines should be uniform and in proportion to the size of the section.





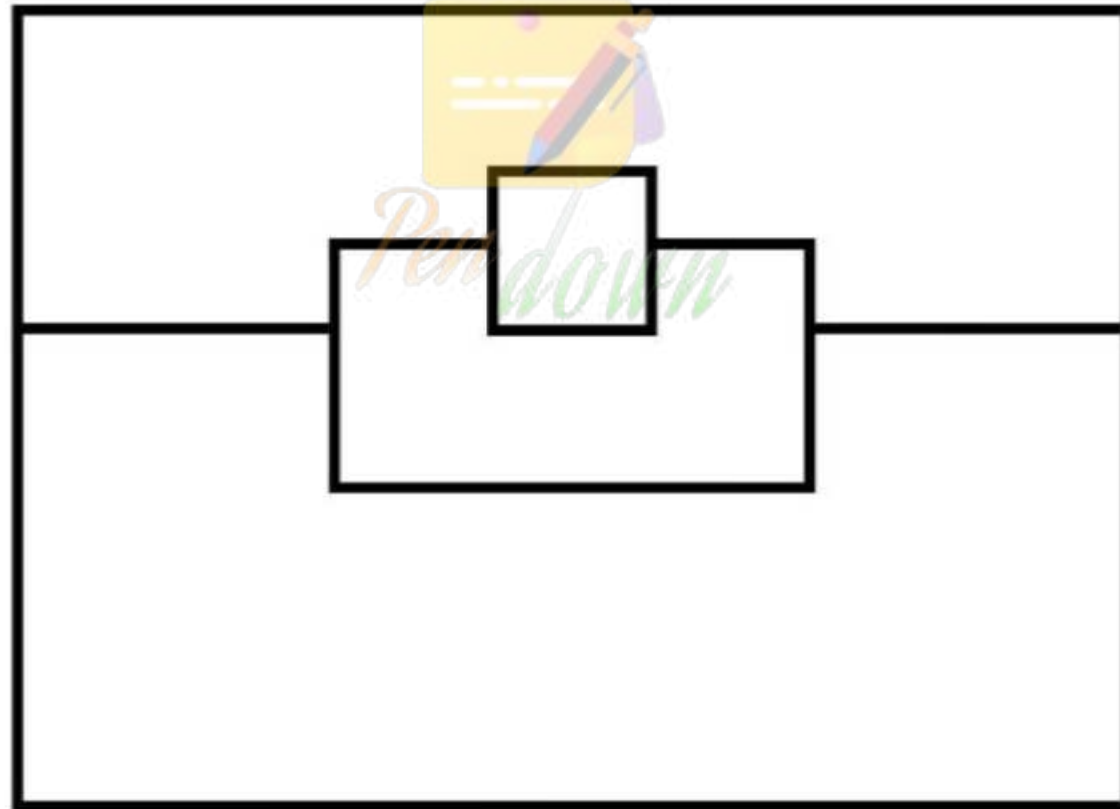
# Section Lines

Section lines in adjacent parts are drawn in opposing directions.

