CHAPTER FIVE : SECTIONAL VIEWS

5.1 : INTRODUCTION

Sometimes hidden lines are not enough to describe the interior features of an object , when the object have a complicated interior features , it is necessary to make one or more of views " in section ".

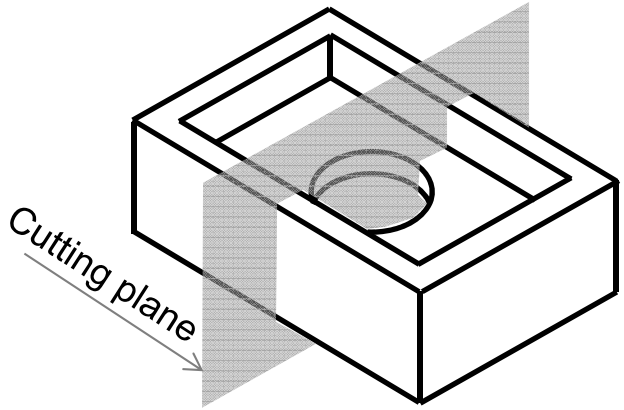
Section is obtained by imagining the object have been cut by a plane and left a fine section lines a cross the surface.

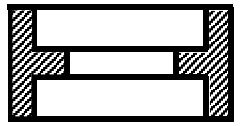
5.2 : TYPES OF SECTIONS

Main types of sectional views are :

5.2.1 : FULL SECTION

Full section occurred when the cutting Plane passes through the object and cut the Object in to two equal parts.

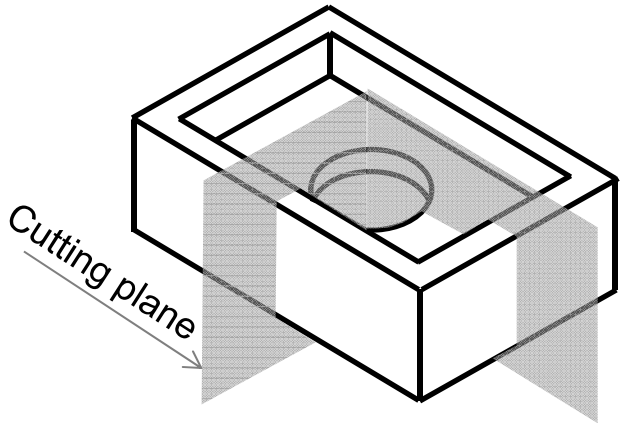


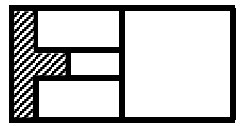


S.F.V

5.2.2 : HALF SECTION

The cutting plane of a half section Removes one-quarter of an object and In this type of section the exterior and Interior features appears in same time

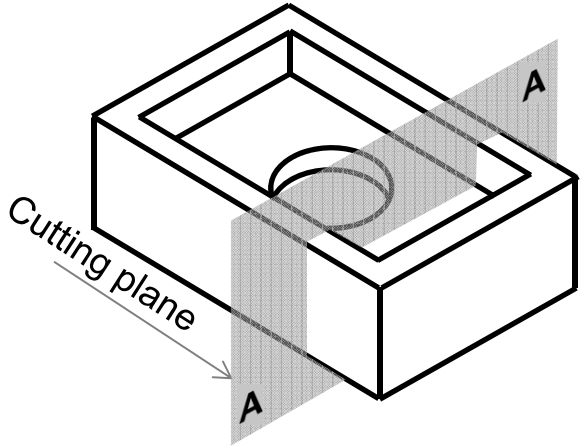


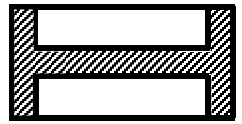


H.S.F.V

5.2.3 : LEVEL SECTION

Level section occurred when the cutting plane location was indicated In any level on object , and the cutting Level indicated by capital letters and The direction of arrows indicated the Direction of sight.





Section A-A

5.3 : NOTES

1- Section lines drawn on sectional surface the lines drawn equally and inclination is about 45^0 .

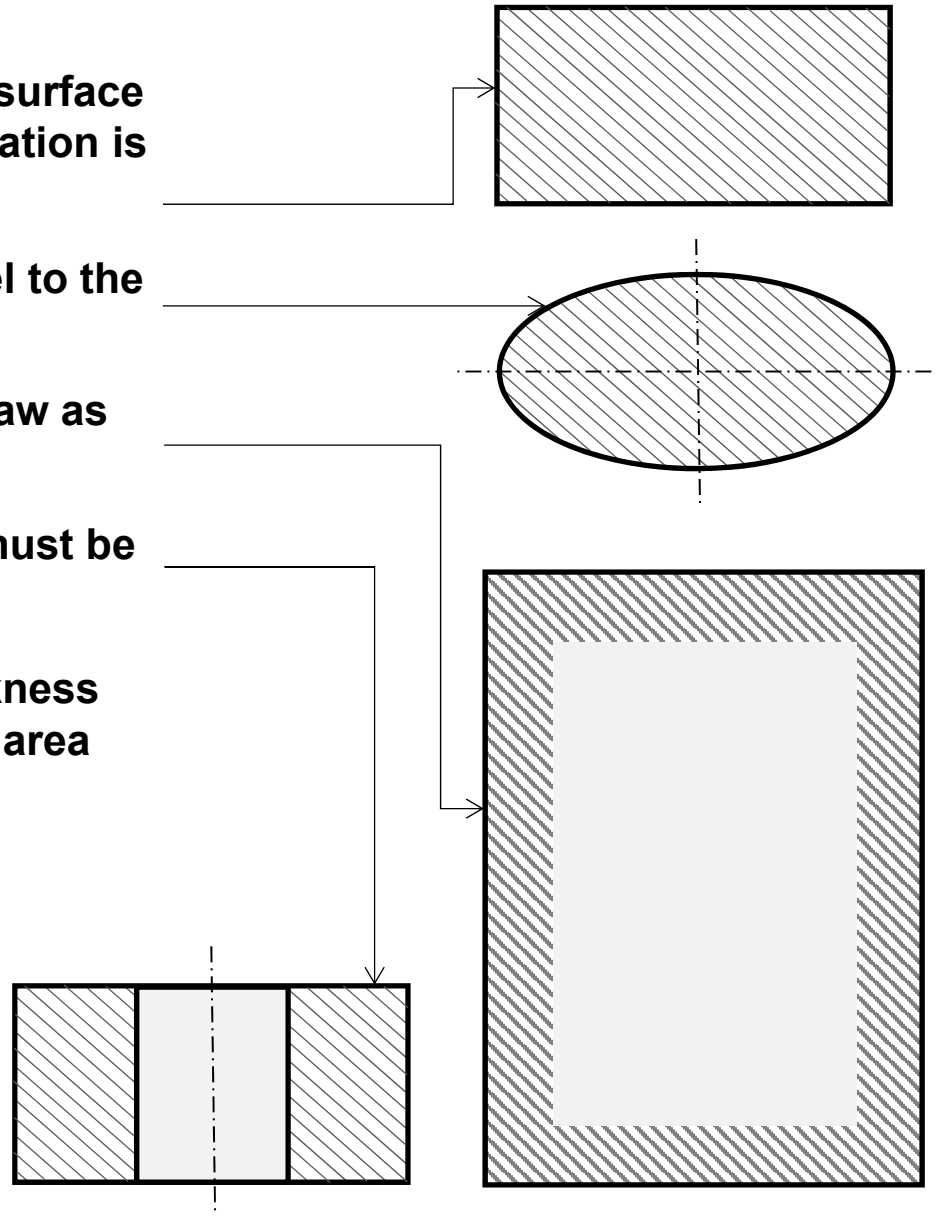
2- Avoid drawing section line parallel to the center lines.

