

102001208
ENGINEERING GRAPHICS

Orthographic Projection

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Outline

- ❖ Introduction — Sectional View
- ❖ Sectional Views - Steps
- ❖ Section Lines — Rules
- ❖ Solution of Problems-
Sectional View

INTRODUCTION - SECTIONAL VIEWS

The purpose of drawing a sectional view

(1) If the object is simple, the dotted lines will be very few. However, if it is complex, there **will be too many dotted lines**. It will be difficult to interpret each and every dotted line. Hence a sectional view is drawn to avoid excessive dotted lines.

INTRODUCTION - SECTIONAL VIEWS

The purpose of drawing a sectional view

(2) A sectional view clearly shows the internal details of the object.

SECTIONAL VIEWS - STEPS

The object is imagined to be cut by a cutting plane.

The part of the object, in-between the observer and the cutting plane, is imagined to be discarded.

SECTIONAL VIEWS - STEPS

The view of the remaining object is drawn and it is called a sectional view.

Thus, there can be a sectional front view, a sectional top view or a sectional side view.

SECTIONAL VIEWS - STEPS

Section lines OR hatching lines are drawn in those areas, where the material is cut.

The other views are unaffected by the use of the cutting plane.

SECTIONAL VIEWS - STEPS

The cutting plane is shown as a centre line and the ends are made thicker.



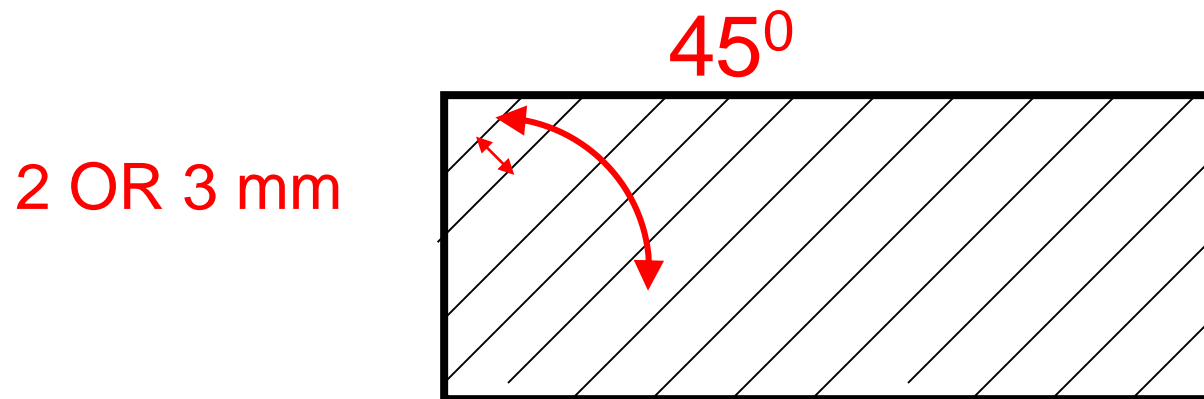
The position of the cutting plane should be shown on the appropriate view.

SECTION LINES (or HATCHING LINES)

Section lines should be shown
in the area where the material
of the object is cut.

SECTION LINES (or HATCHING LINES)

Section lines should be thin, medium dark, at 45° to the horizontal, and spaced uniformly about 2 or 3 mm apart, as shown below.



SPECIAL RULES – SECTION LINES

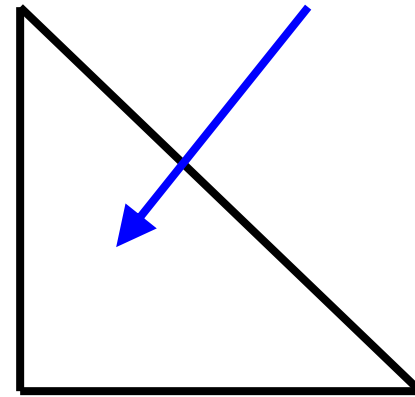
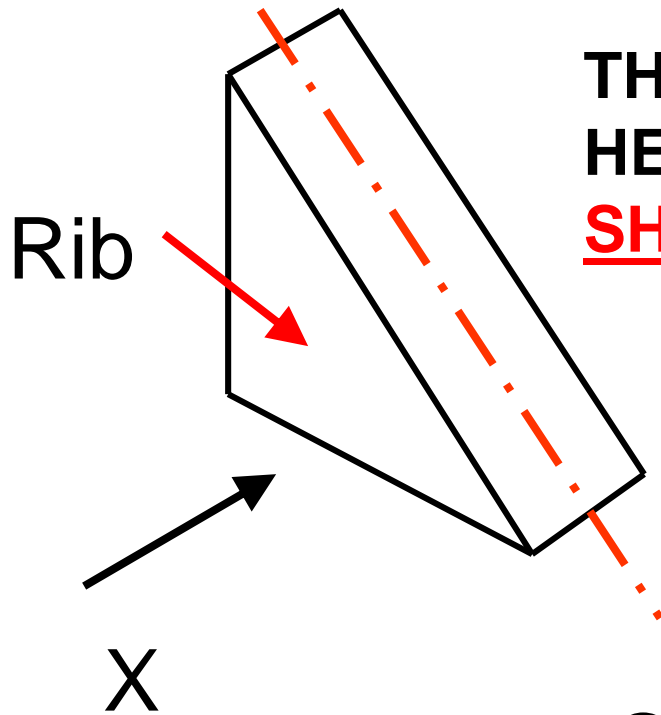
Thin plates, which are used to give additional strength to the object, are called **RIBS** (or **WEBS**). They may be triangular, rectangular etc.

SPECIAL RULES – SECTION LINES

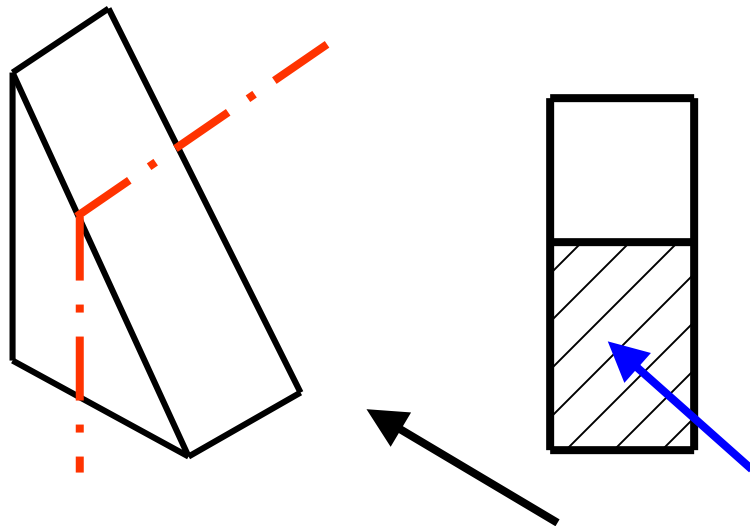
If a rib is cut longitudinally, (i.e. dividing the thickness), the section lines **are not shown in the rib area.**

If a rib is cut perpendicularly (or at right angles to its thickness), section lines ***are shown in the cut portion (cut area) of the rib.***

THE RIB IS CUT **LONGITUDINALLY**,
HENCE **SECTION LINES ARE NOT**
SHOWN IN THE RIB AREA.



SECTIONAL F.V. ALONG "X".



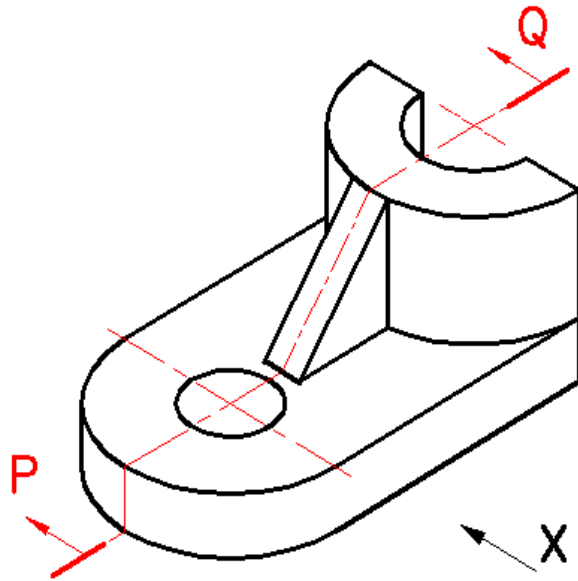
THE RIB IS CUT AT RIGHT
ANGLES TO ITS PLANE
(PERPENDICULARLY).
HENCE SECTION LINES **ARE**
SHOWN IN THE CUT
PORTION OF THE RIB.

SPECIAL RULES – SECTION LINES

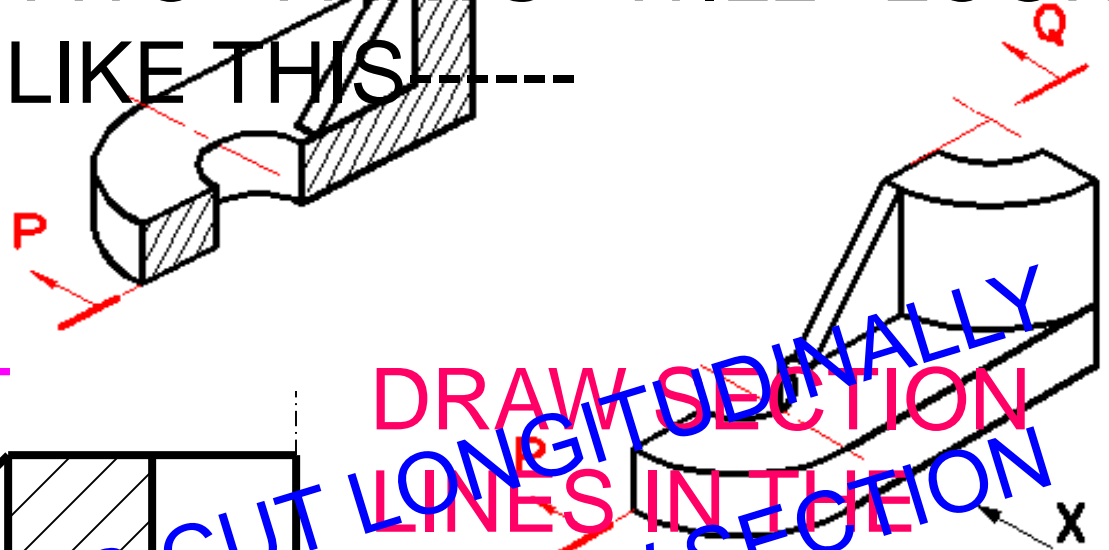
Many machine parts such as nuts, bolts etc. are not shown in section, if the cutting plane passes through their axes. Such parts are – bolts, nuts, studs, spindles, shafts, cotters, keys, rivets, set screws etc.

However, if they are cut perpendicular to their axes, then the section lines are shown in the cut surface.

PROBLEM SOLUTION

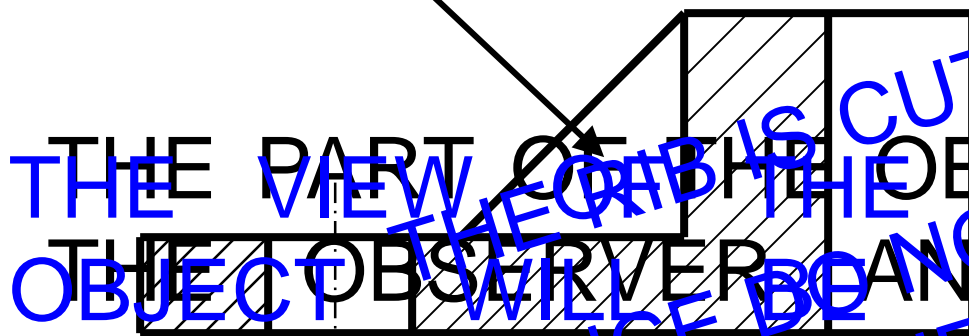


THE OBJECT IS CUT
ALONG ~~P-Q~~. AND THE
TWO PARTS WILL LOOK
LIKE THIS-----



RIB

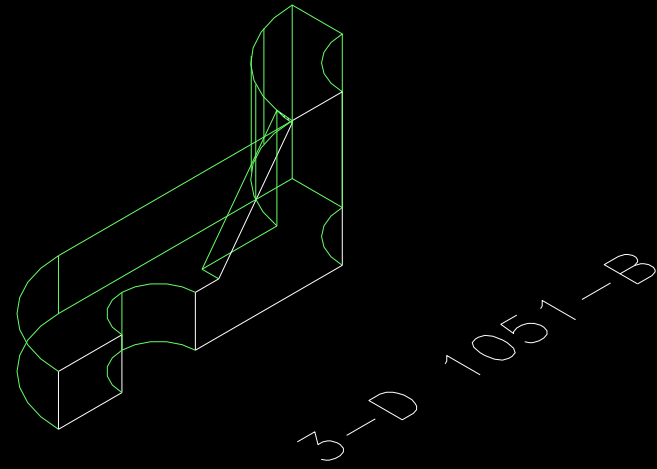
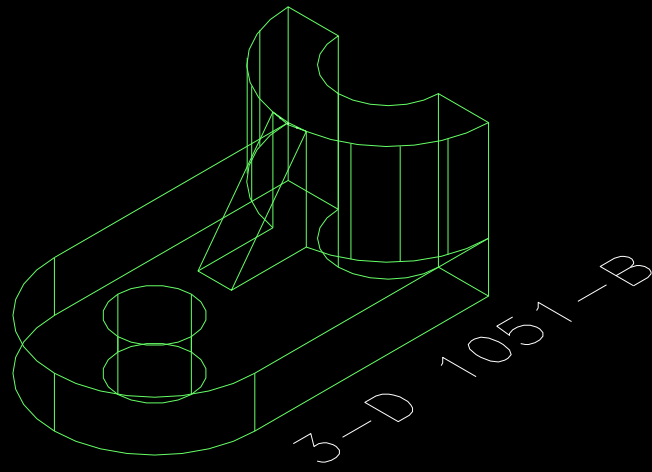
LET US DRAW IT

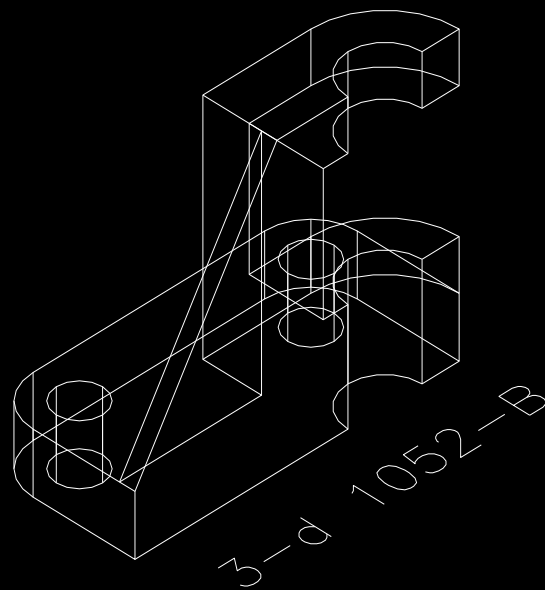
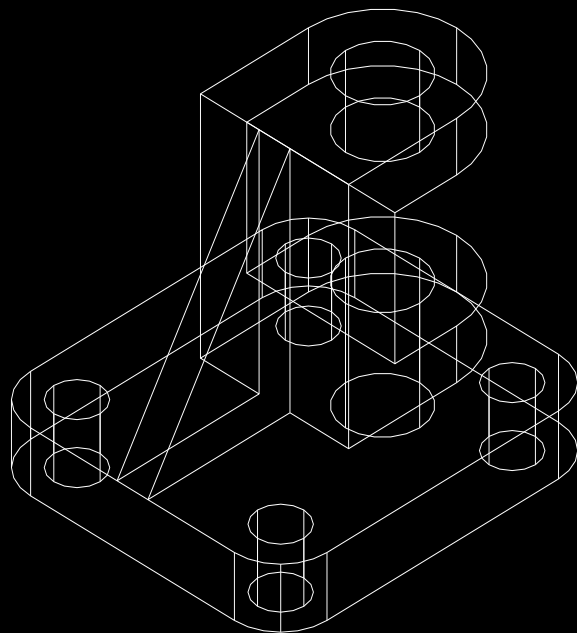


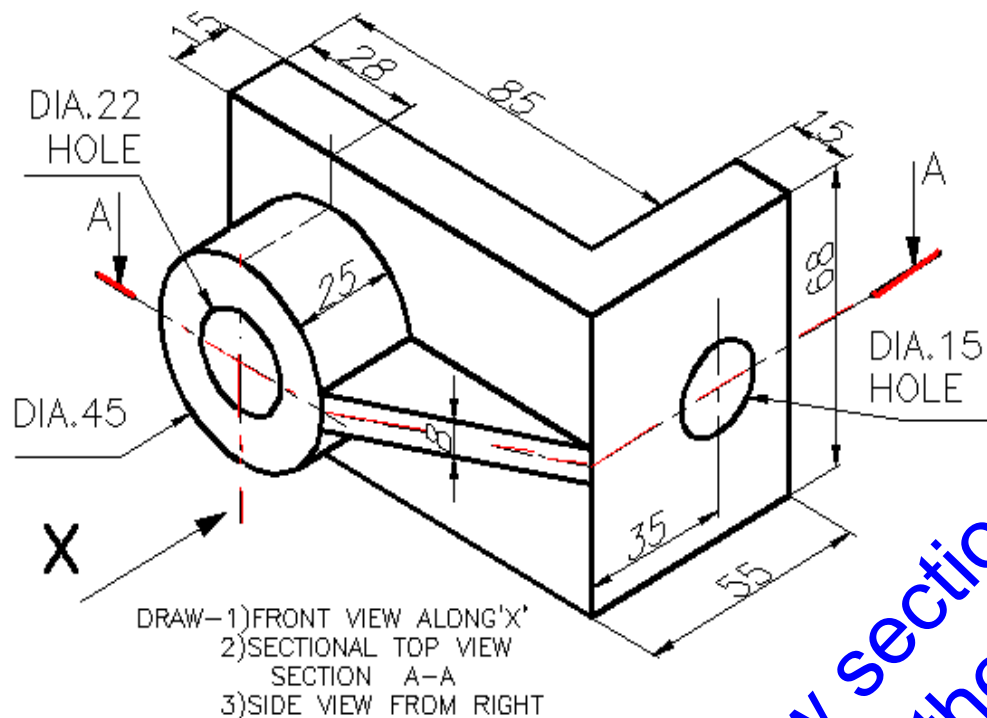
THE PART OF THE OBJECT BETWEEN
THE OBSERVER AND THE CUTTING
PLANE IS DISCARDED. MATERIAL IS
SECTIONAL FRONT VIEW. RIBS ARE
CUT.

DRAW LONGITUDINALLY
SECTION LINES IN THE

THE PART OF THE OBJECT BETWEEN
THE OBSERVER AND THE CUTTING
PLANE IS DISCARDED. MATERIAL IS
SECTIONAL FRONT VIEW. RIBS ARE
CUT.







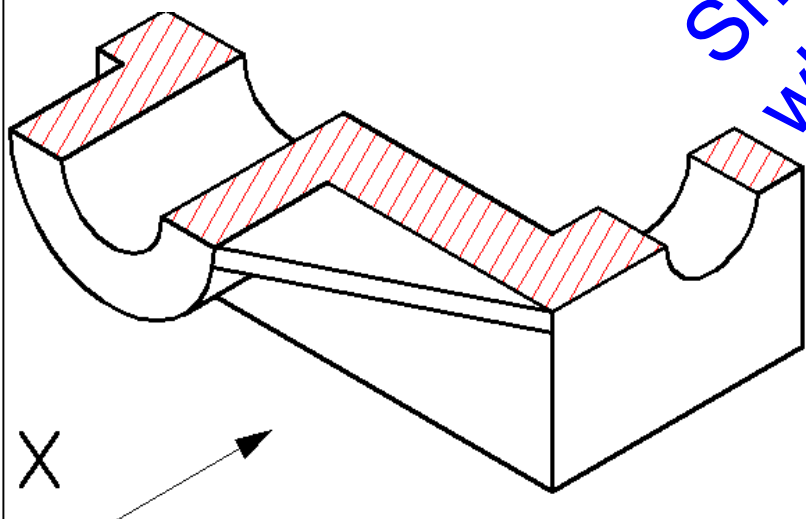
Looking from the front top, the object will be.....