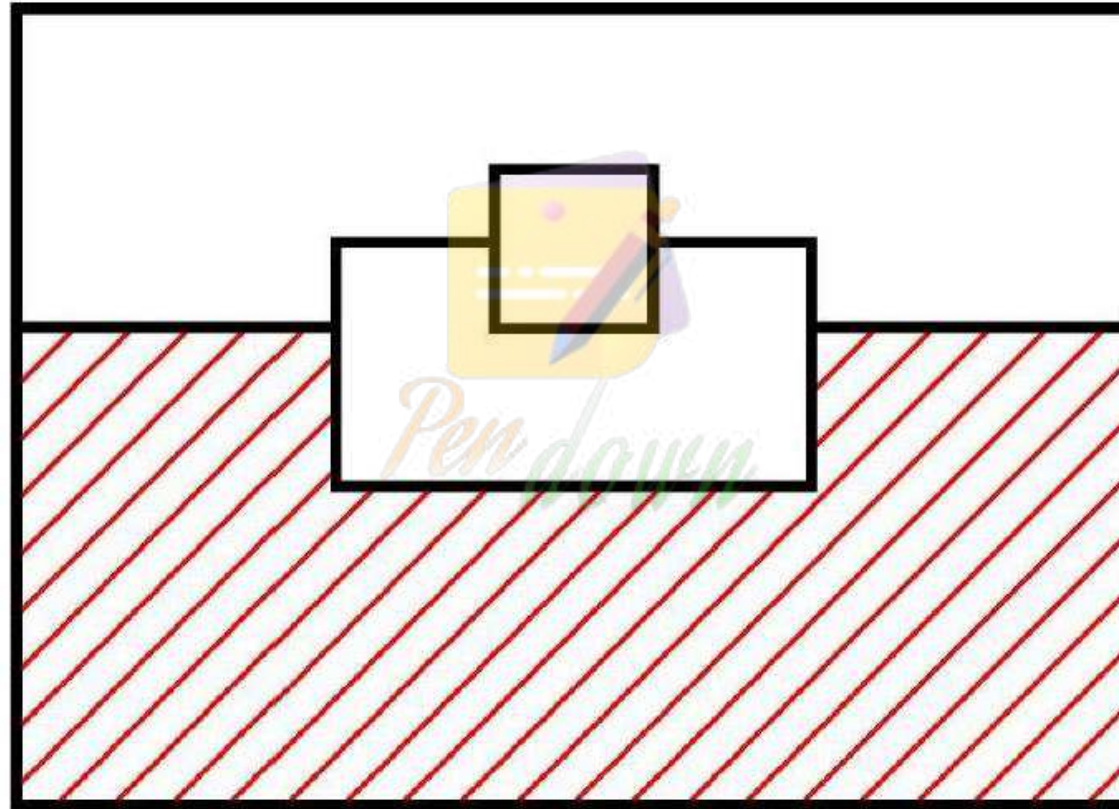
- 
- In the largest area, section lines are drawn at  $45^\circ$
  - Next largest =  $135^\circ$  ( $- 45^\circ$ )
  - Additional areas =  $30^\circ$  and  $60^\circ$
  - Smaller areas = The distance between the section lines may also be varied to further distinguish between parts.



- Draw the section lines for the assembly shown.
- Number of parts or Number of materials are four