3- In large areas the section lines draw as follows

4- In same section the section line must be in the same style.

5- For sections less than 3 mm thickness draw the section by hatching the area

6- Don't draw the hidden lines in sectional views



CHAPTER SIX : PICTORIAL DRAWING

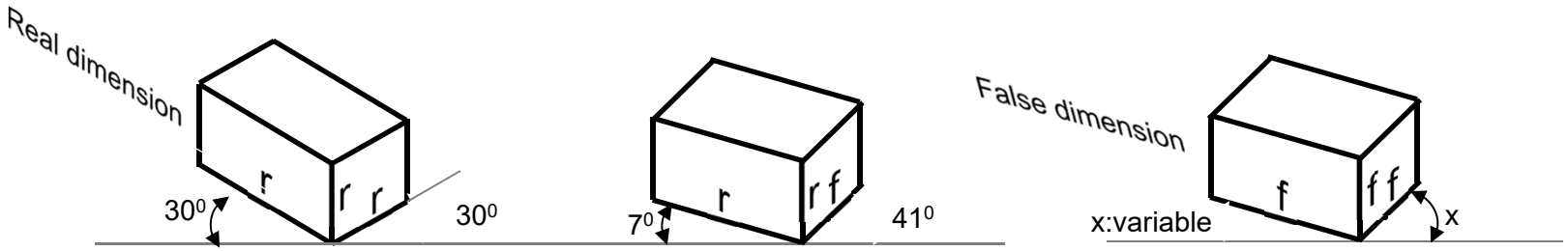
6.1 : INTRODUCTION

An orthographic drawing of two or more views describes an object accurately in form and size, because each of the views shows only two dimensions. Engineers and technologists often find that they must use pictorial drawing to convey technical information to persons who don't poses the training necessary to construct an object mentally from multi views.

6.2 : TYPES OF PICTORIAL DRAWING

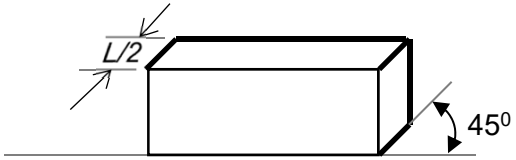
1- Axonometric drawing

Isometric drawing | **Dimetric drawing** | **Trimetric drawing**

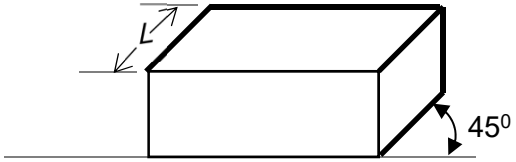


2- Oblique drawing

Cabinet drawing

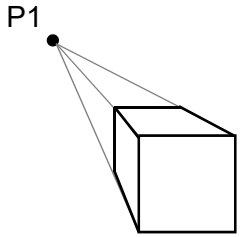


Cavalier drawing

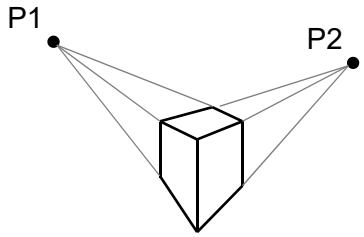


3- Perspective drawing

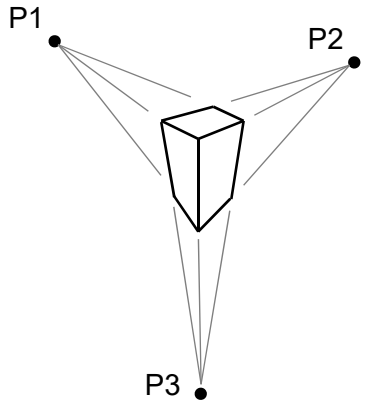
One vanishing point



two vanishing point

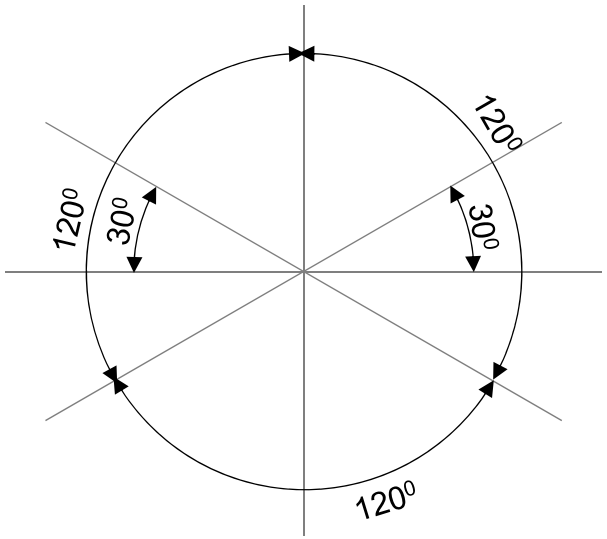


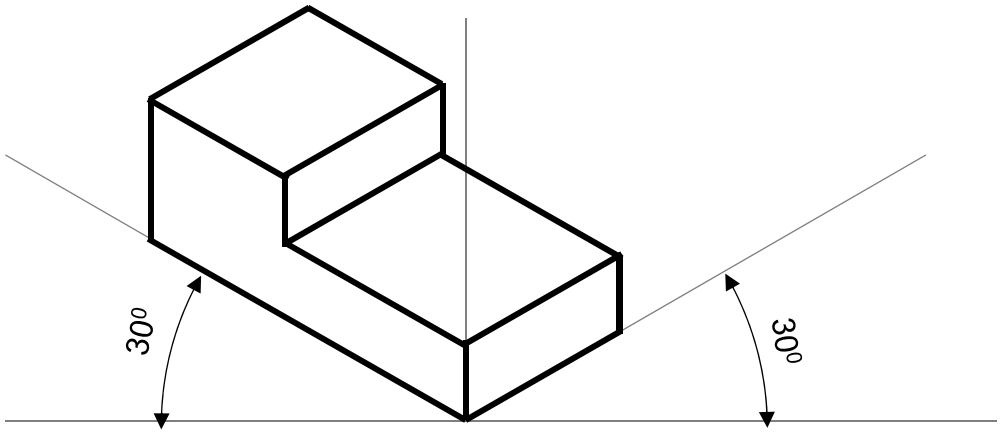
Three vanishing point



6.3: ISOMETRIC DRAWING

Isometric drawing are the most used of the three common pictorials, they are easier to draw than perspective drawings. And they illustrate objects Almost as well as perspective drawings, isometric drawing use the axis, at 120^0 to each other.





6.4: DRAWING THE CIRCLES IN ISOMETRIC DRAWING

1- Locate the center of the circle(O).

2- locate points (a,b,c and d) on the axes far from the center (O) by distance = radius of the circle.