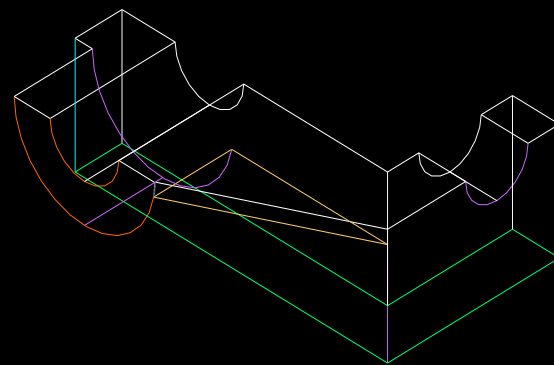
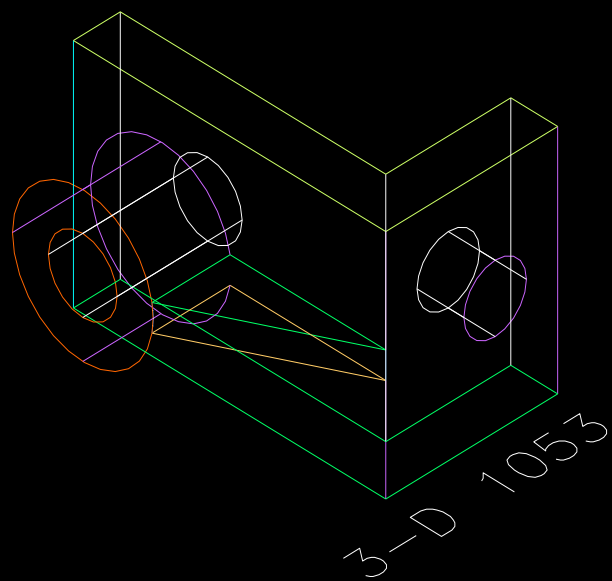
The upper half of the object is removed.

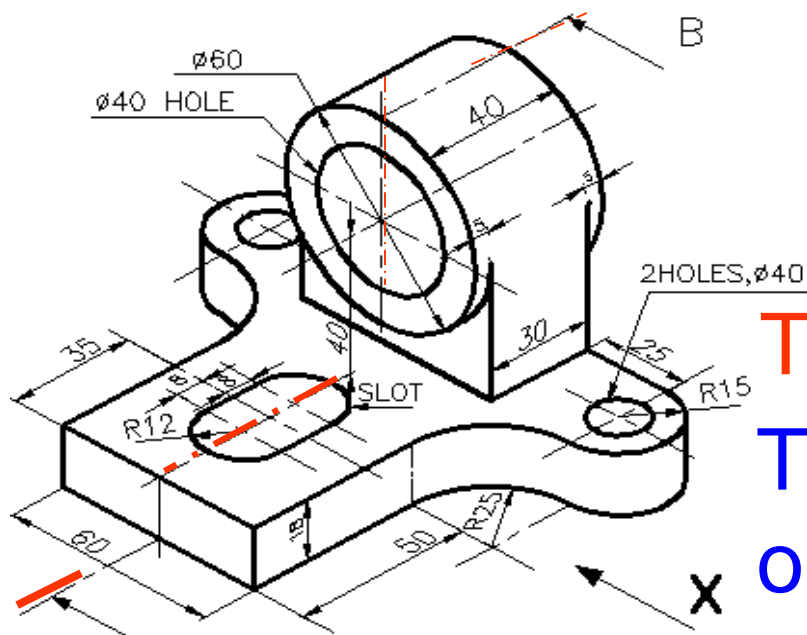
The lower half of the object will look like this-----

DO NOT SHOW SECTION LINES IN THE TRIANGULAR RIB AREA.

Show section lines where the material is cut.



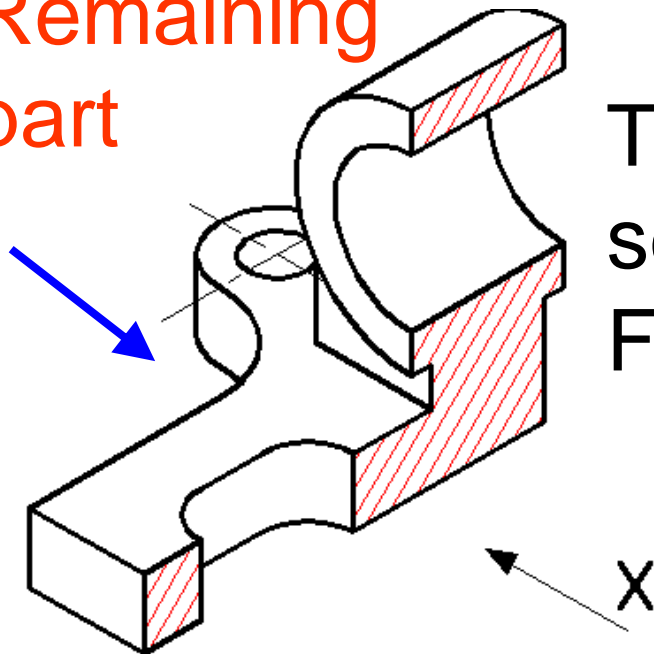




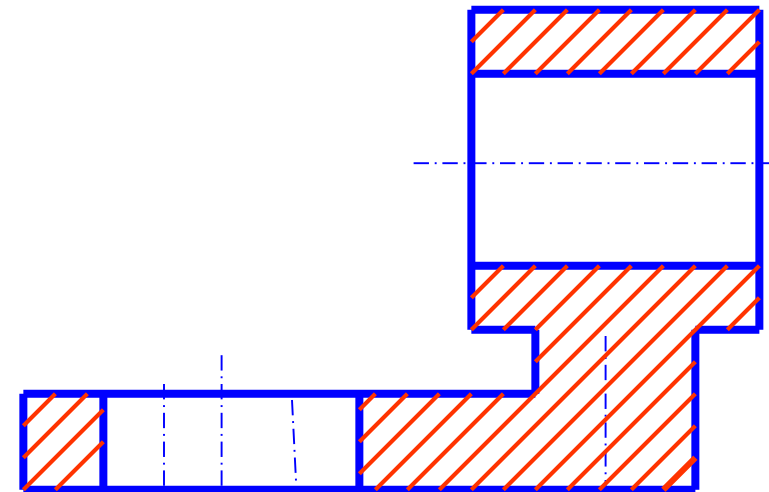
Draw sectional F.V.

The object is cut along A-B
The part, in-between the observer and the cutting plane is discarded.

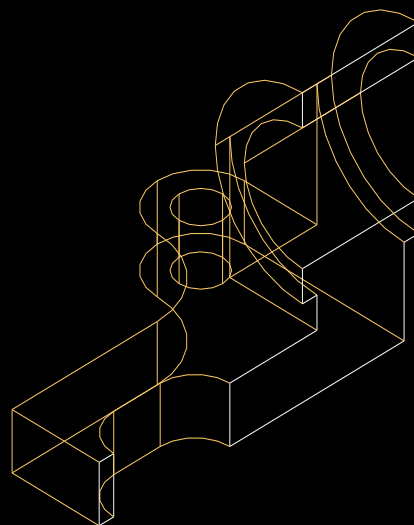
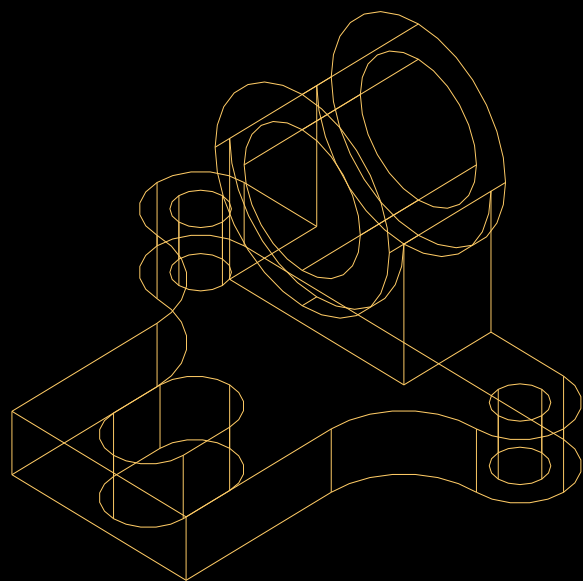
Remaining part



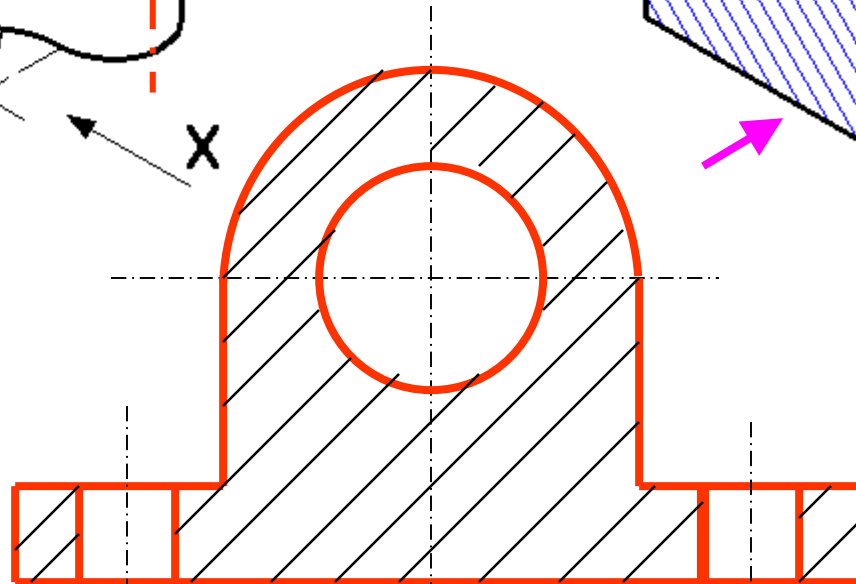
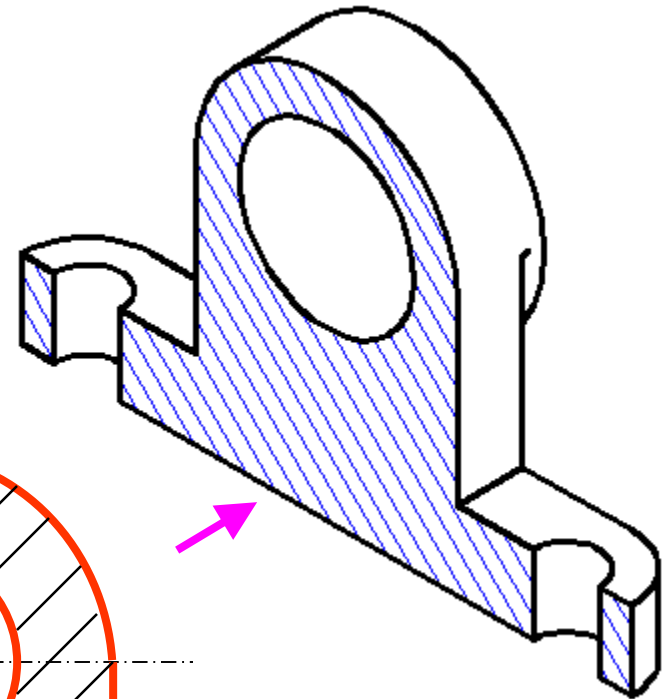
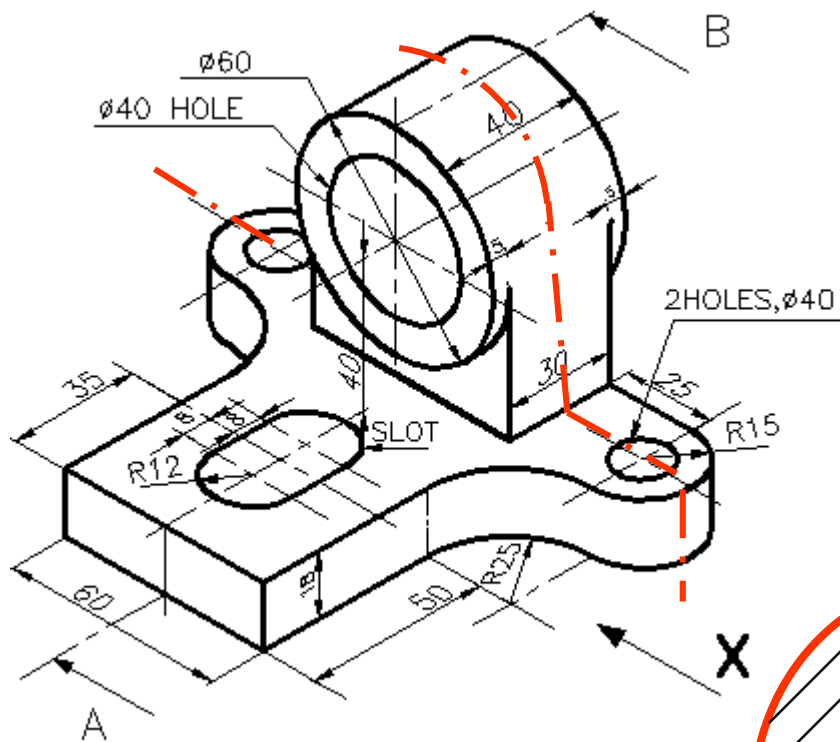
The sectional F.V.

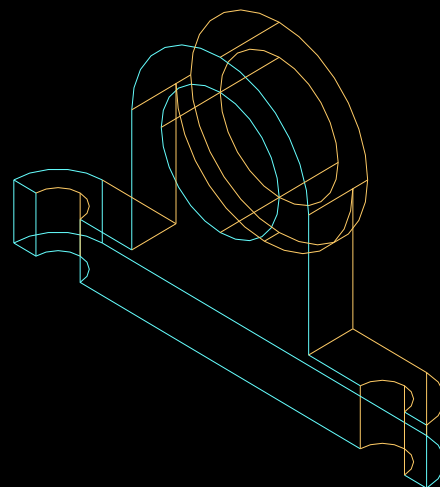
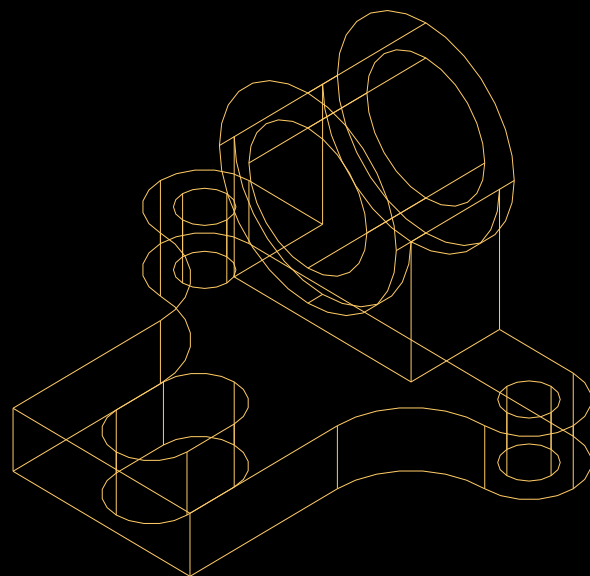


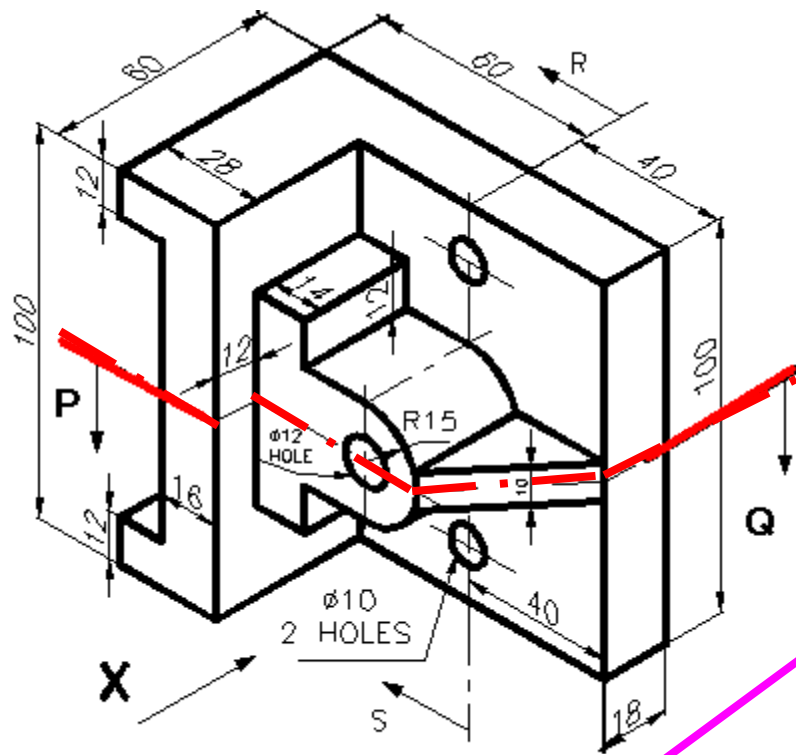
Sectional F.V. is ready.



Draw sectional left hand side view.