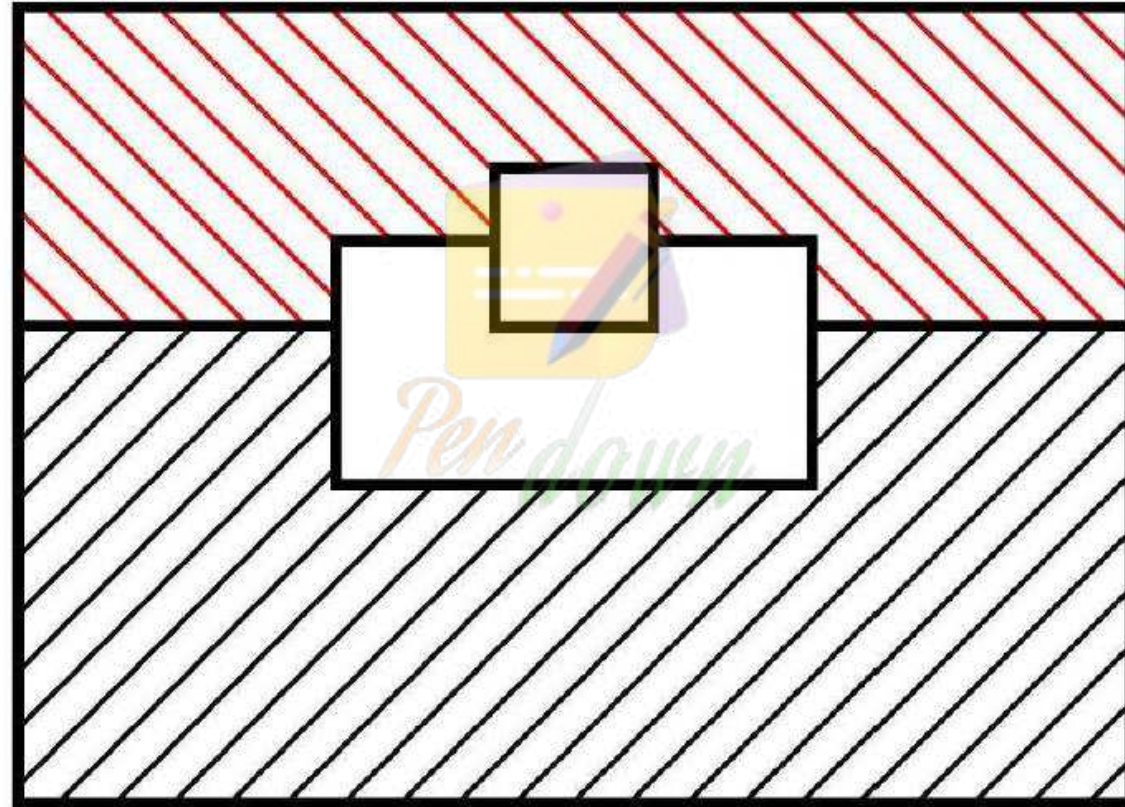


Fill in the section line is the largest area.



45°

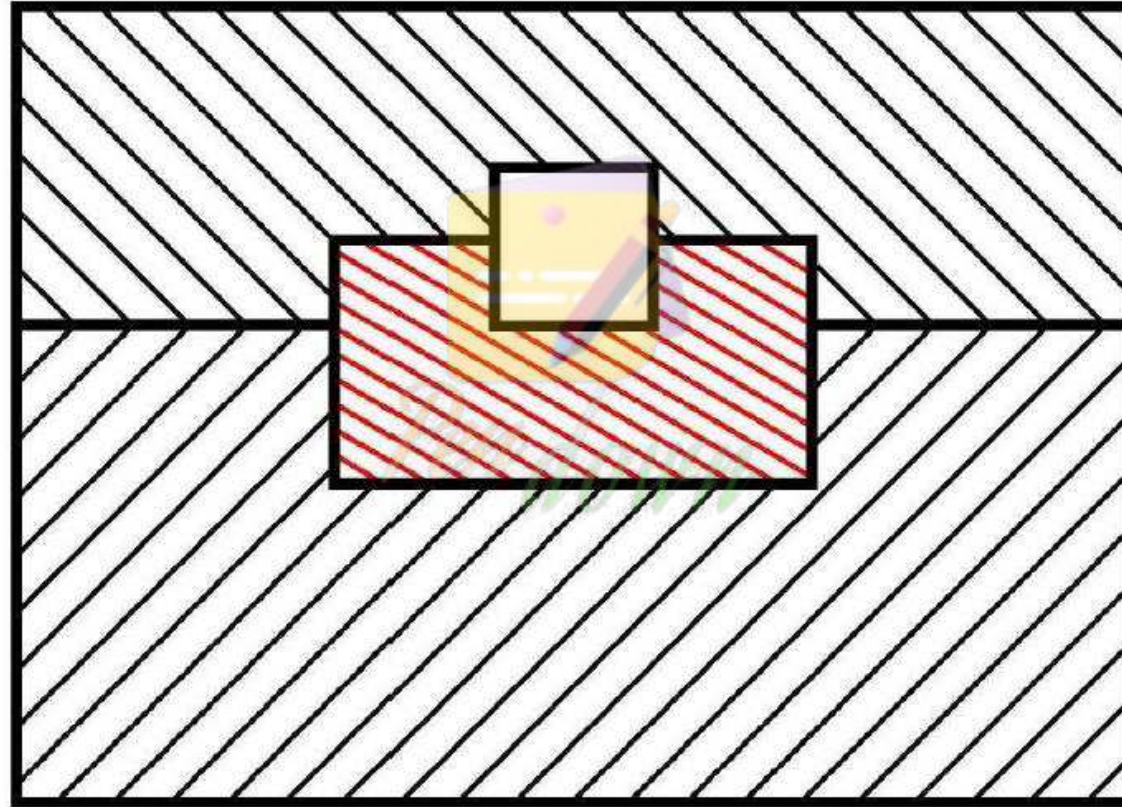
Fill in the section line is the 2<sup>nd</sup> largest area.