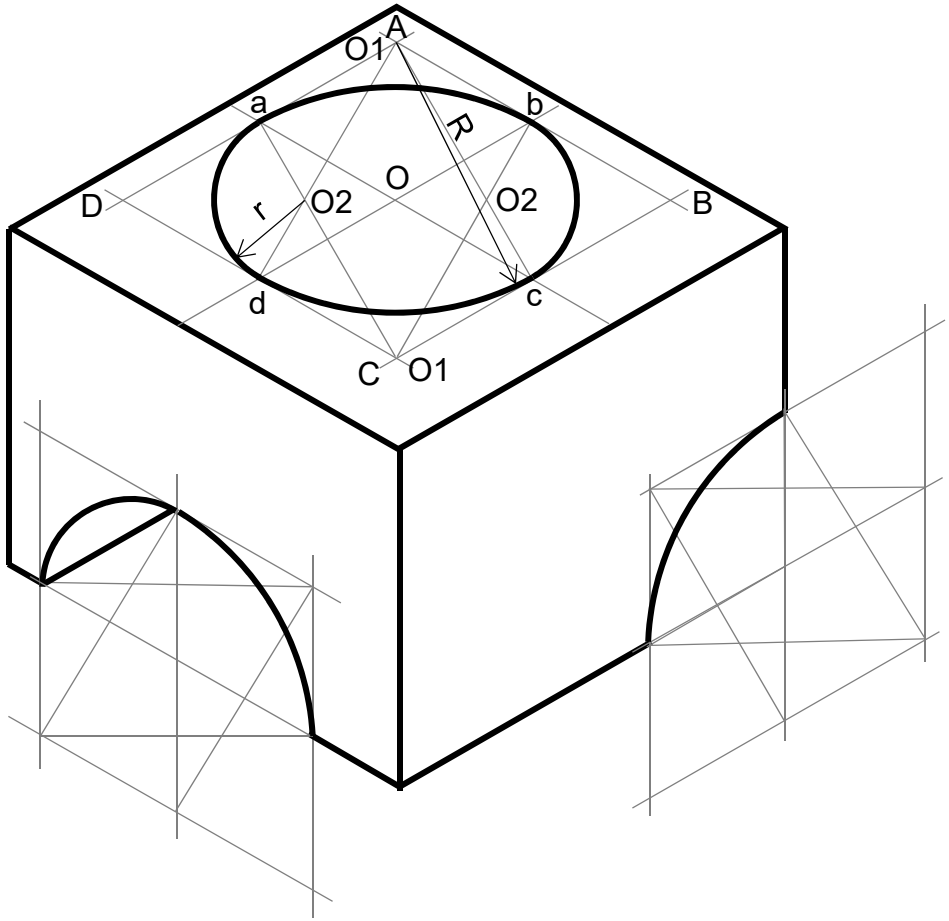
3- From points (a,b,c and d) draw an axillary lines parallel to the axes to intersect in (A,B,C and D).

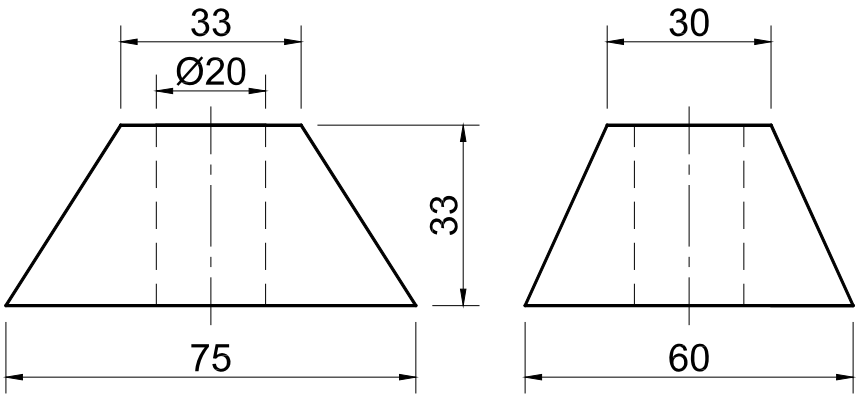
4- The intersection of the 4 previous lines making 2 acute angles D and B+2 obtuse angles A and C

5- From the 2 obtuse angles draw axillary lines Ac,Ad and Ca,Cb to find O2.and O1 will be in A&C

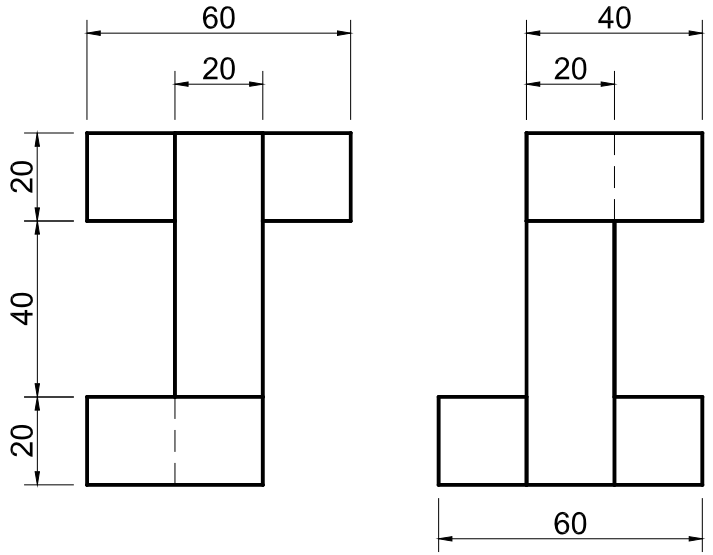
6- Using 4-center method R=Ac & r = O2a draw the arcs.

7- Using the same procedure for drawing the half and quarter circle in isometric drawing.