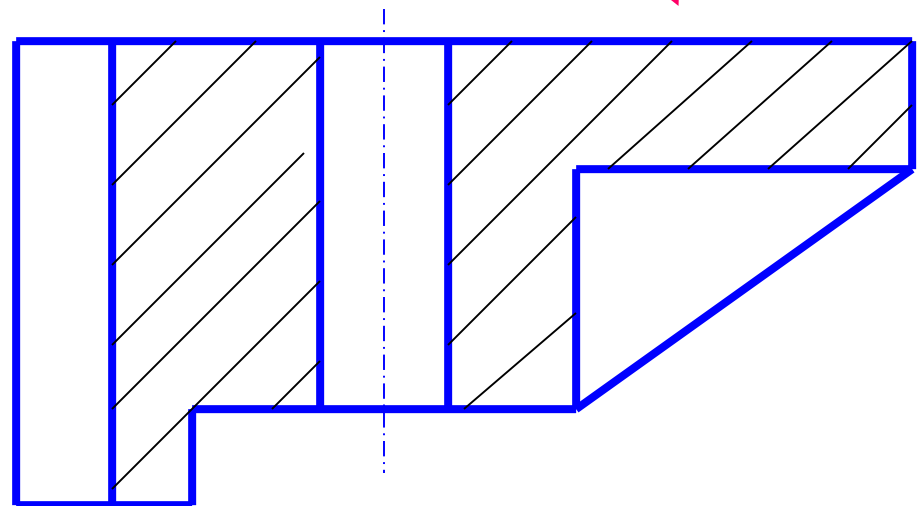
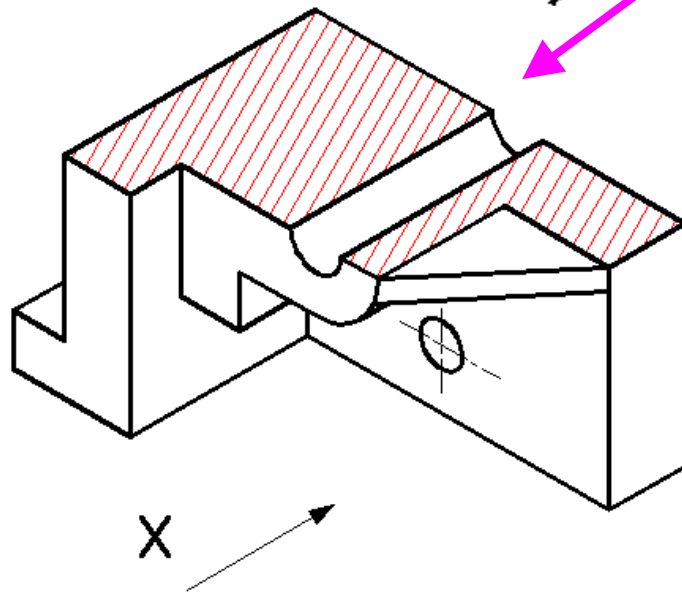




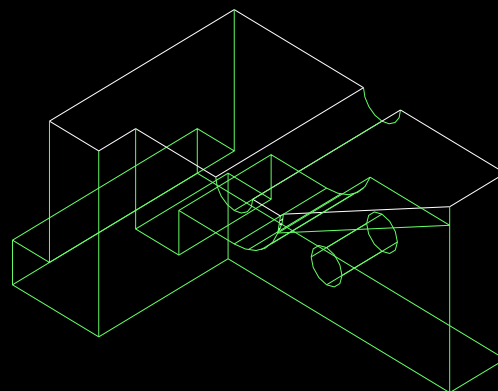
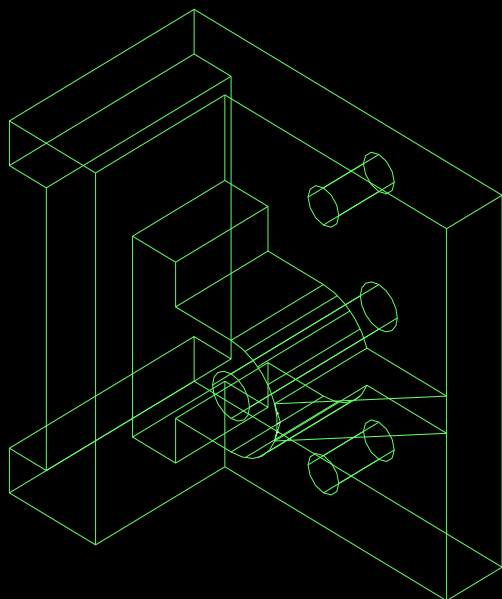


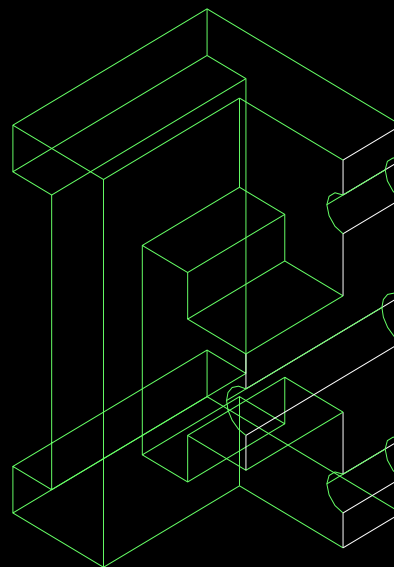
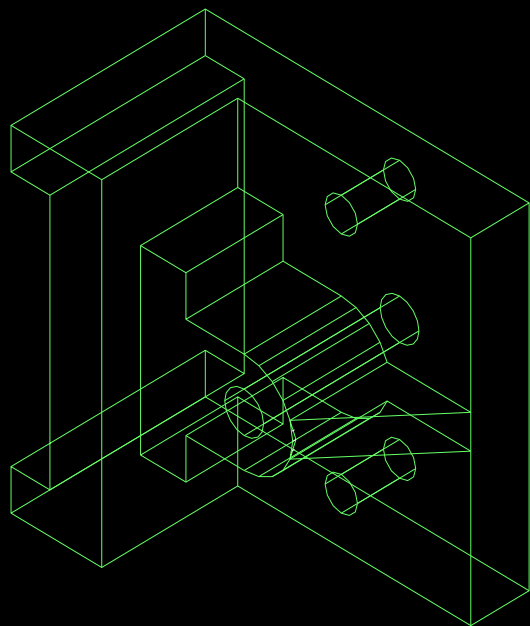
Draw the sectional top view.

1. The upper half is removed.
 2. The lower half is placed.
 And the sectional top view will be



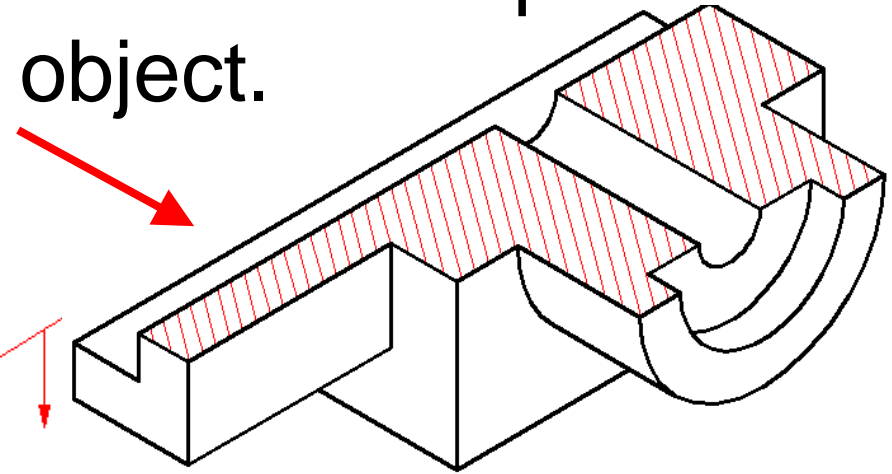
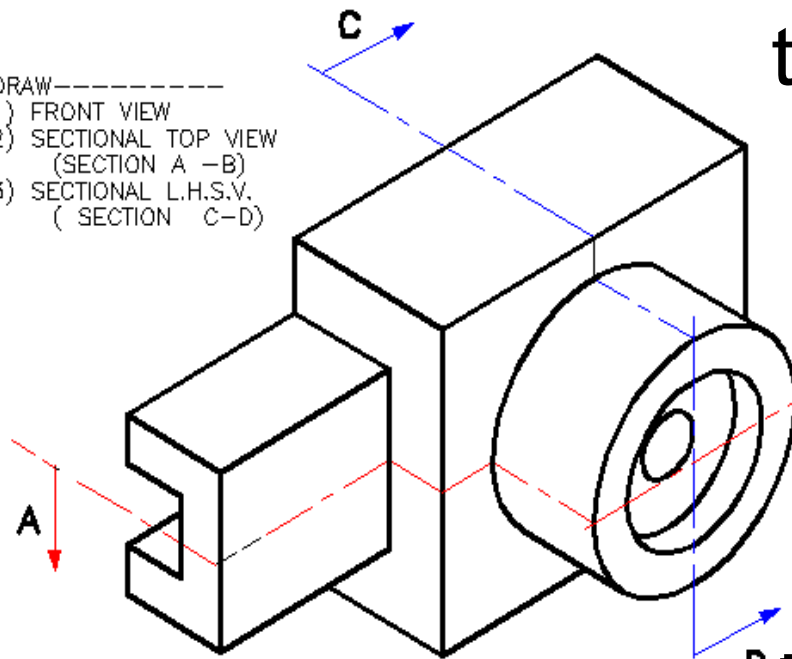
Sectional top view



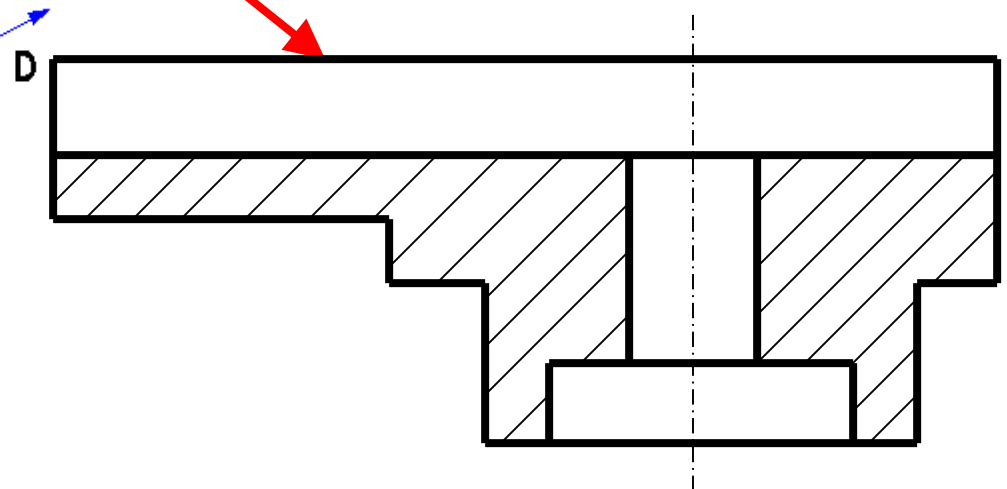


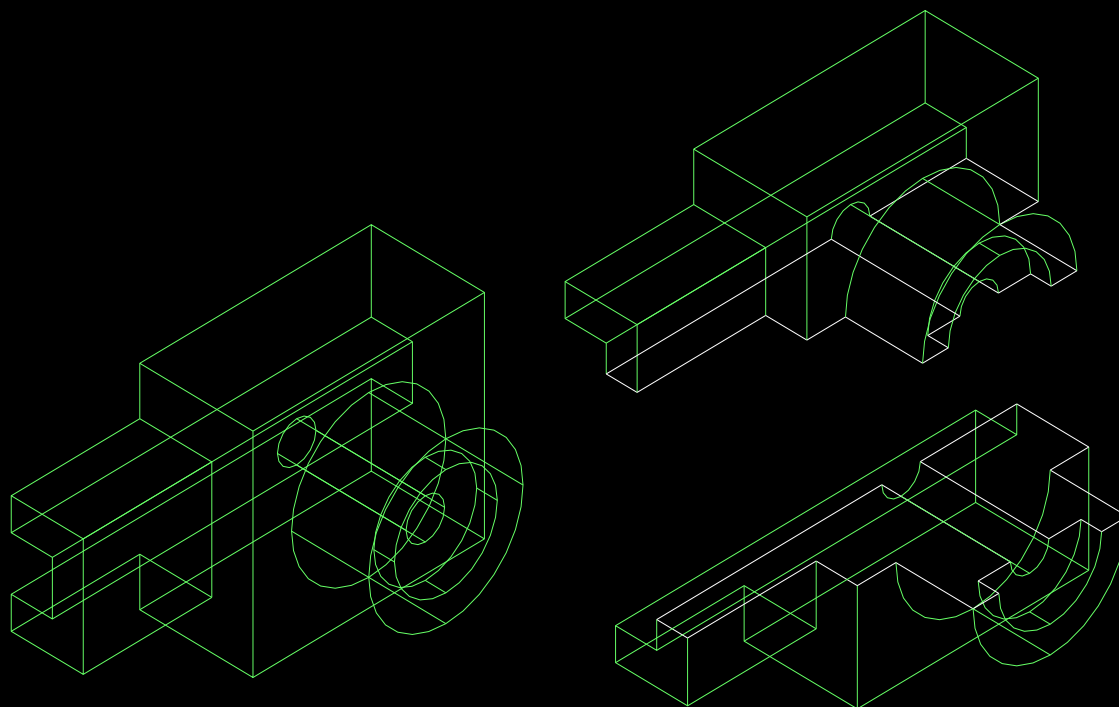
Draw this is the new top view of the object.

- DRAW-----
 1) FRONT VIEW
 2) SECTIONAL TOP VIEW
 (SECTION A -B)
 3) SECTIONAL L.H.S.V.
 (SECTION C-D)

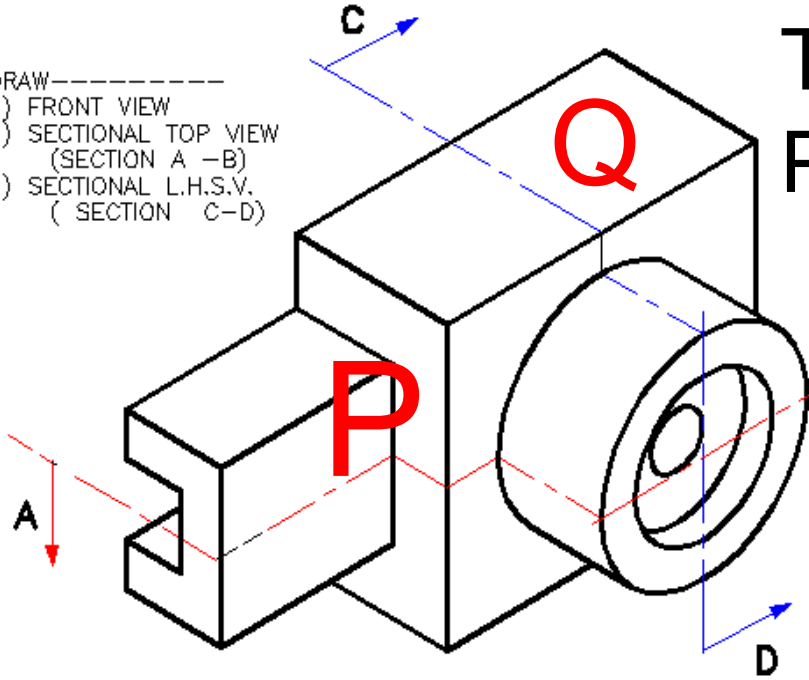


The sectional top view.

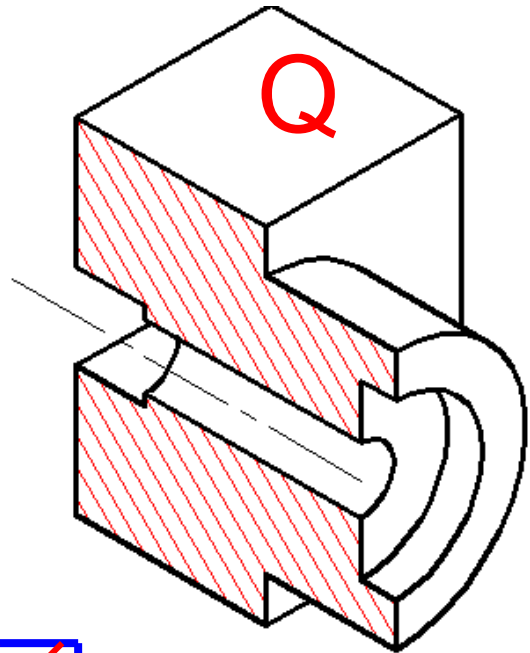




- DRAW-----
1) FRONT VIEW
2) SECTIONAL TOP VIEW
(SECTION A -B)
3) SECTIONAL L.H.S.V.
(SECTION C-D)

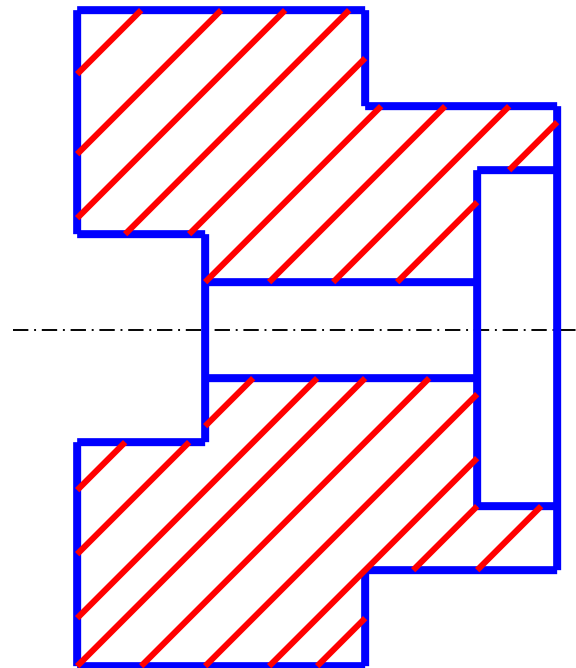


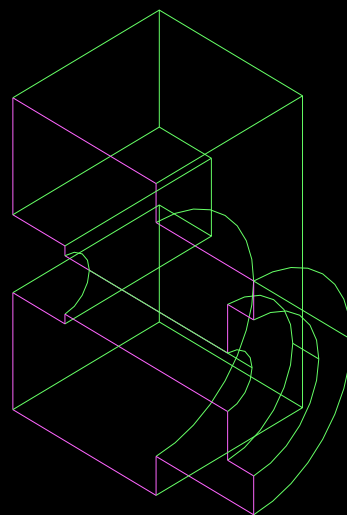
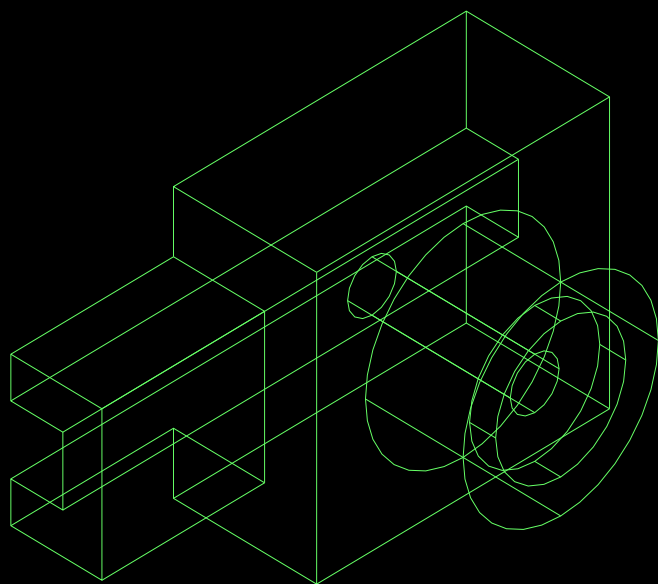
This is
Part “Q”.

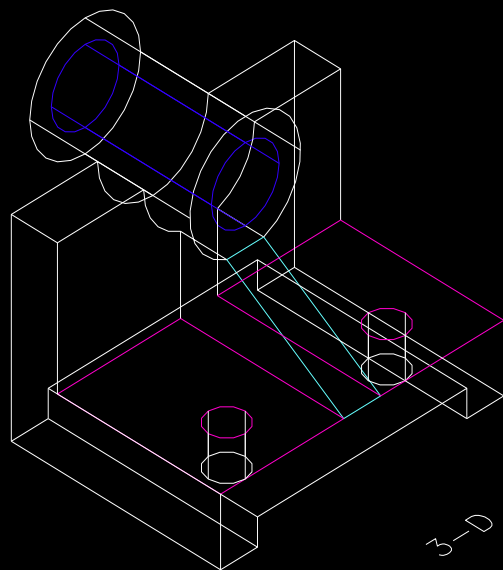


Draw the sectional
left hand side view.

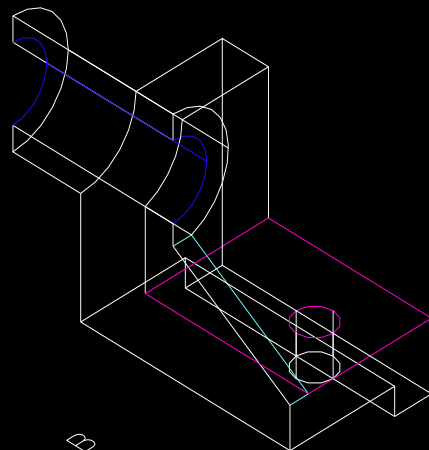
Part “P” is discarded.