-45°



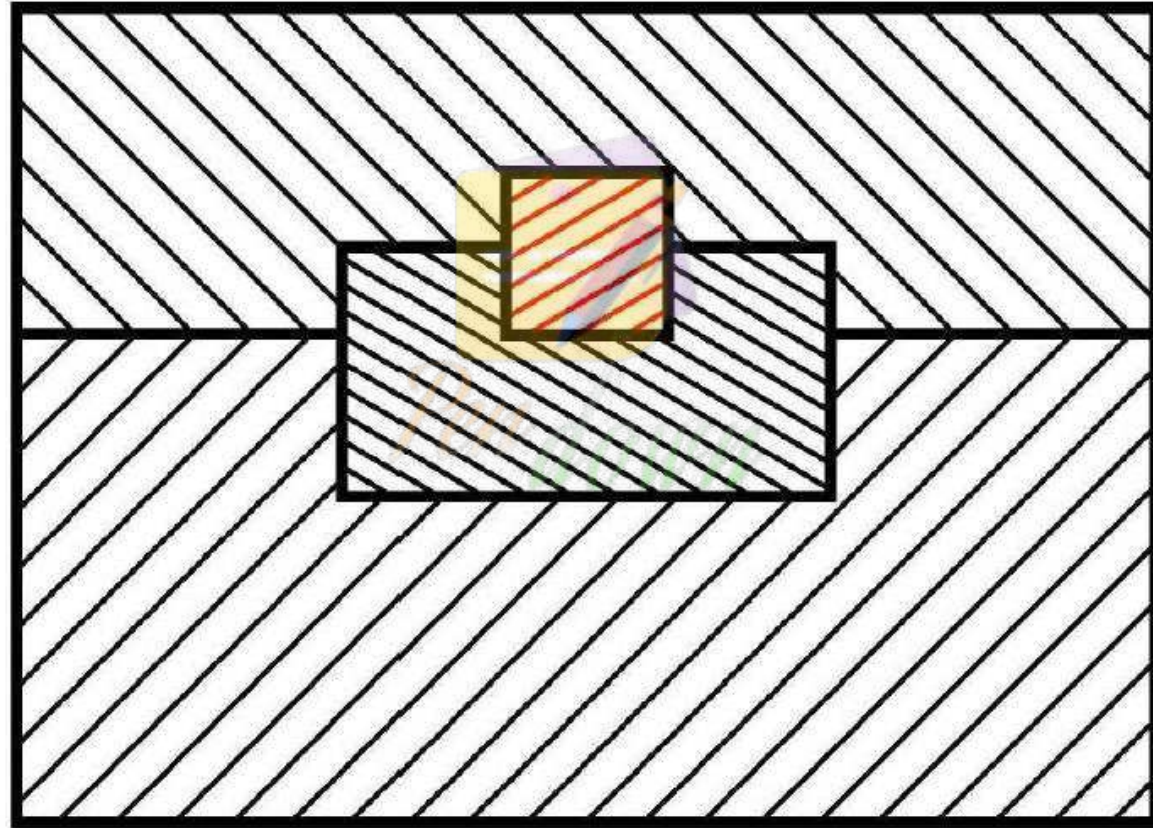
Fill in the section line is the next largest area.



-30°, smaller spacing



Fill in the section line is the last area.



30°