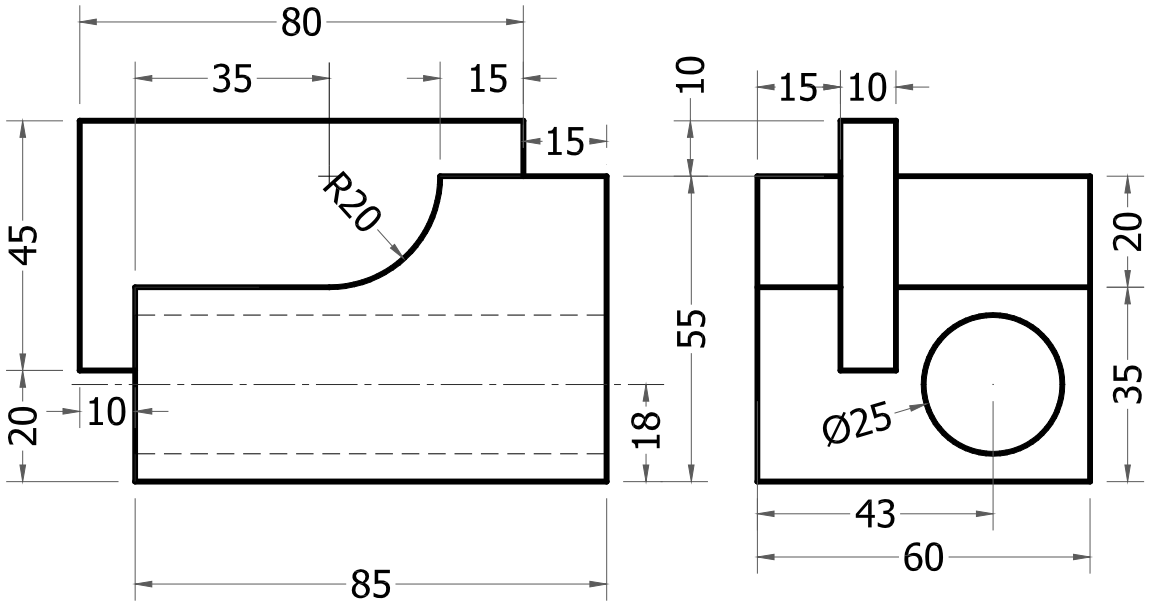



33
Ø20
33
75
30
60

59

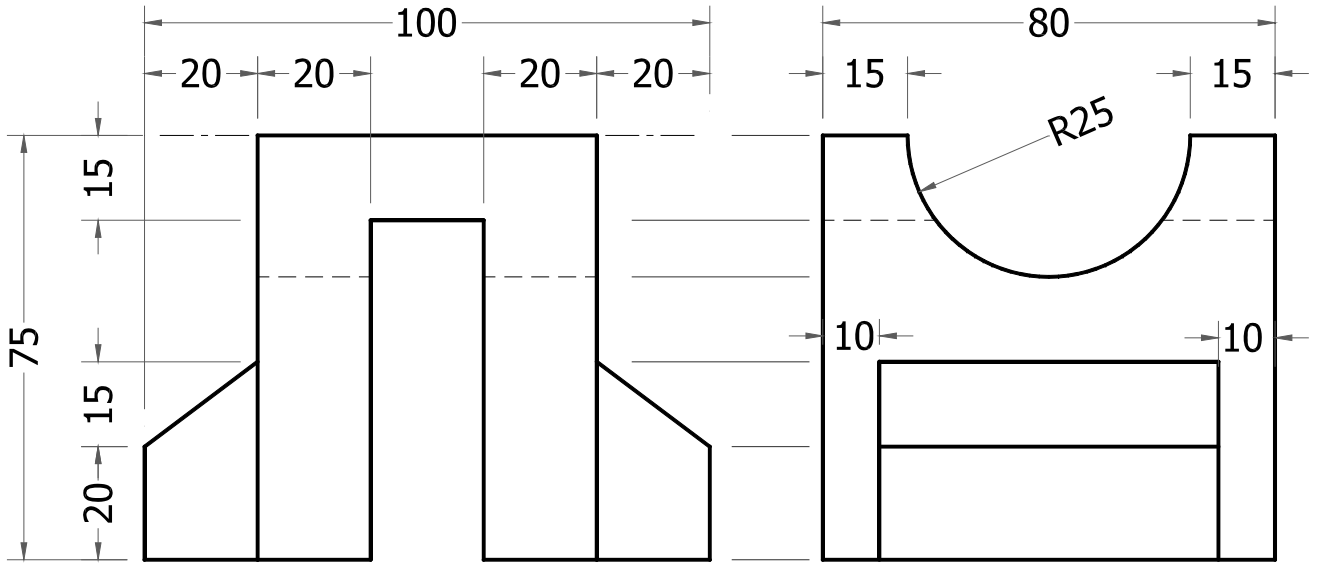

60
20
20
40
20
40
20
60

60

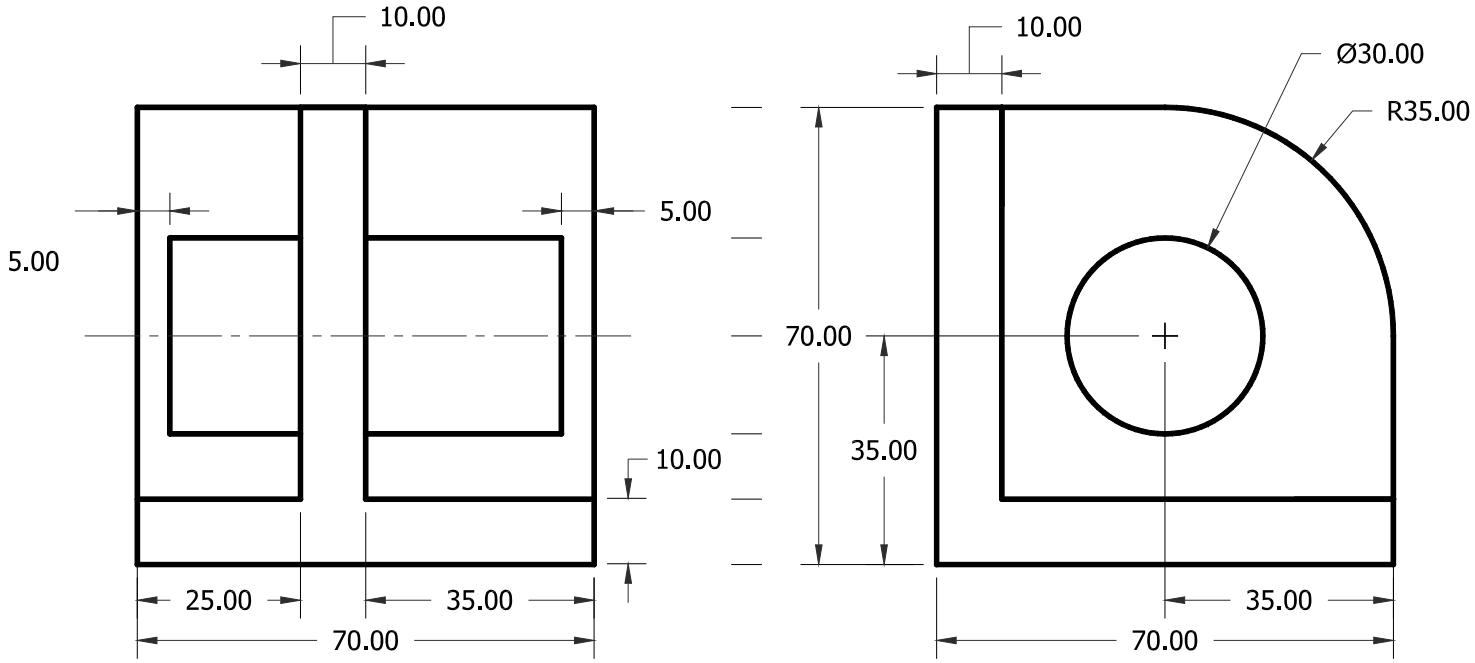

80
35
15
15
R20
45
20
10
10
55
18
15
10
20
35
Ø25
43
60
85

61

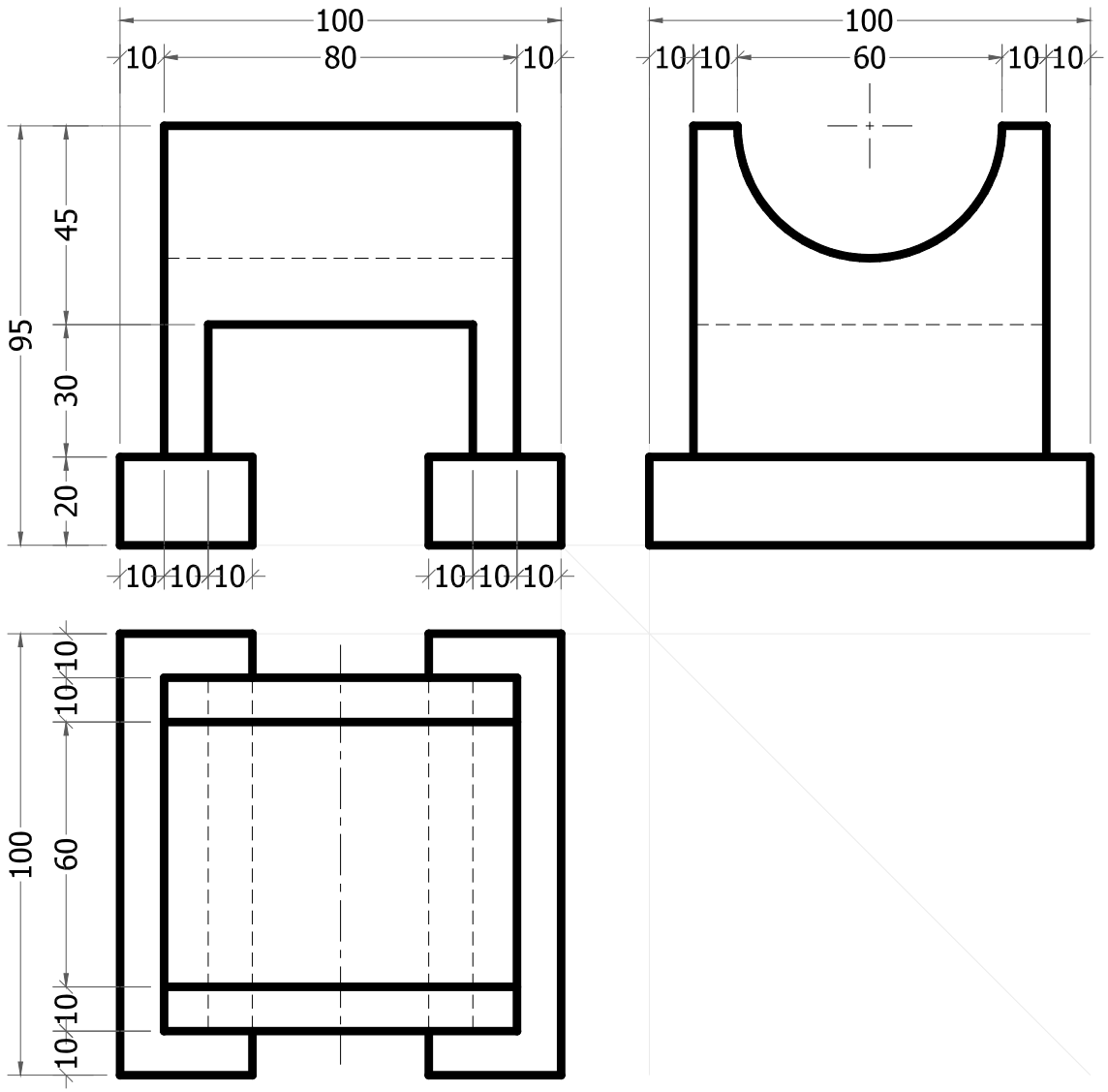
62