3-D 1057-B

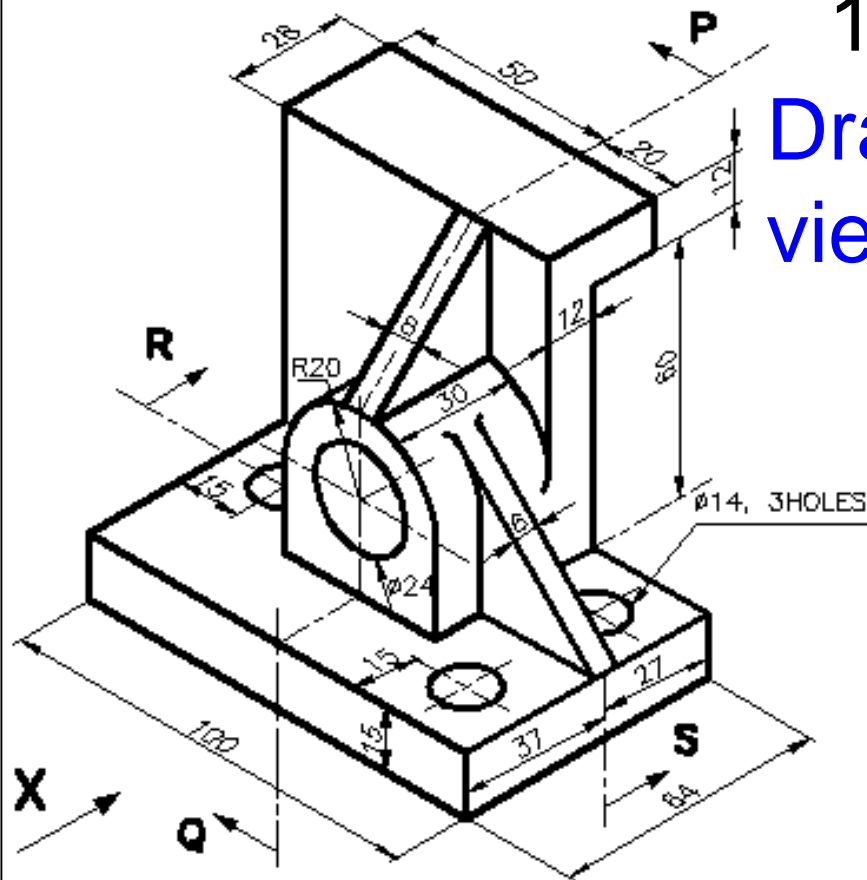


3-D 1057-B

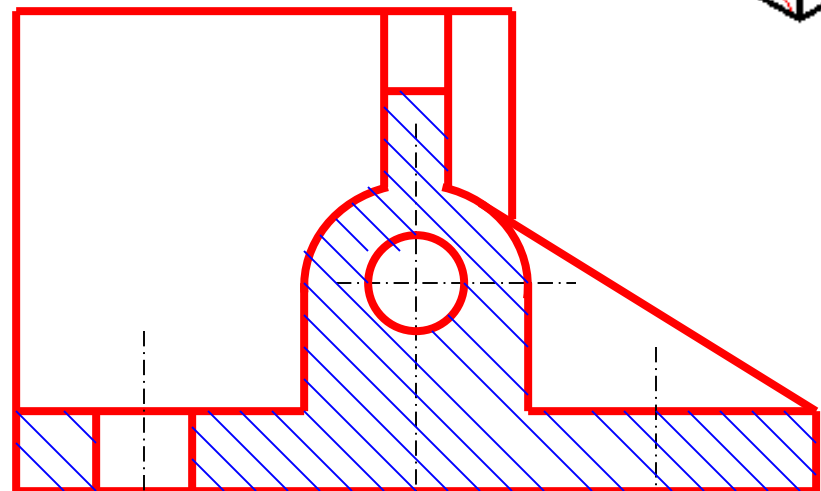
1058

Draw the sectional front view. (Section R-S)

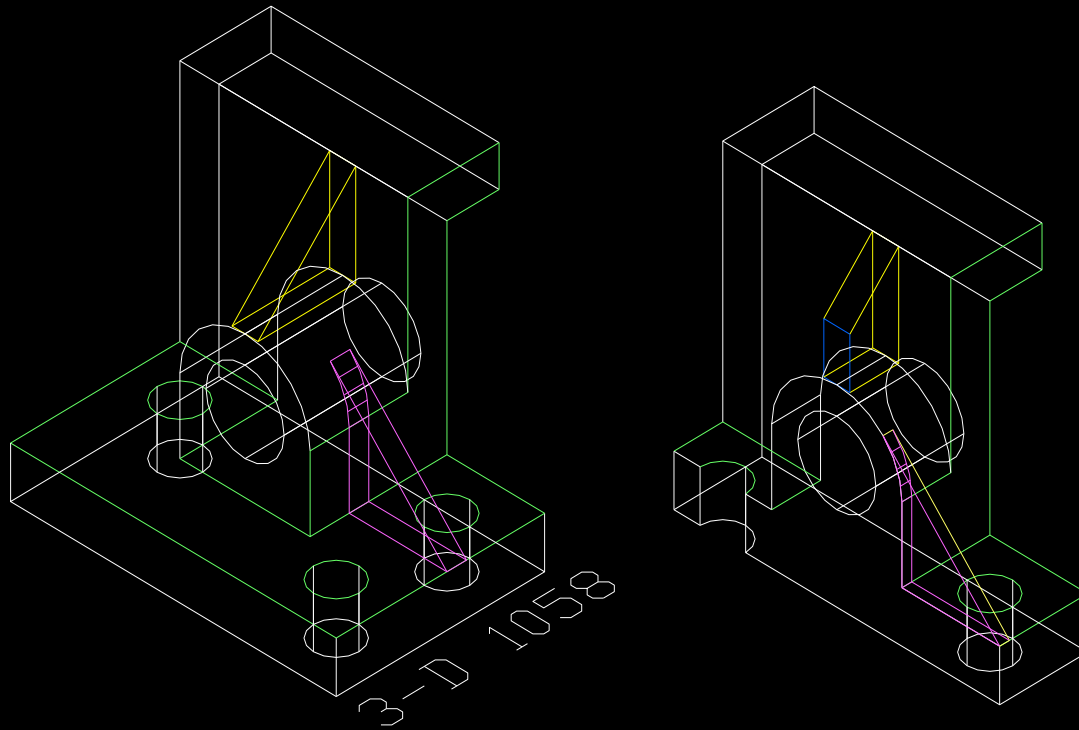
The part of the object in between the observer and the remaining portion of the object will look like this-----



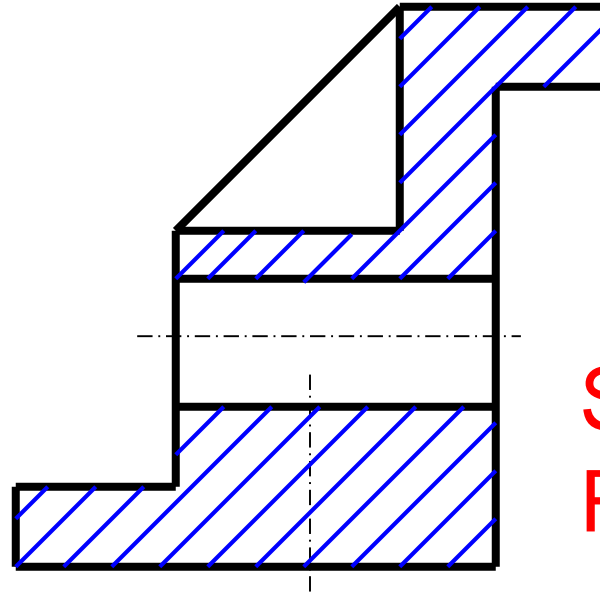
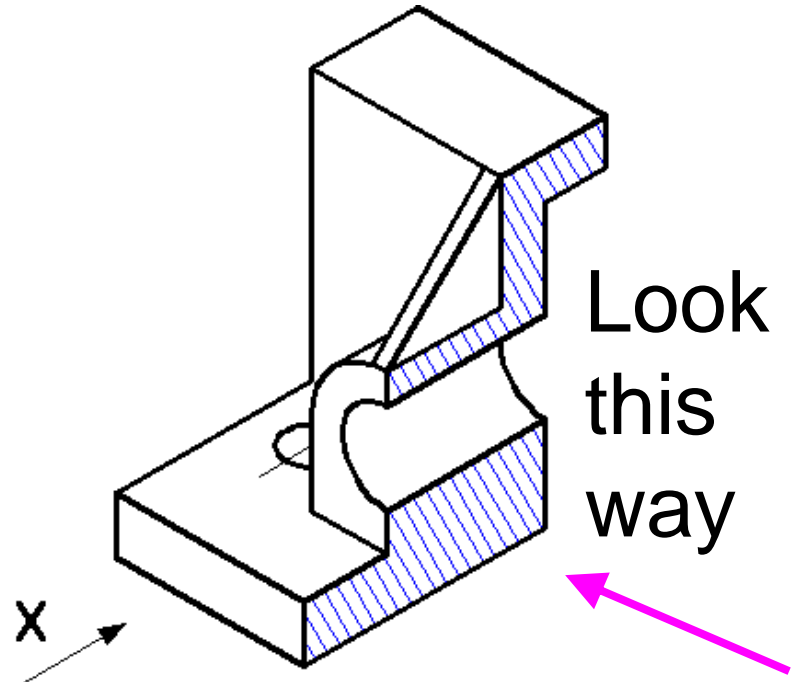
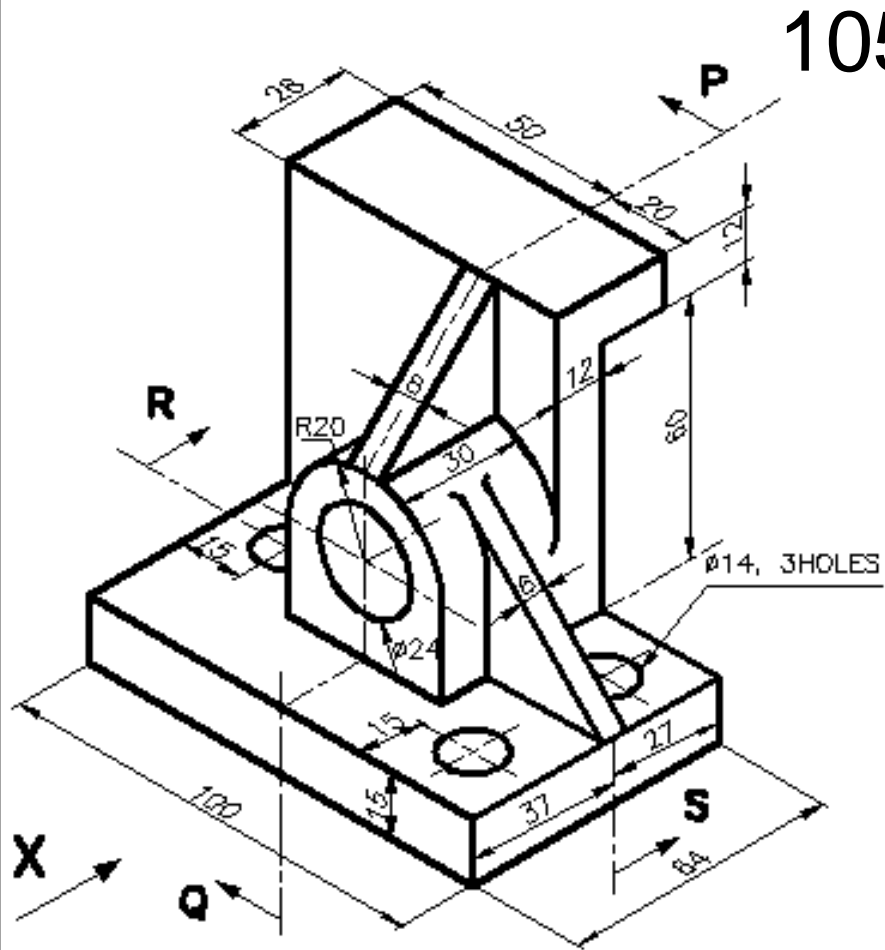
The answer



3-D 1058-B

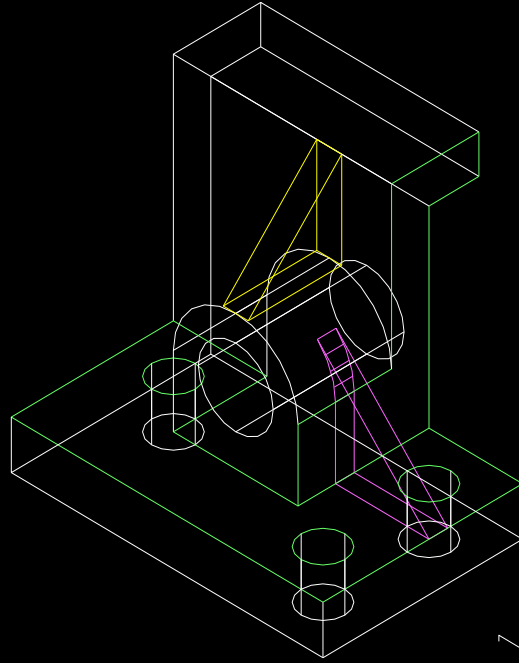


1058

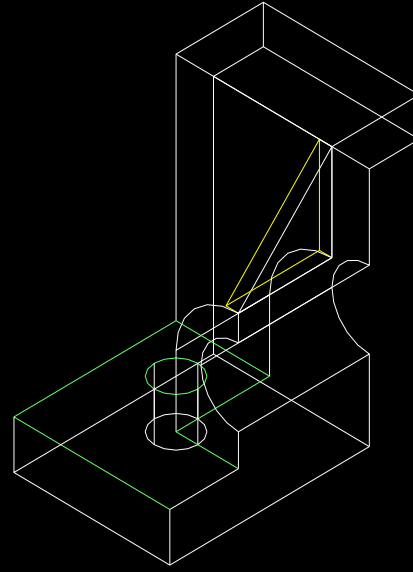


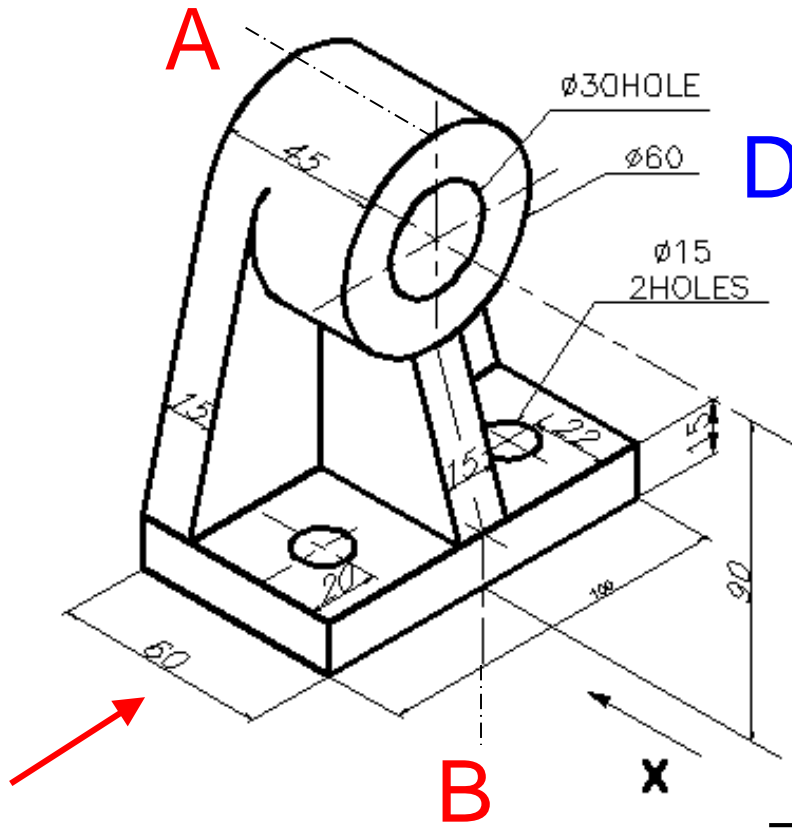
Draw the sectional R.H.S.V. section P-Q.

Sect.
R.H.S.V.



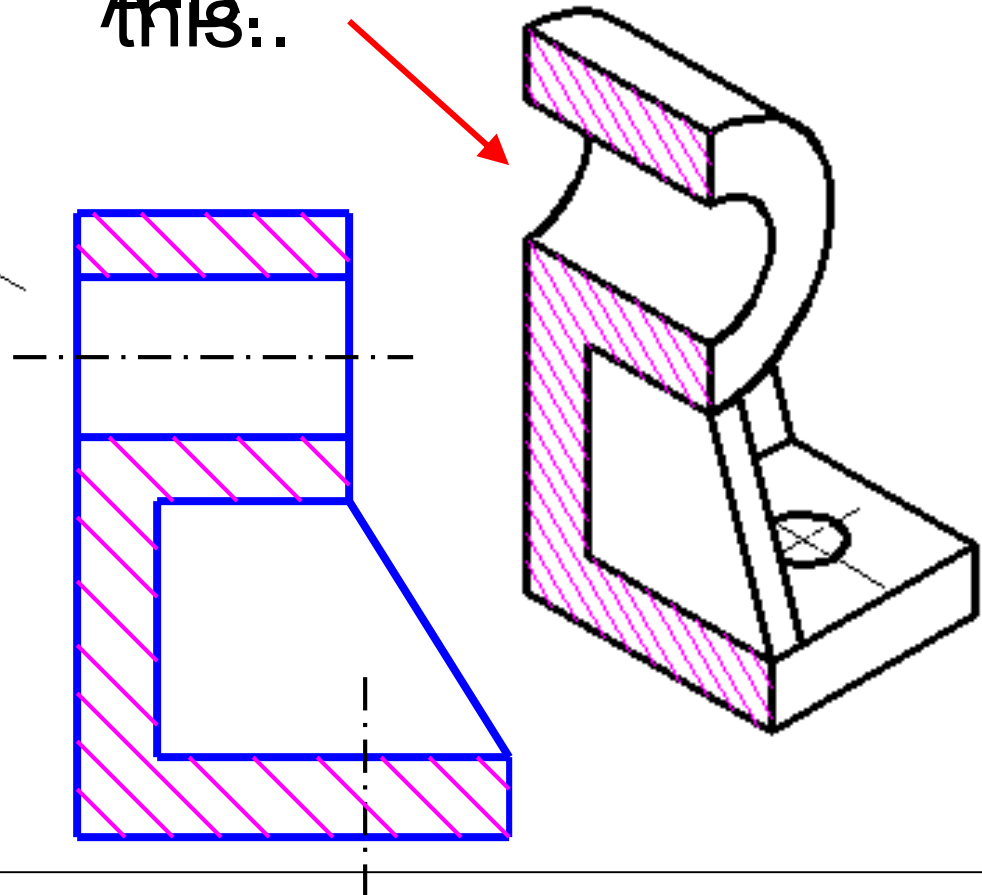
3-D 1058

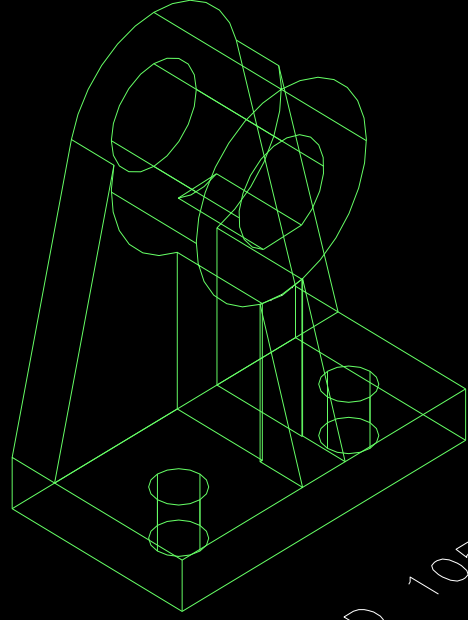




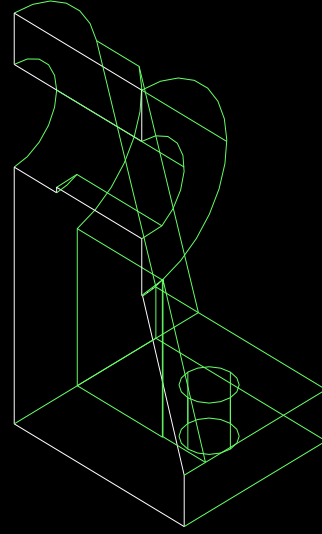
Draw the sectional L.H.S.V.