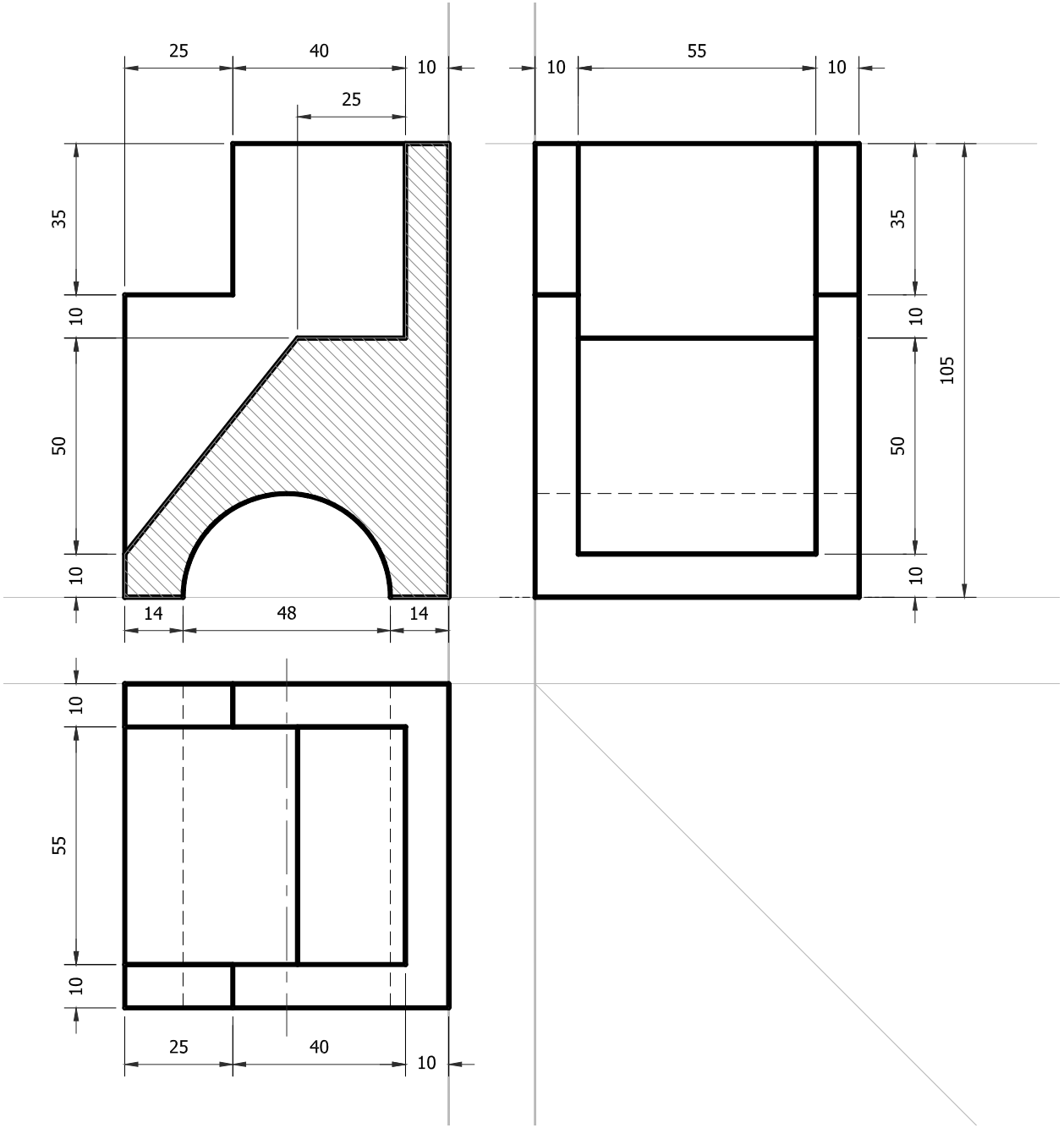

100
20
20
20
20
80
15
15
R25
15
15
15
20
75
10
10

63

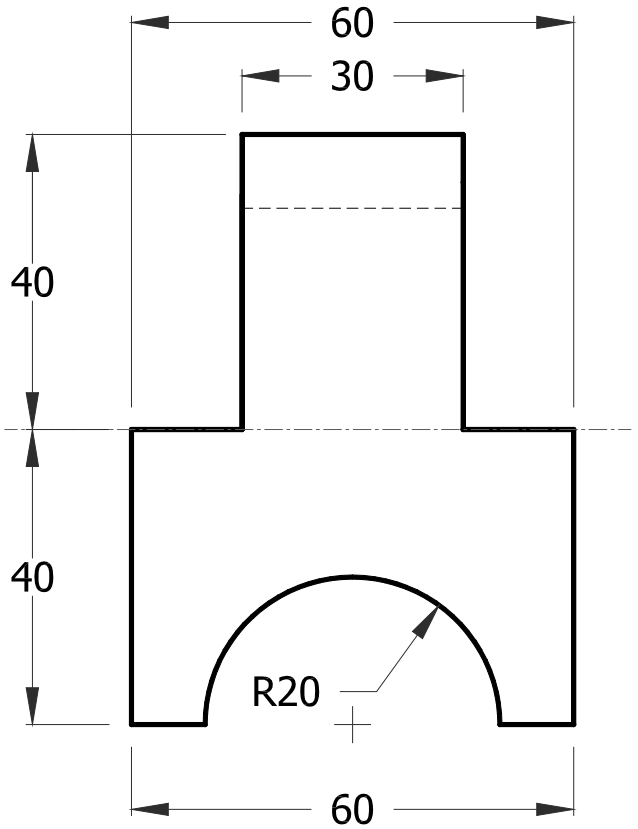

10.00
5.00
5.00
10.00
25.00
35.00
70.00
10.00
Ø30.00
R35.00
70.00
35.00
35.00
70.00

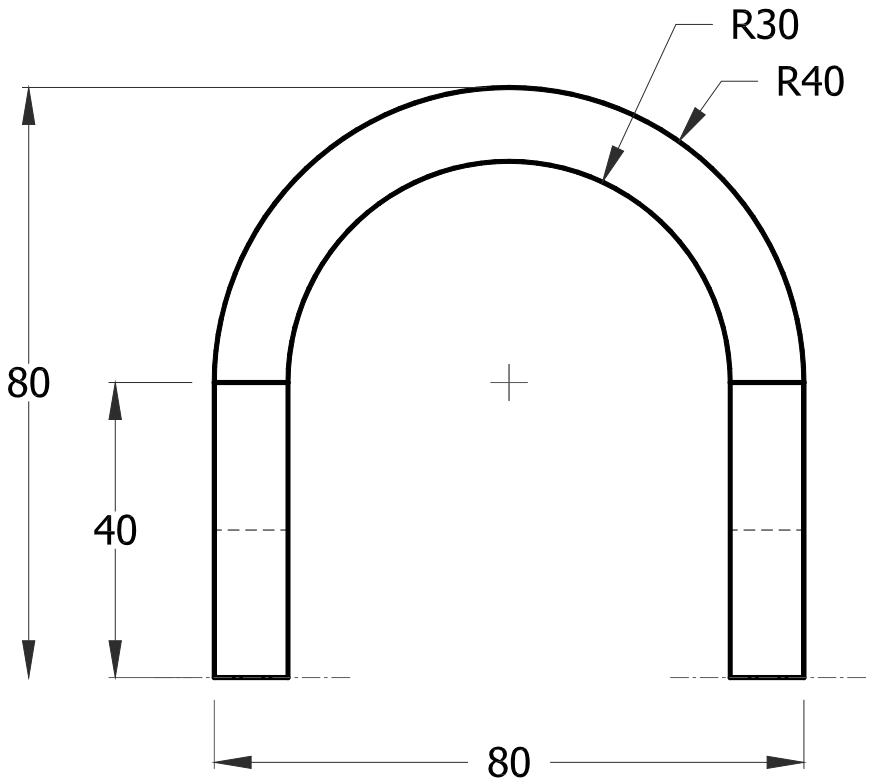
64


100
10
80
10
100
10
10
60
10
10
95
45
30
20
10
10
10
10
10
10
100
10
10
60
10
10


25
40
10
25
35
10
50
10
14
48
14
10
55
10
35
10
50
10
105
10
55
10
25
40
10

65





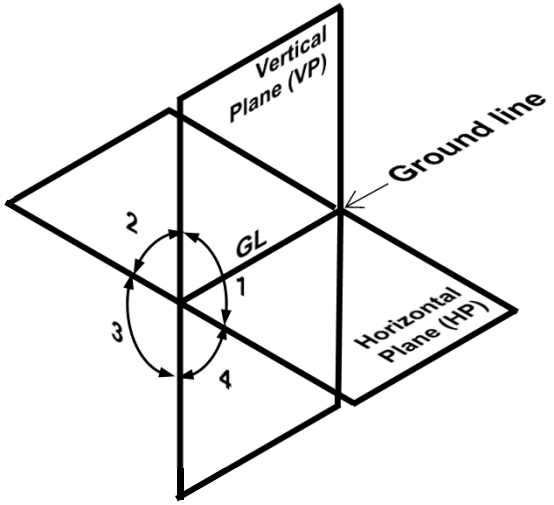
66

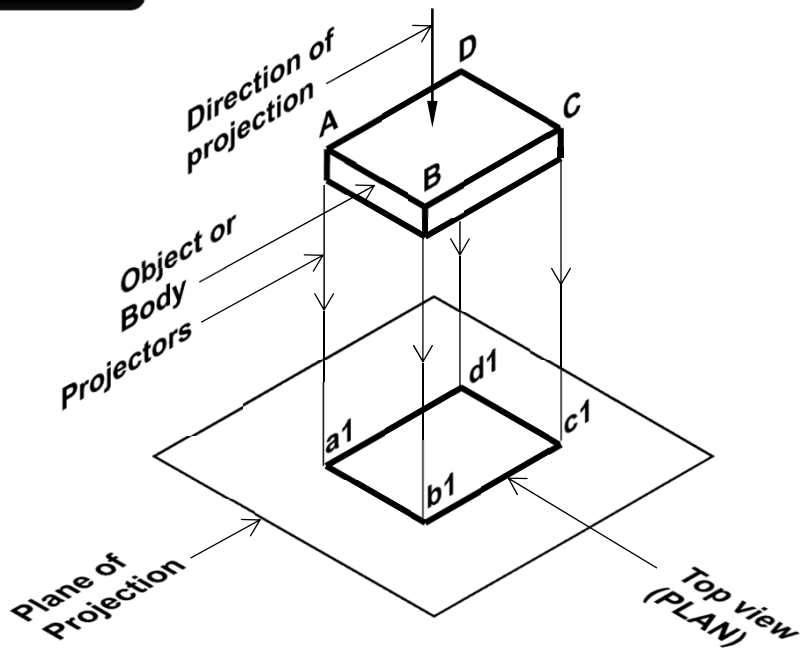
CHAPTER SEVEN : DESCRIPTIVE GEOMETRY

7.1: INTRODUCTION :