The remaining part of the object is cut along the object looks like A or B:

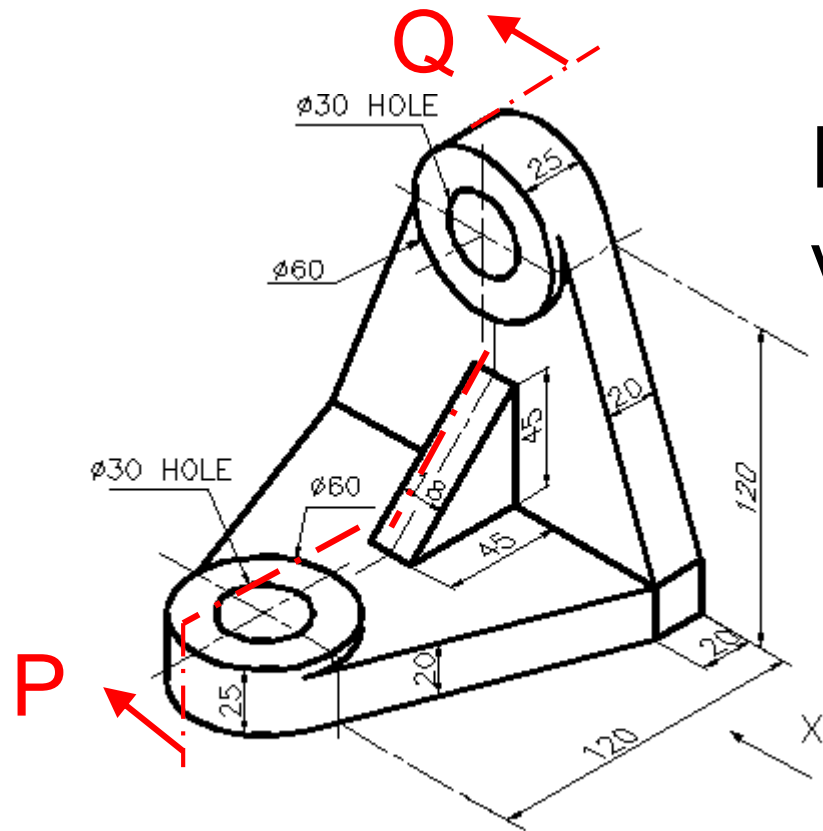




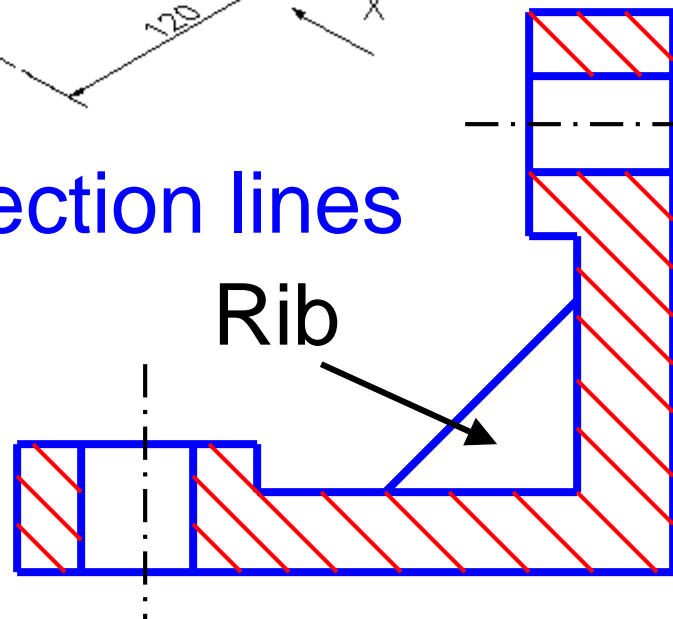
3-D 1059-B



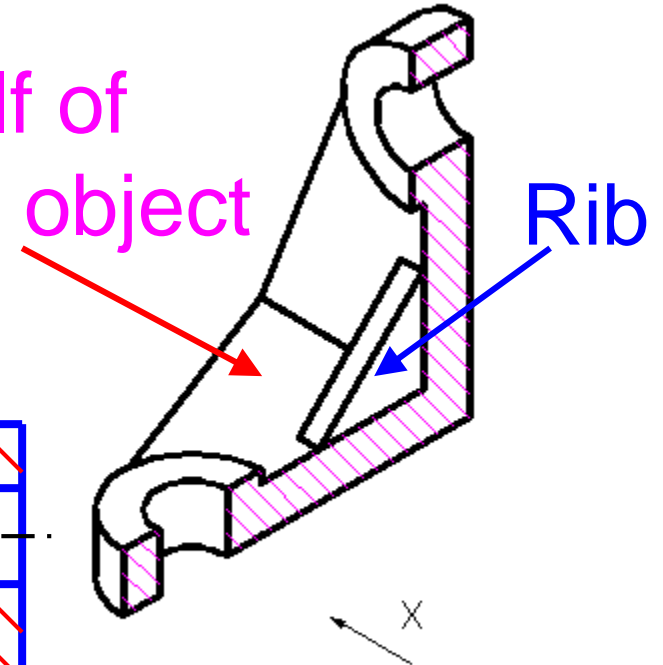
Draw the sectional front view – section P-Q.



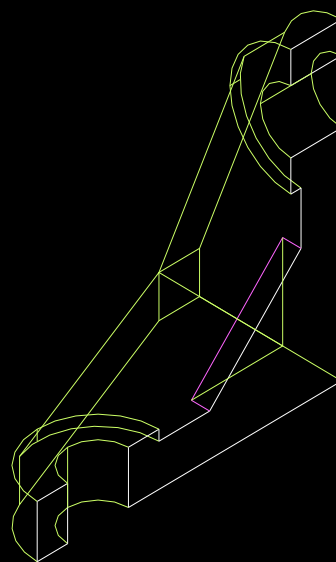
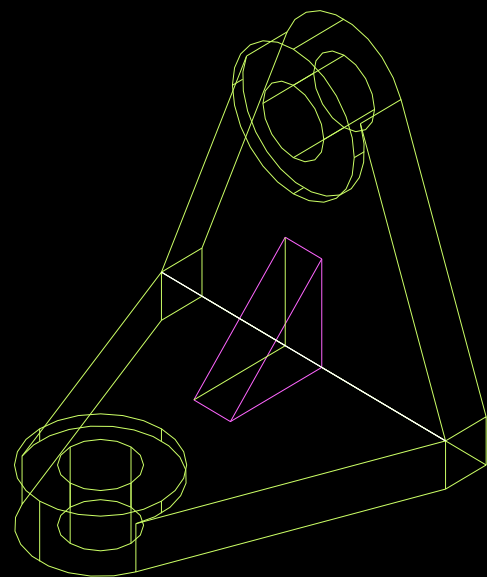
Show the section lines

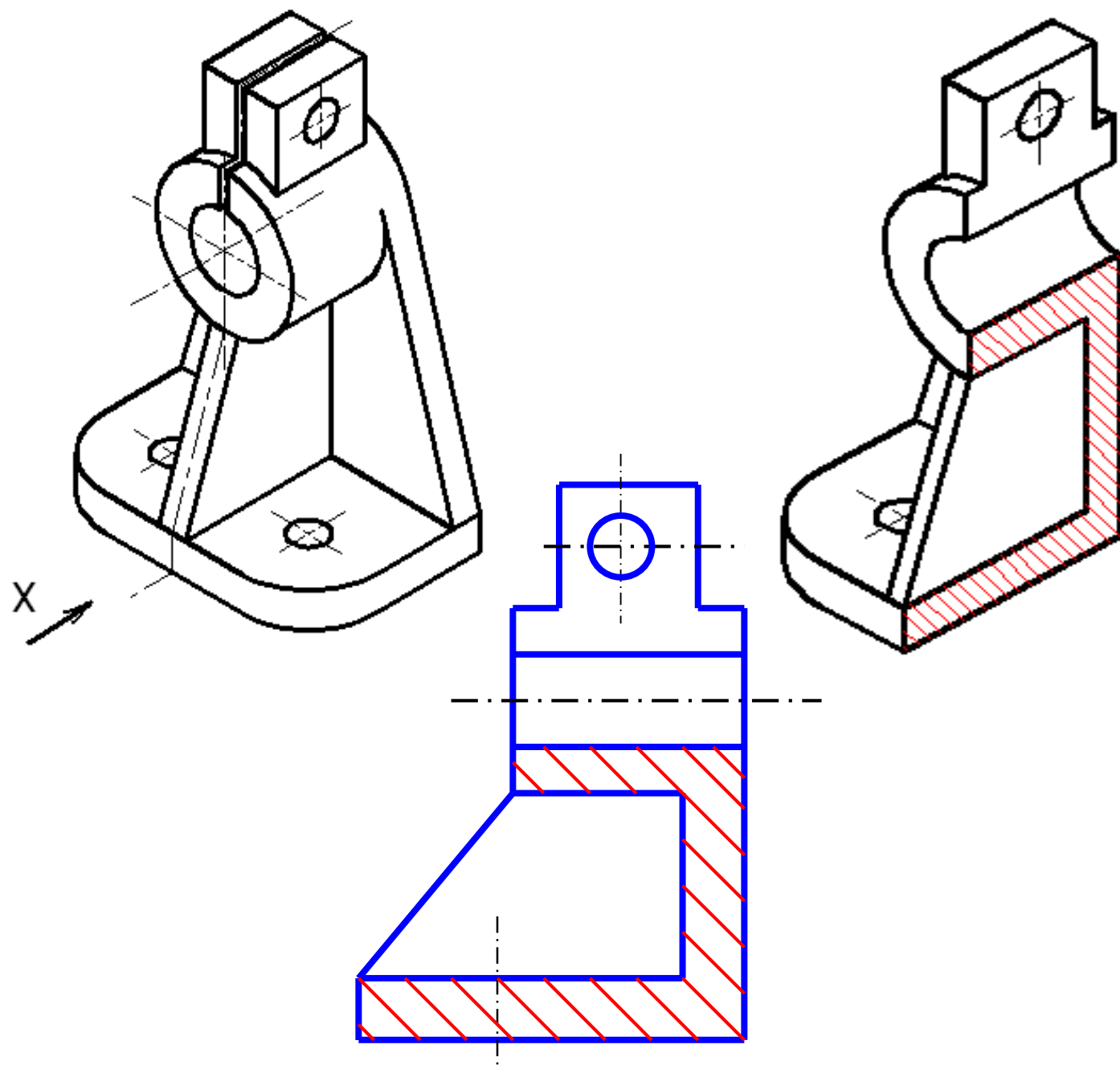


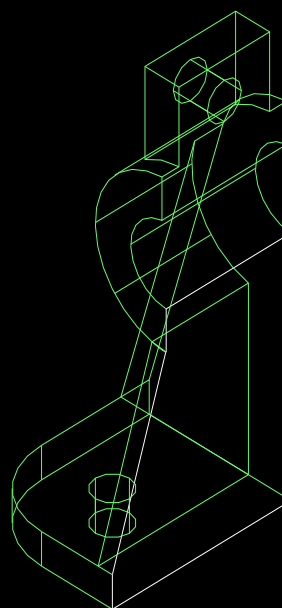
Half of
the object

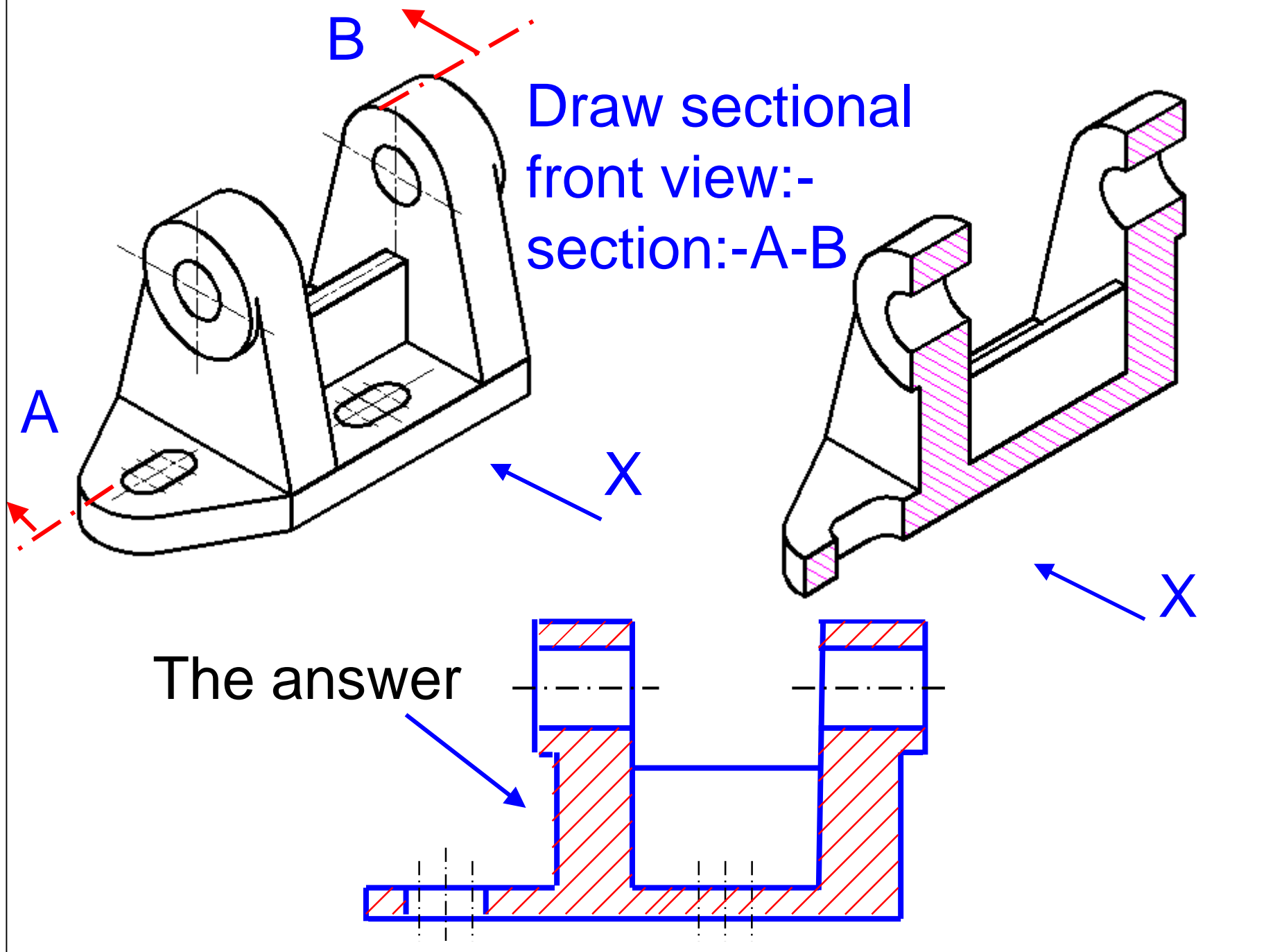


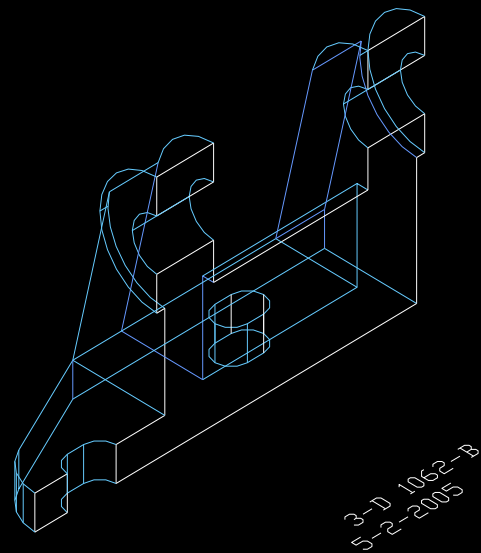
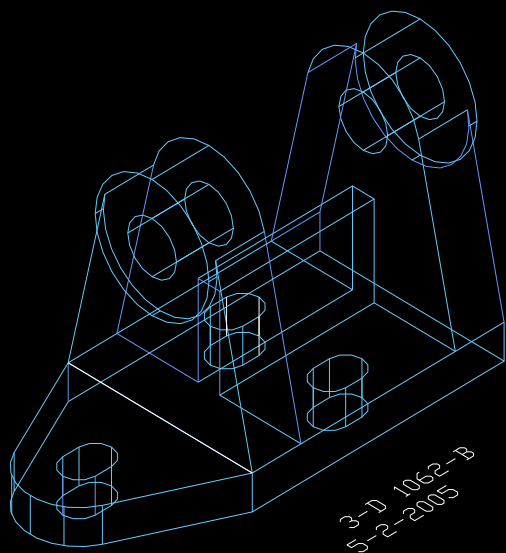
Sectional F.V.

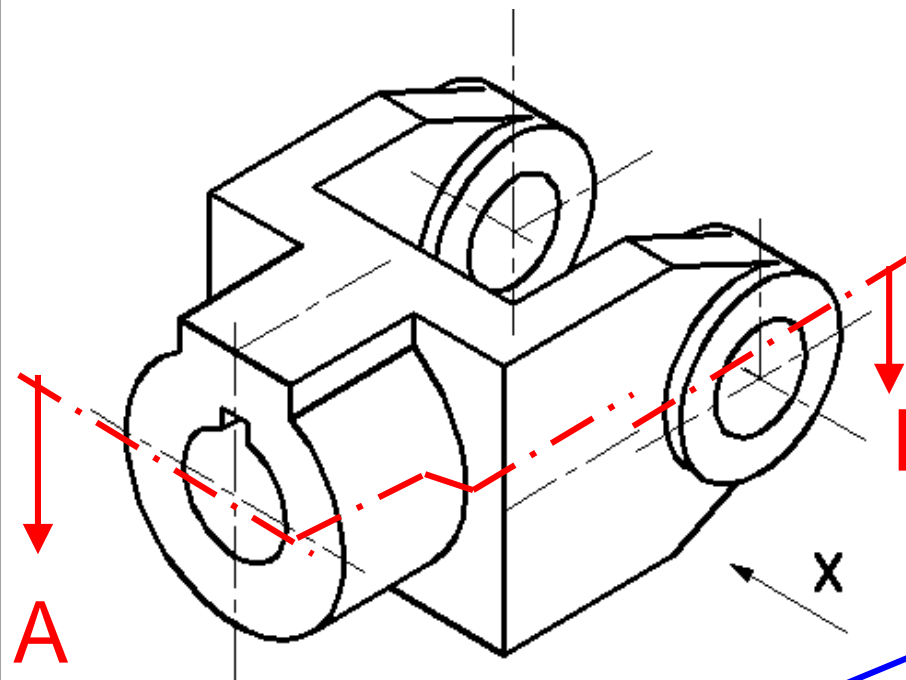






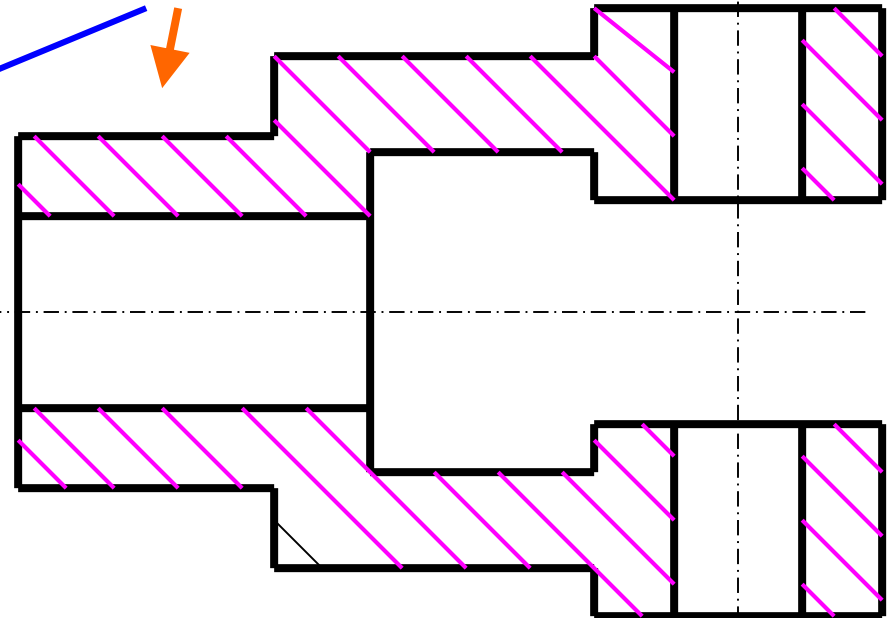
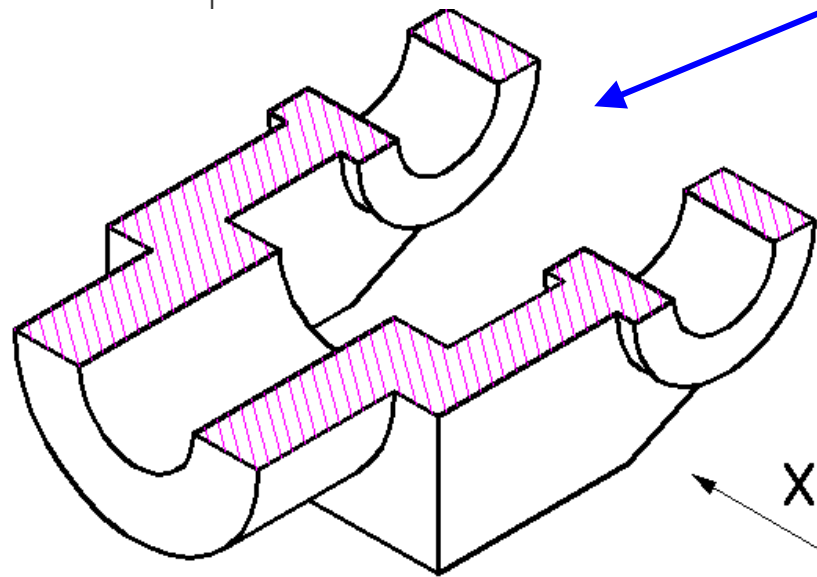


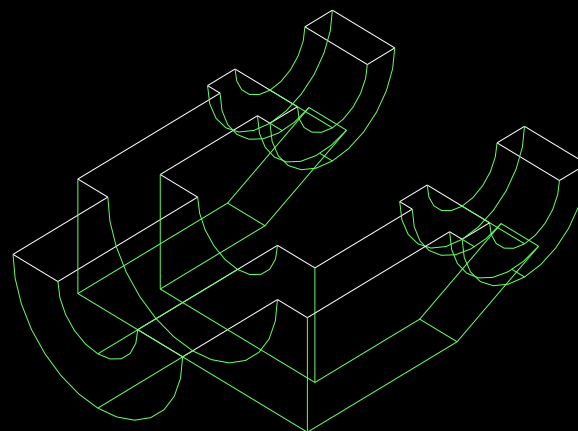
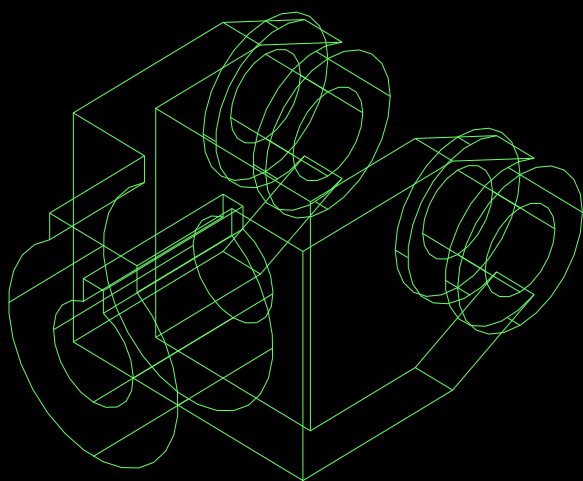


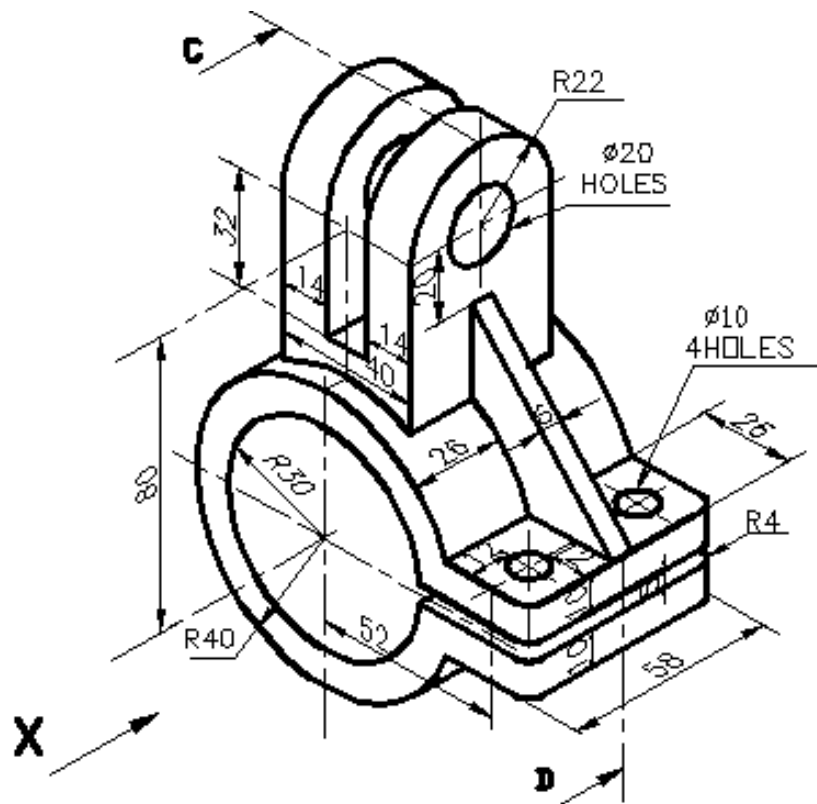


Draw the sectional top view- **section A-B.**

The lower half will look like this....



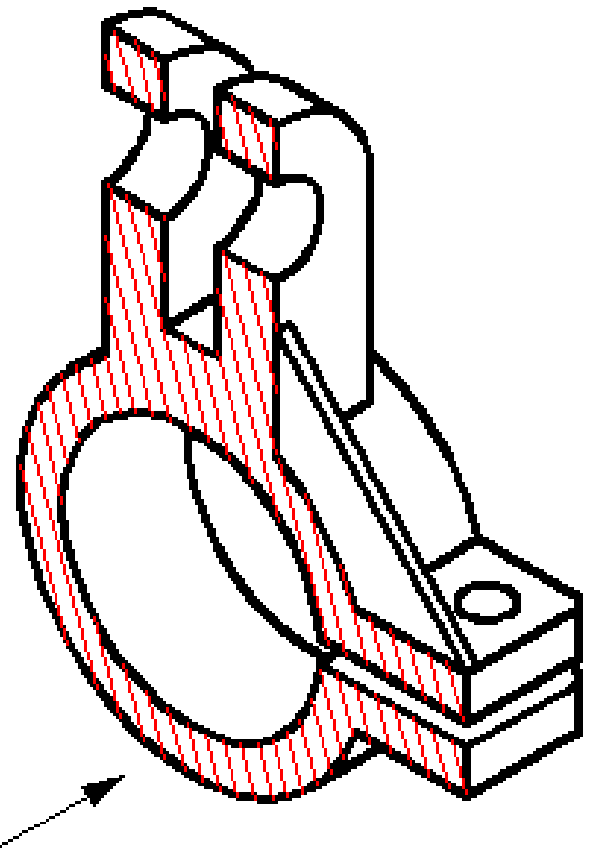




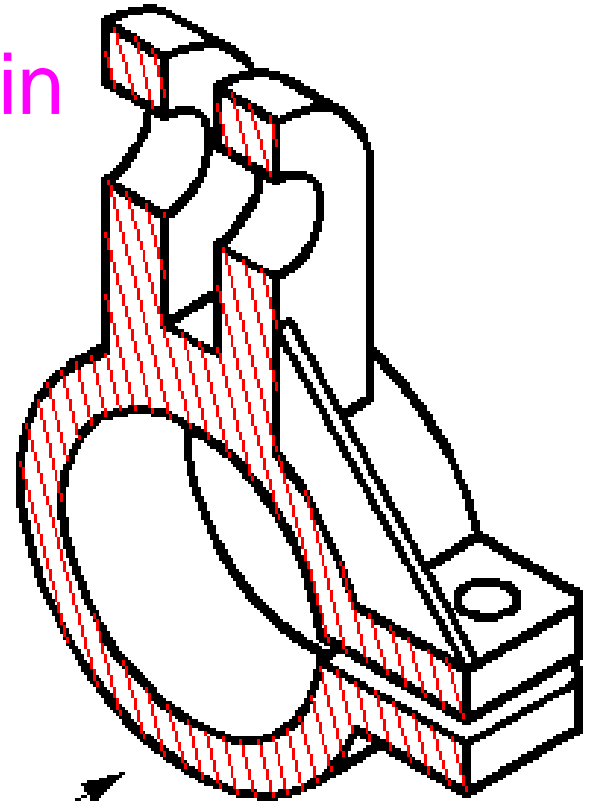
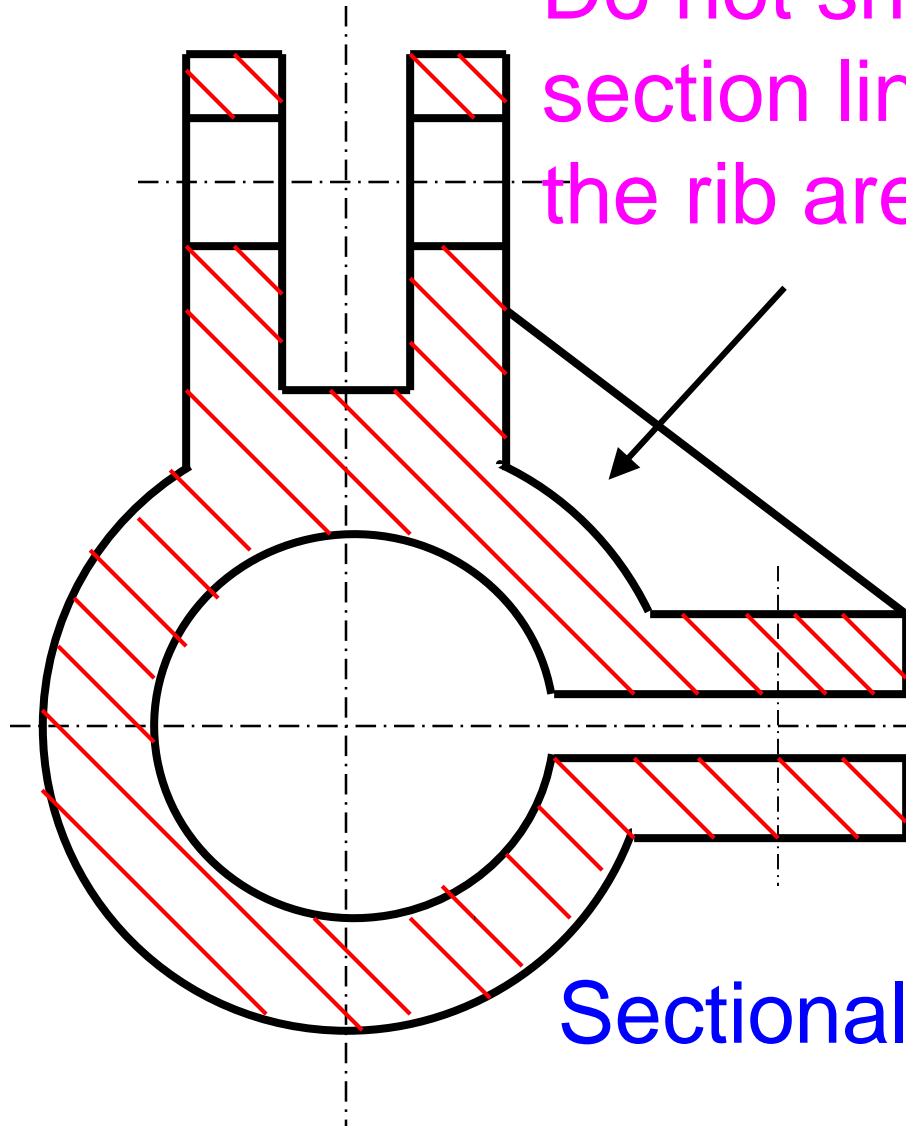
Practice Problem:- Draw the sectional front view.

(Wait for some help!!)

(Solution is shown on the next slide !!)

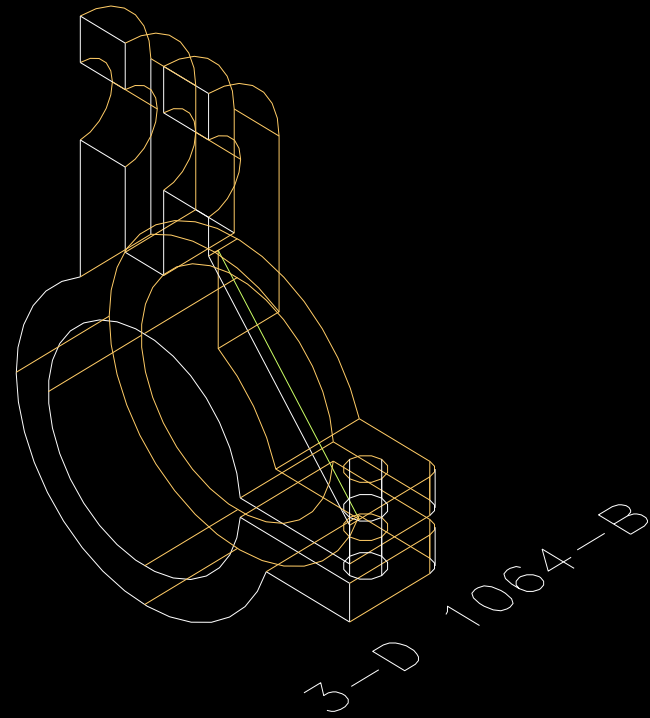
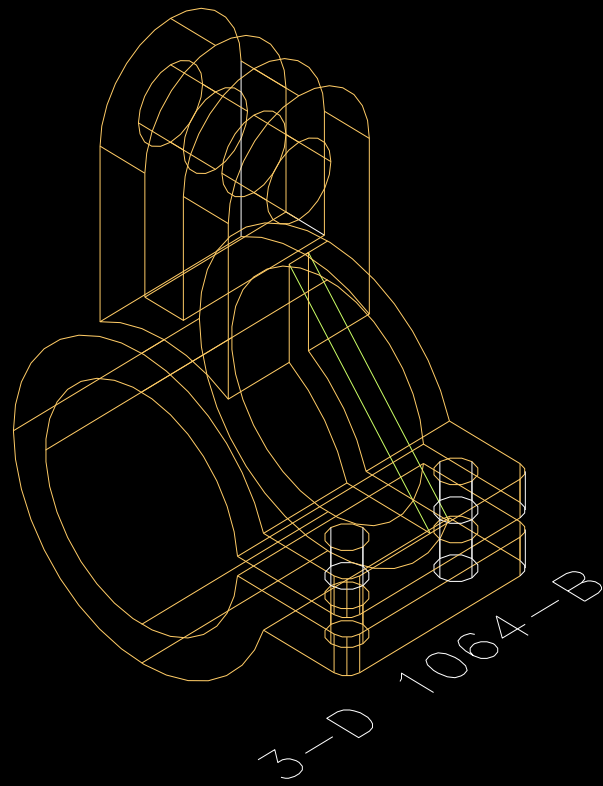


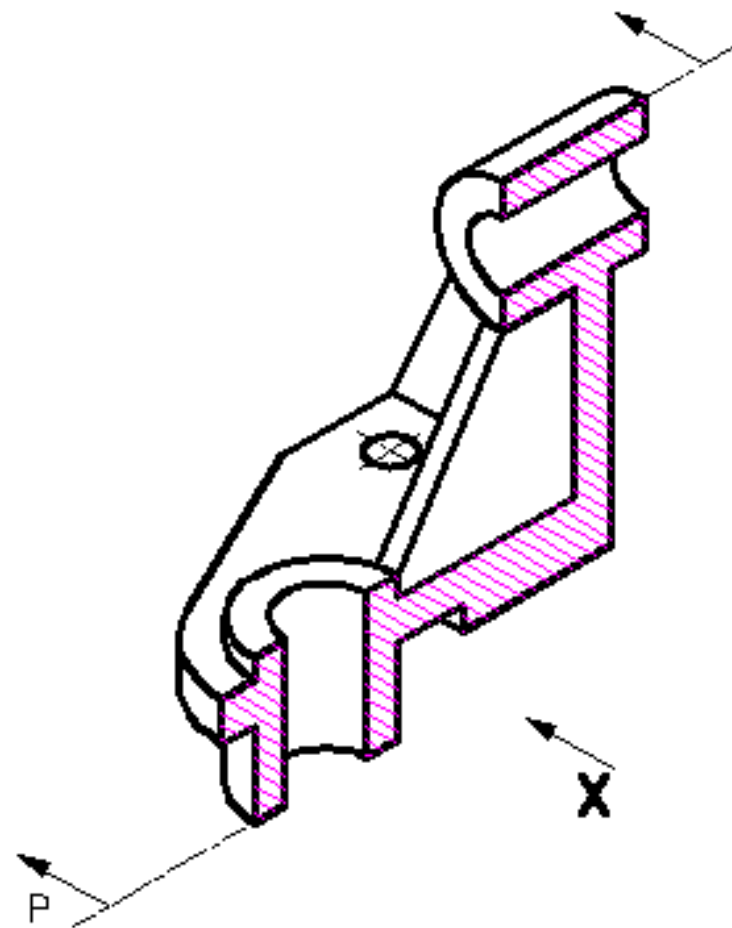
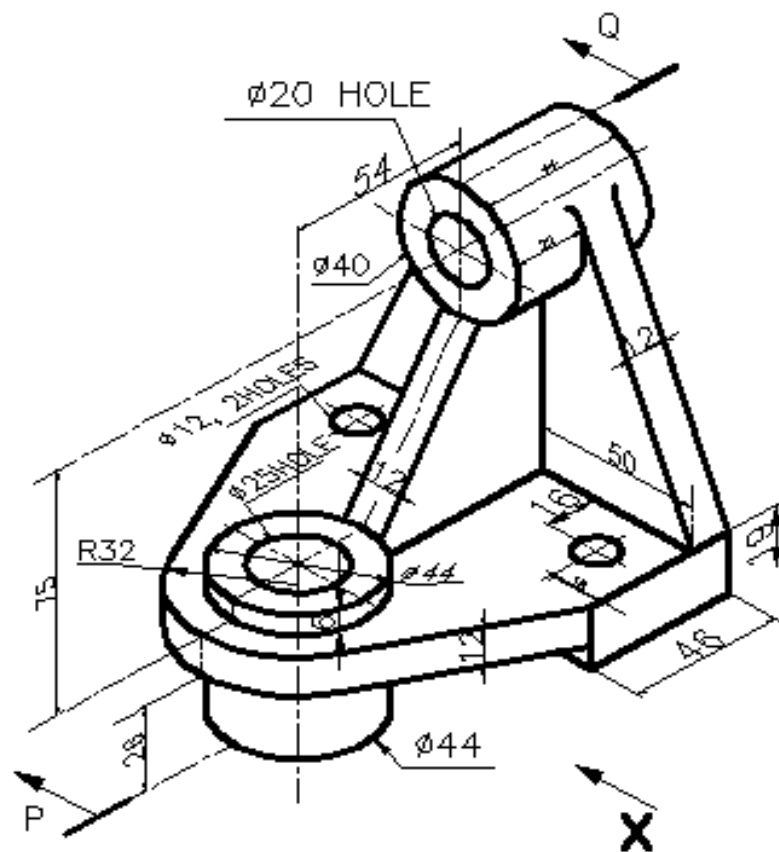
Do not show
section lines in
the rib area.