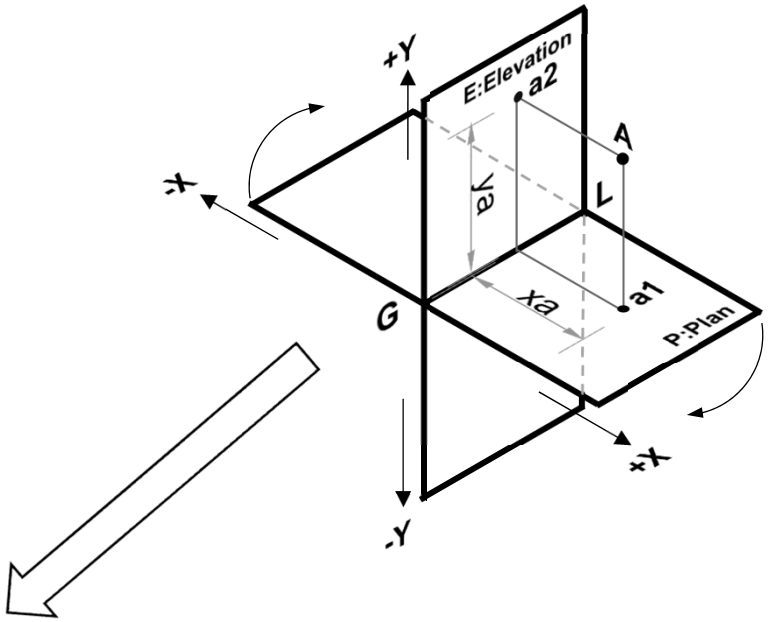
It is the representation of bodies on a plane surface as the plane of paper, in a manner that the shape and real dimension of these bodies can be determined from direct measuring of that drawing.