X

Sectional front view

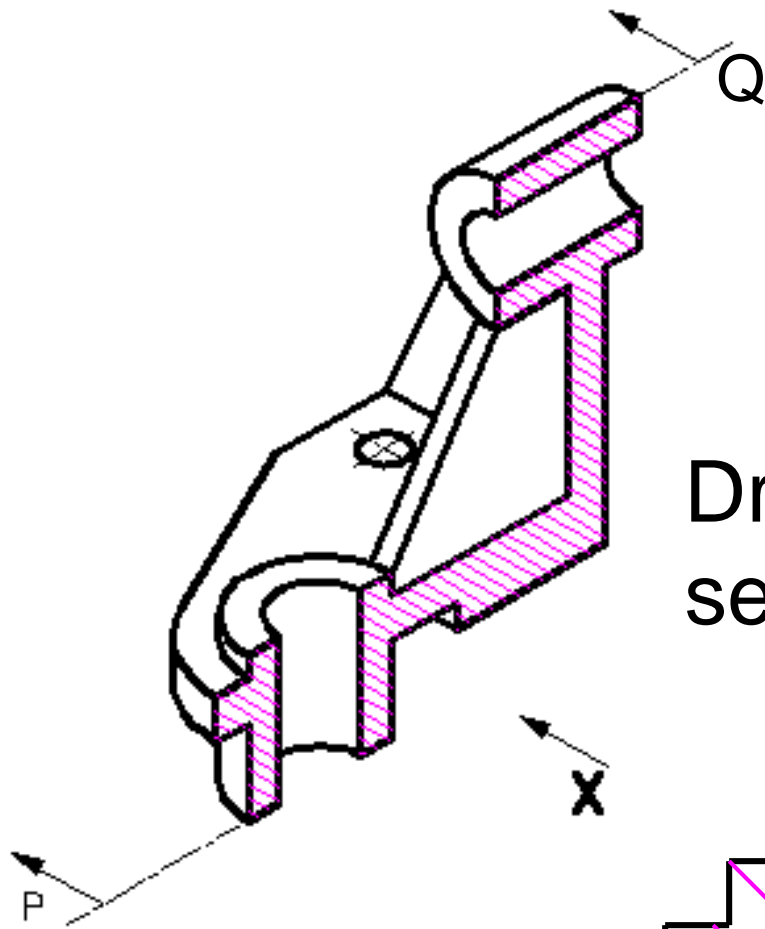




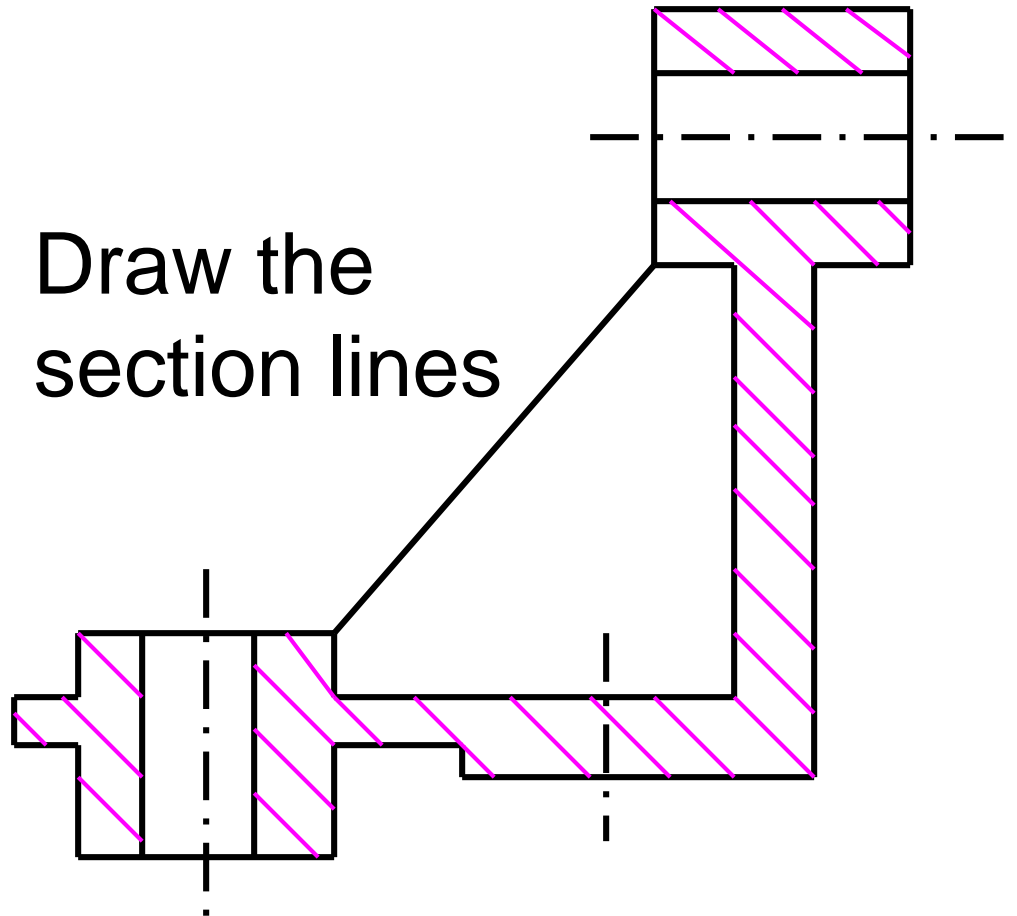
Practice Problem:-

Draw the sectional front view.

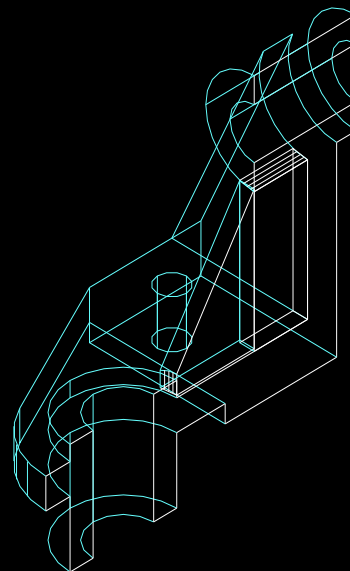
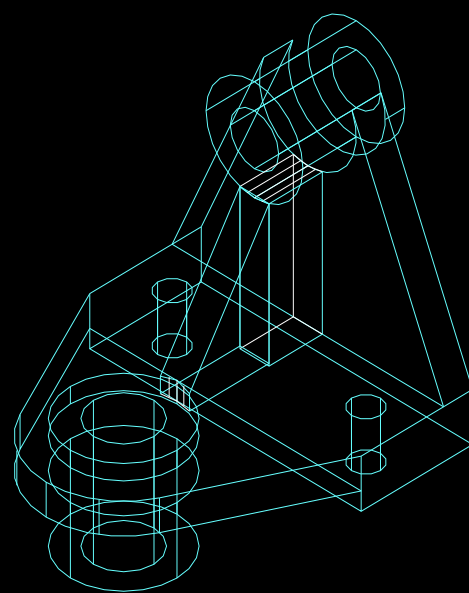
(Solution on the next slide!!)

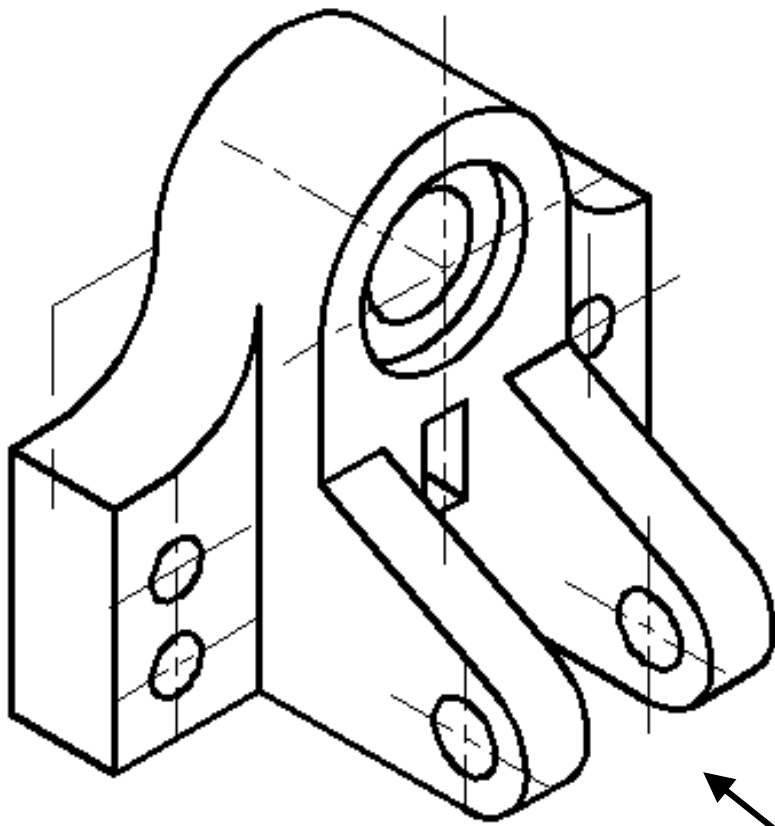


Draw the
section lines



Sectional R.H.S.V.



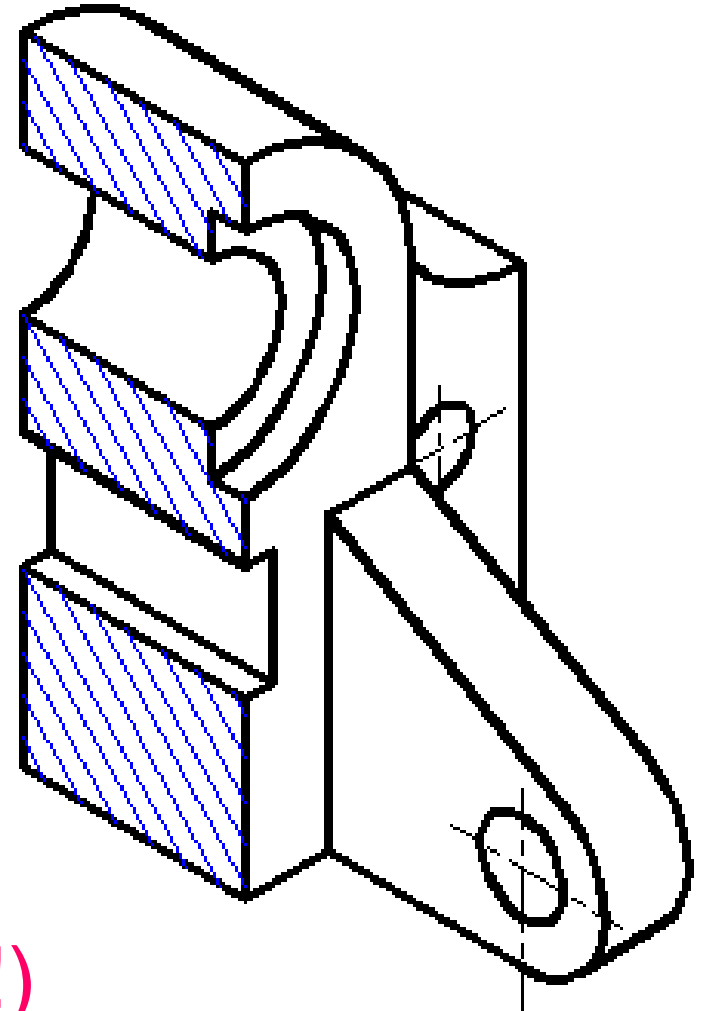


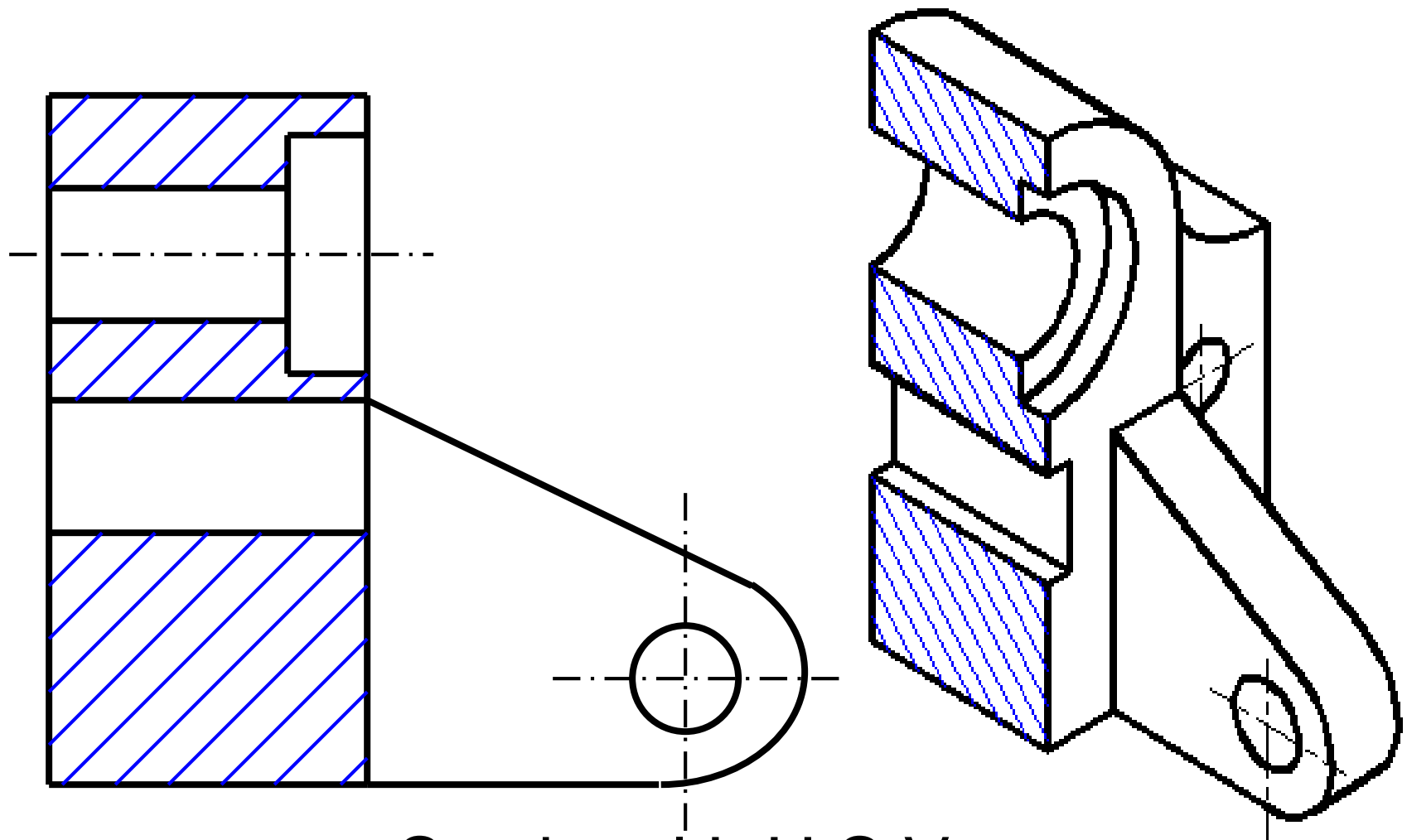
X

Practice Problem:-

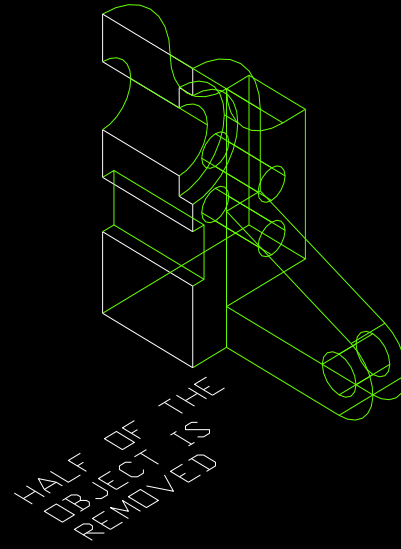
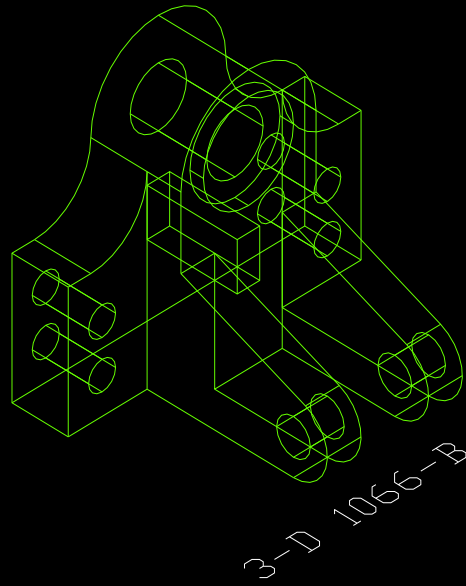
Draw the sectional L.H.S.V.

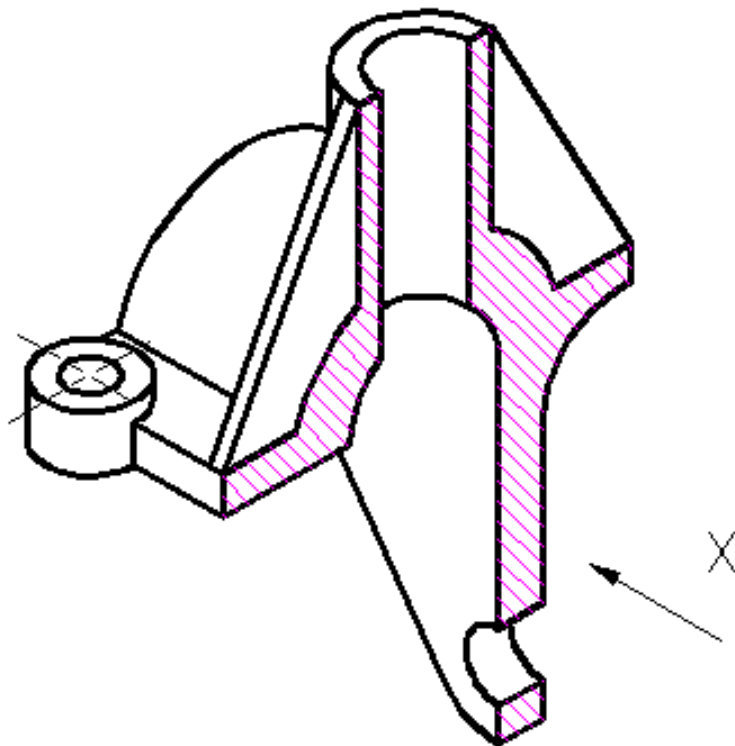
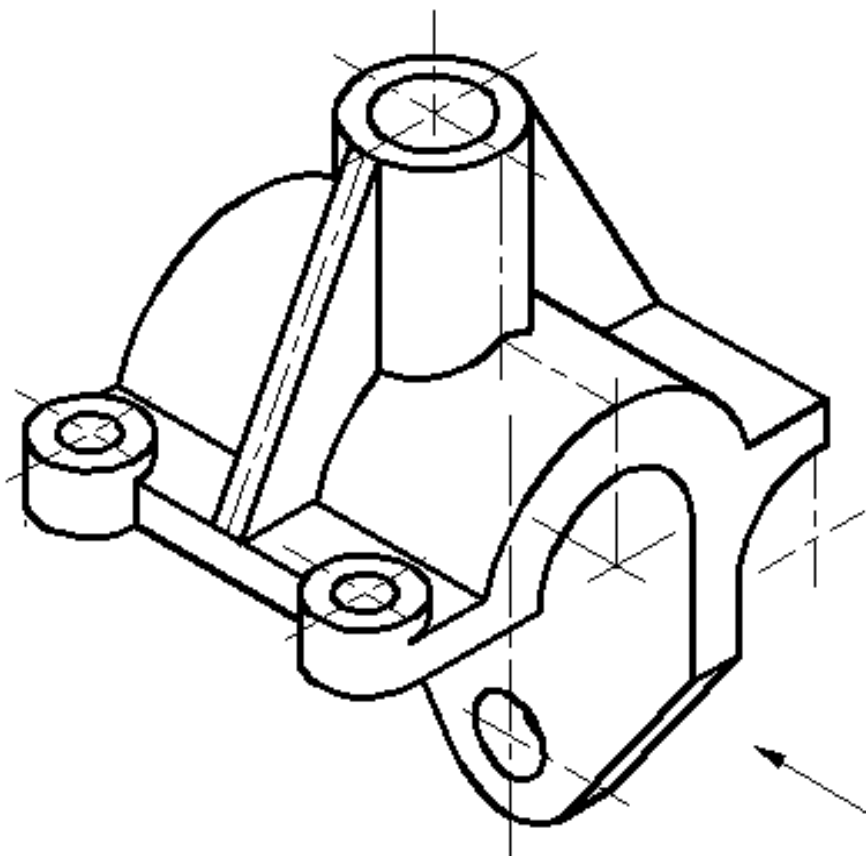
(Solution on the next slide!!)





Sectional L.H.S.V.

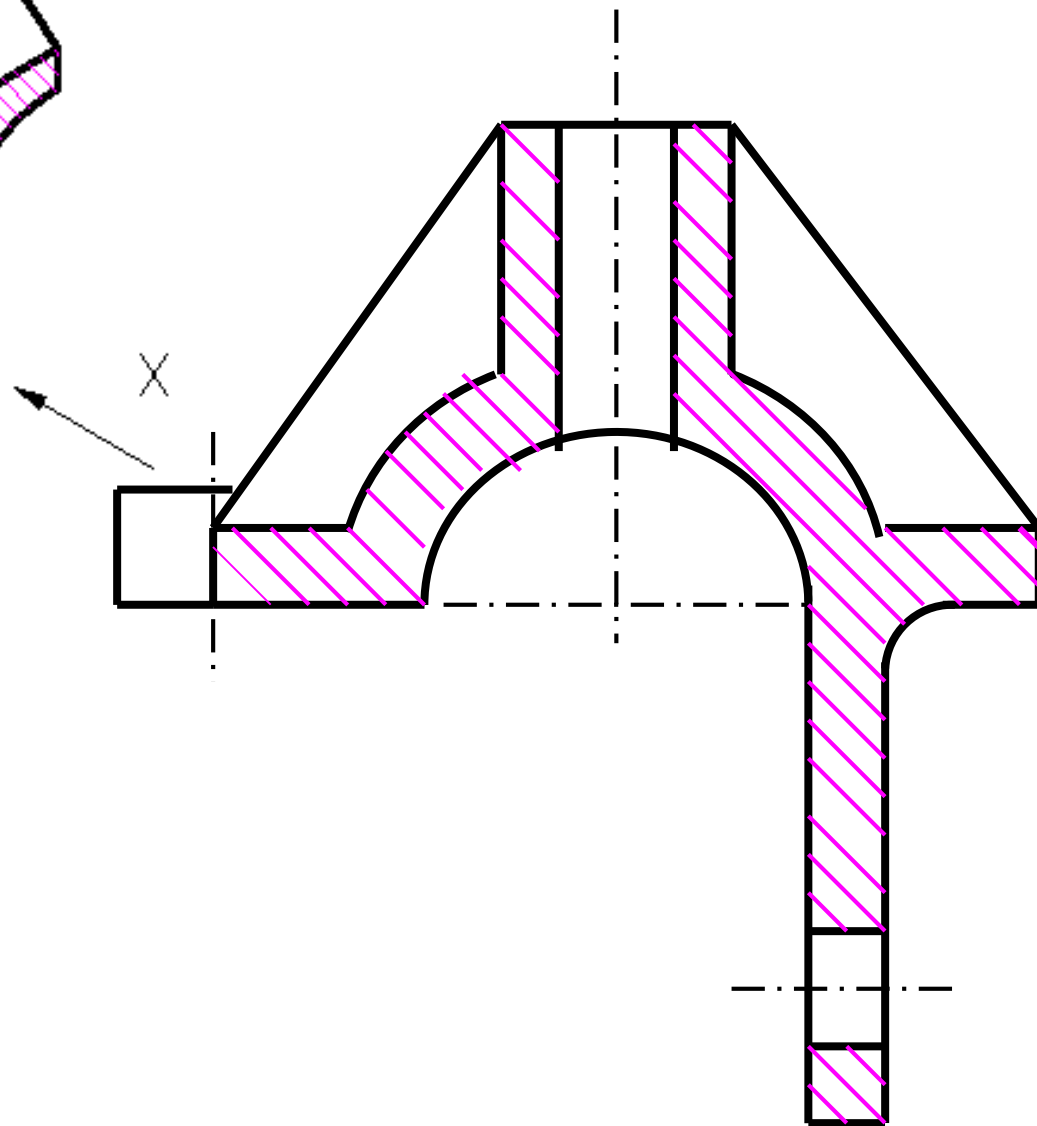
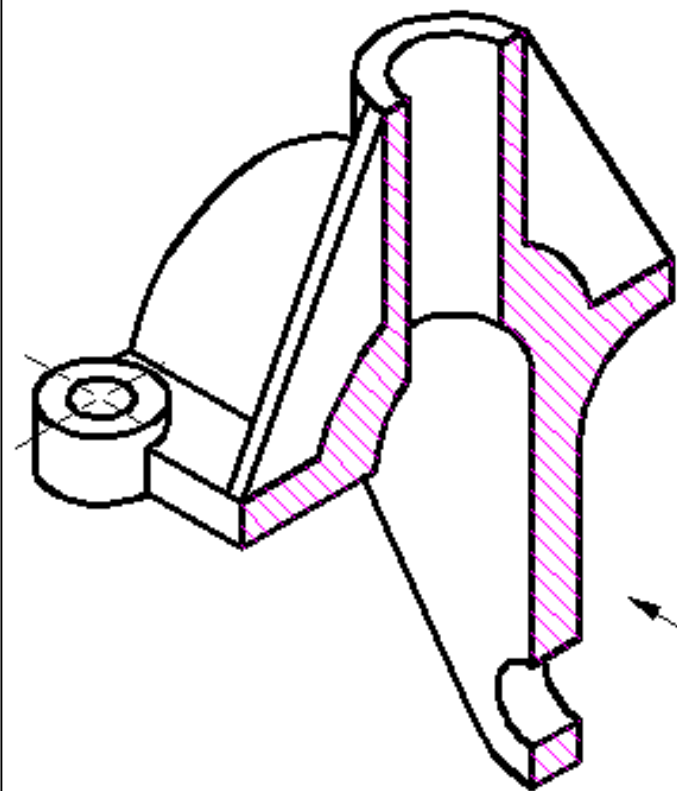


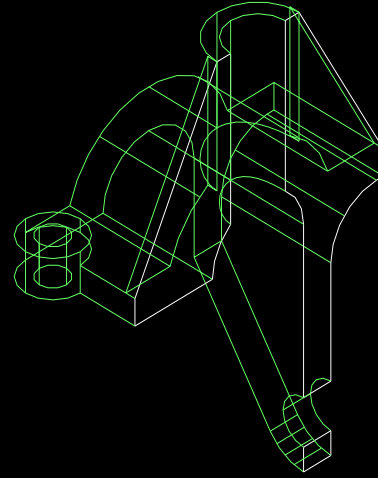
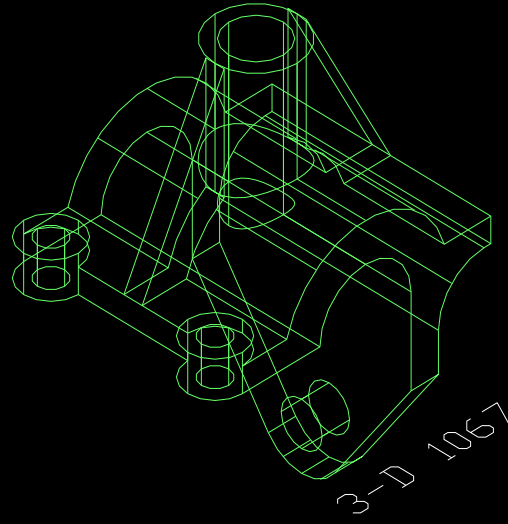


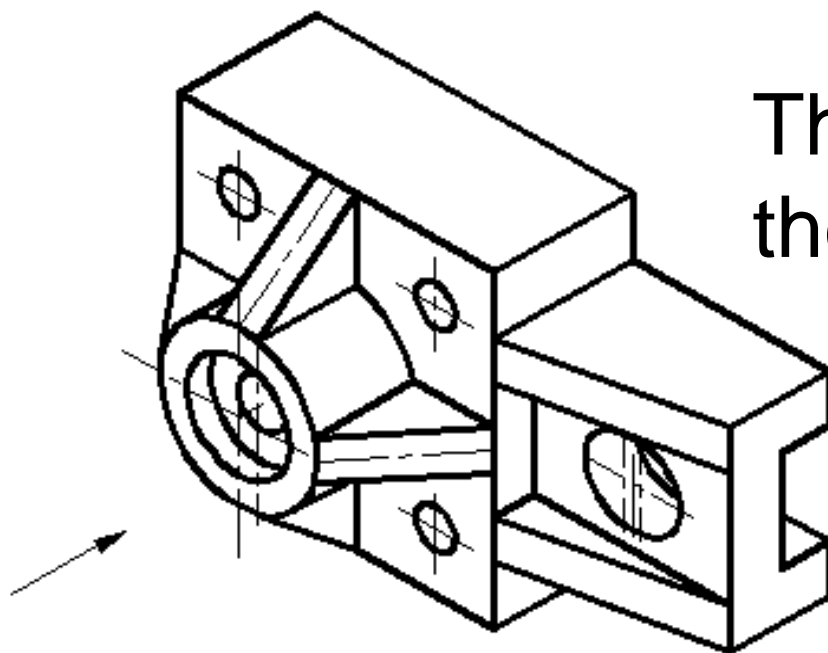
Practice Problem:-

Draw the sectional front view.

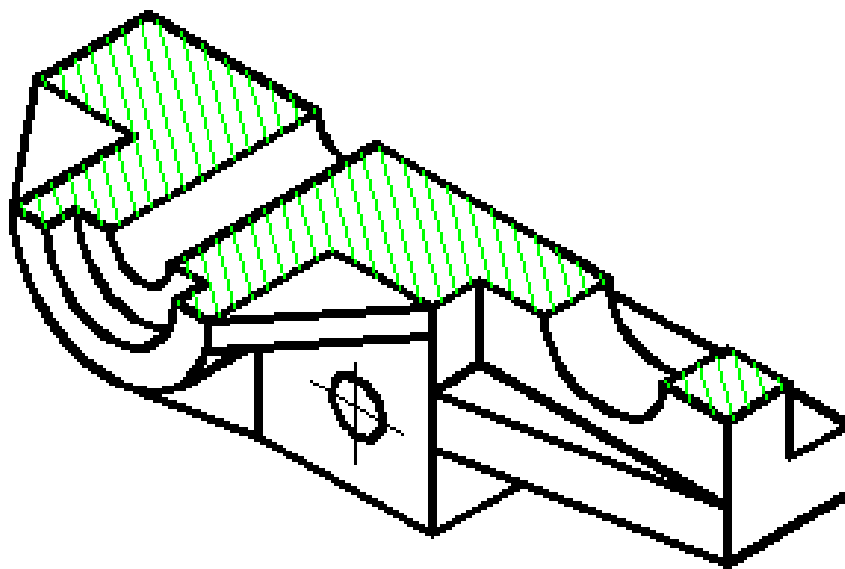
(Solution on the next slide!!)







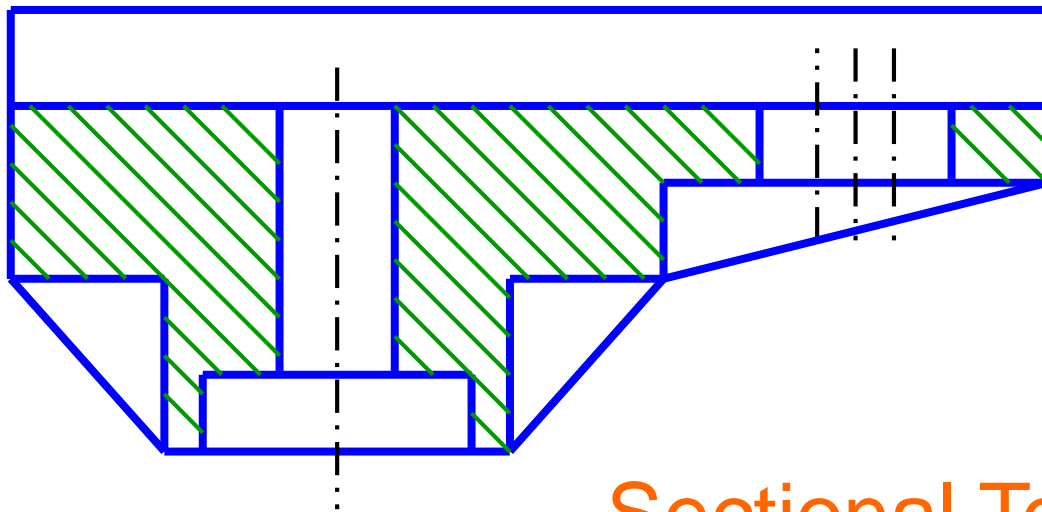
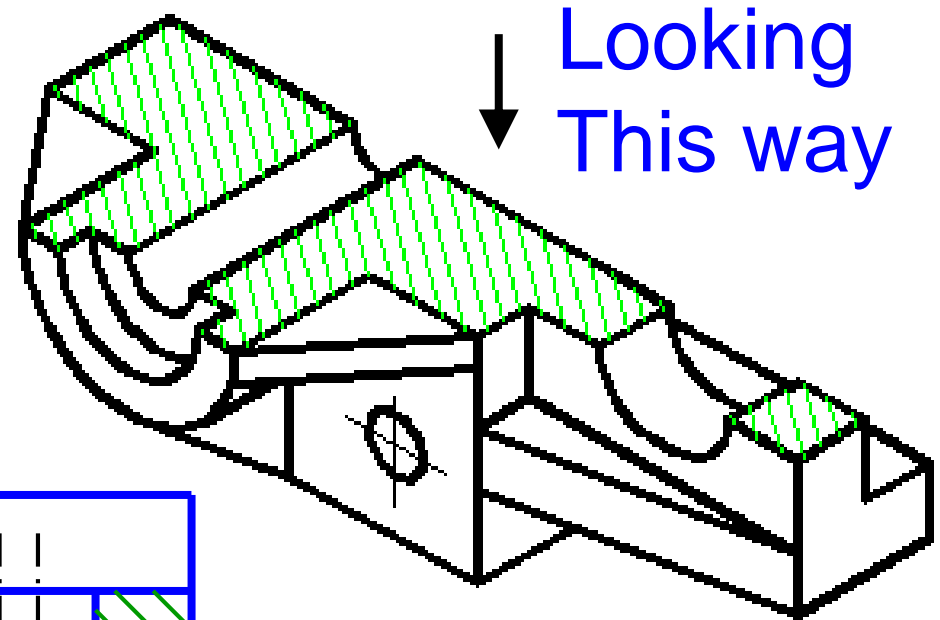
This is lower half of
the object.



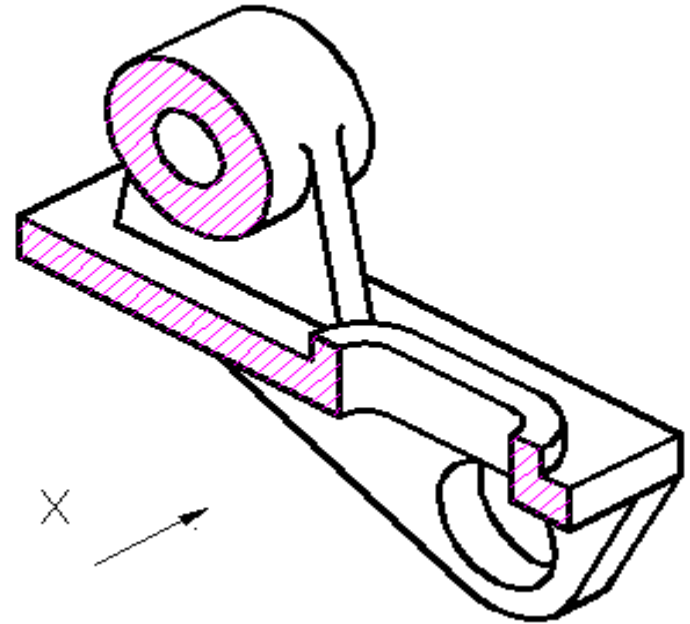
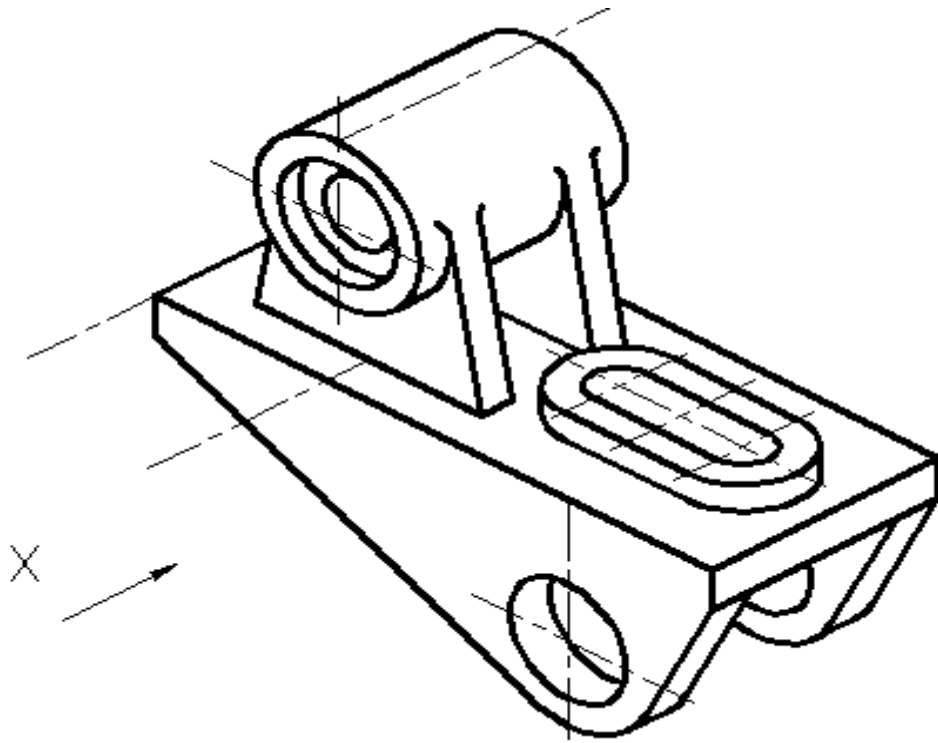
Practice Problem:-

Draw the sectional top view.

(Solution on the next slide!!)



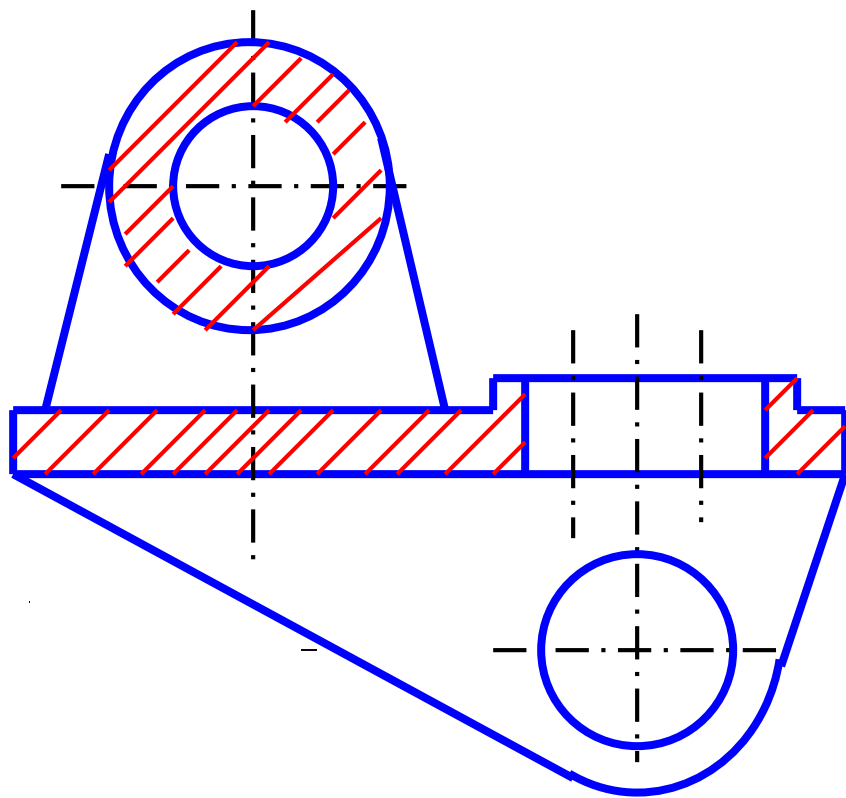
Sectional Top View



Practice Problem:-

Draw the sectional front view.

(Solution on the next slide!!)



Sectional Front View