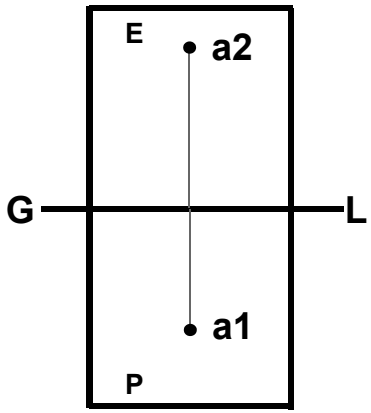
7.2: THE THEORY OF PROJECTION



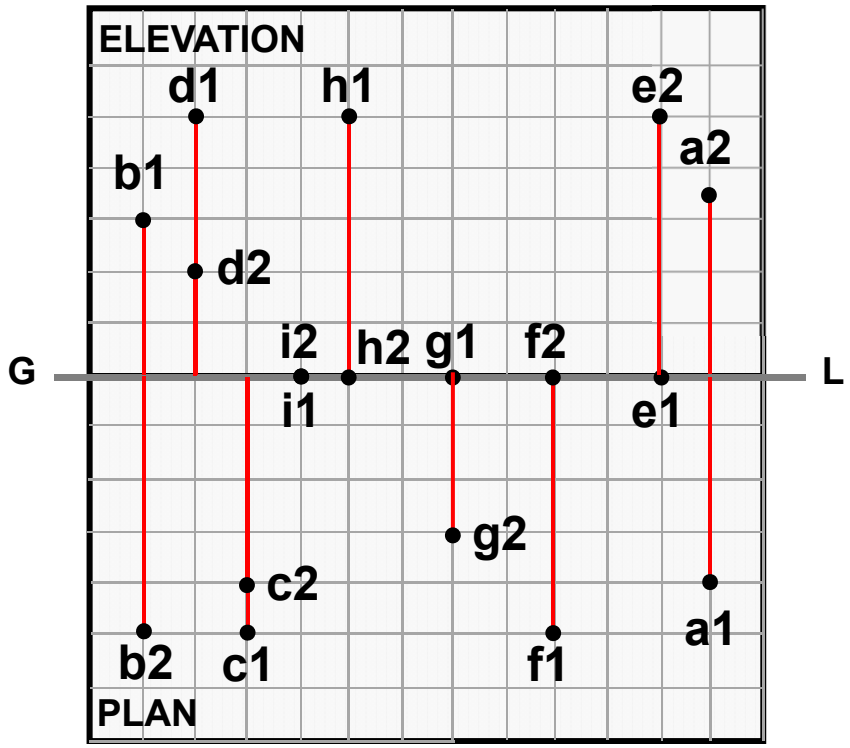


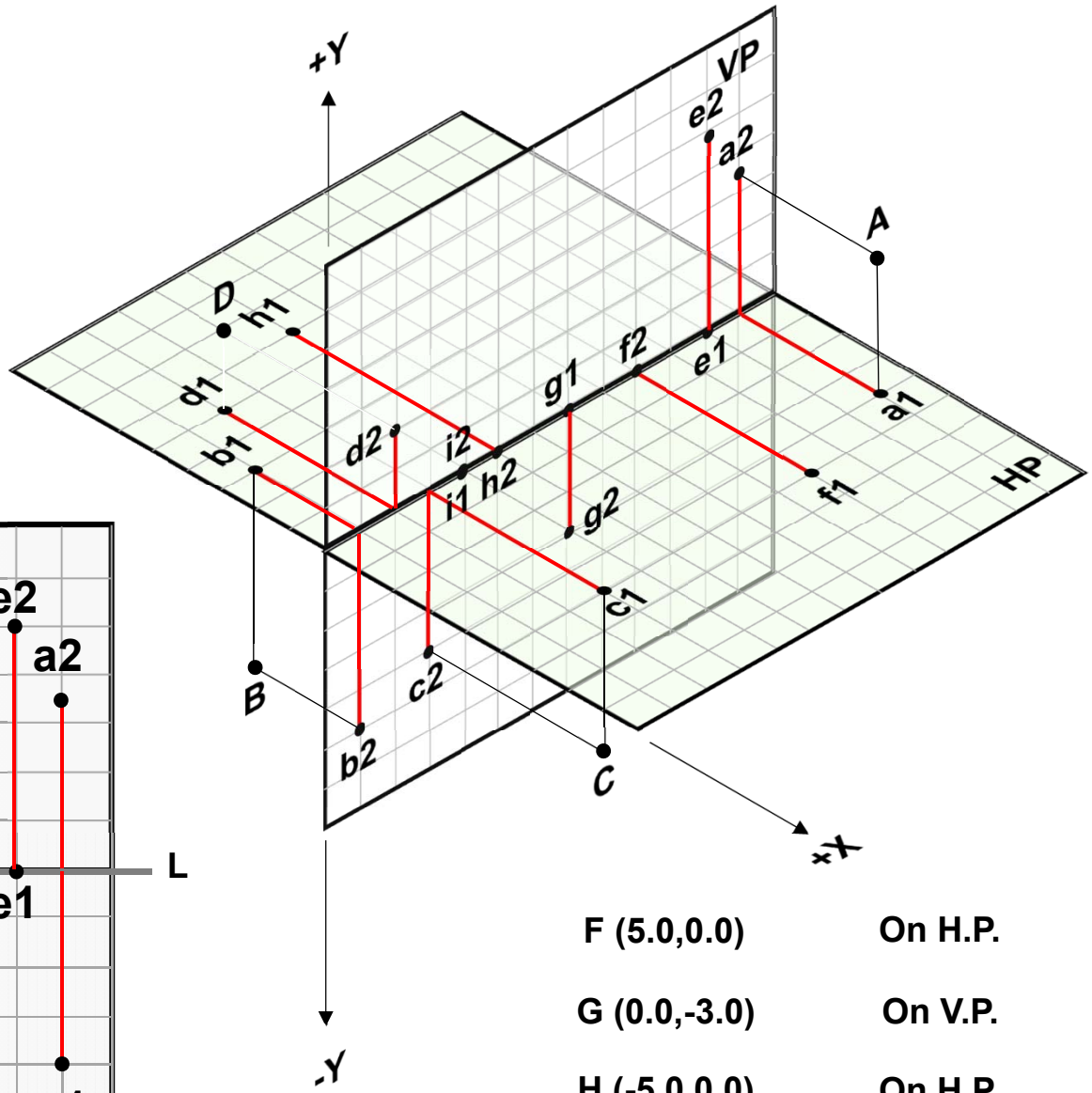
7.3: PROJECTION OF THE POINT





A (4.0,3.5)	1st quadrant
B (-3.0,-5.0)	3rd quadrant
C (5.0,-4.0)	4th quadrant
D (-5.0,2.0)	2nd quadrant
E (0.0,5.0)	On V.P.

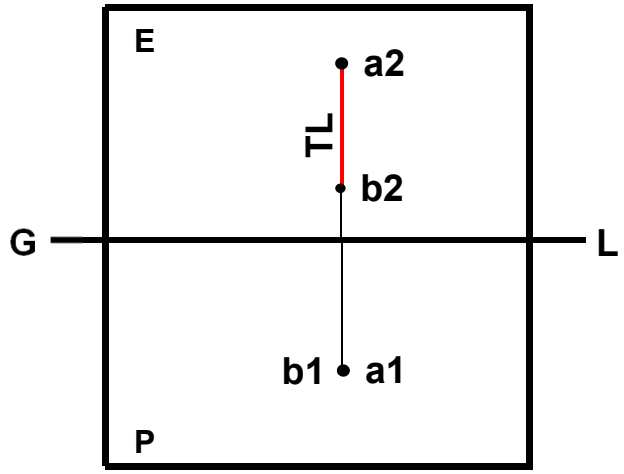


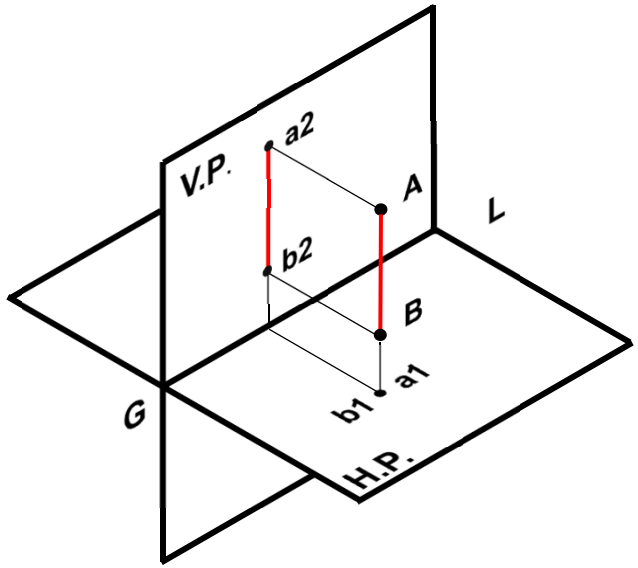


F (5.0,0.0)	On H.P.
G (0.0,-3.0)	On V.P.
H (-5.0,0.0)	On H.P.
I (0.0,0.0)	On G.L.

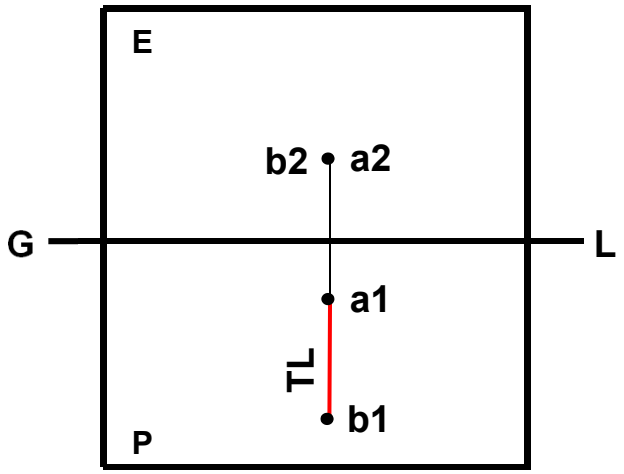
7.4: PROJECTION OF THE STRAIGHT LINE

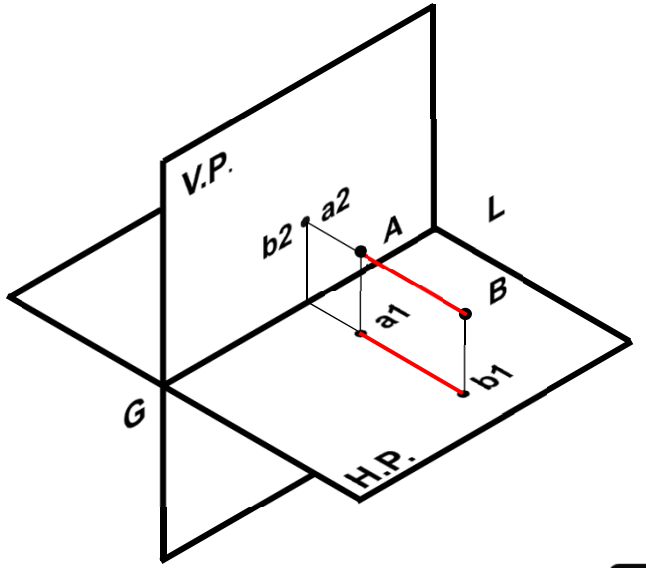
Case 1:
Line AB is perpendicular to the Horizontal plane (H.P.)



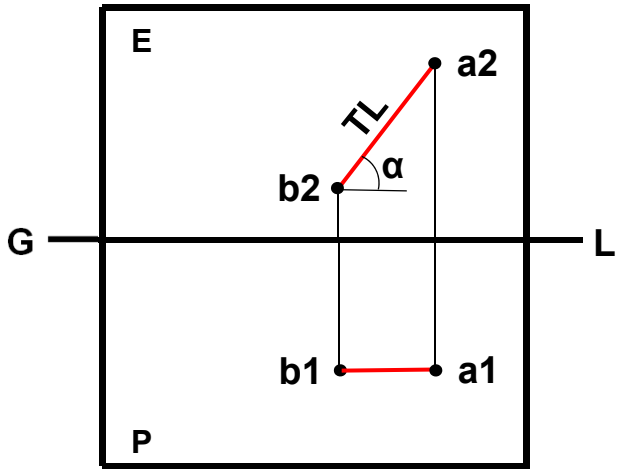


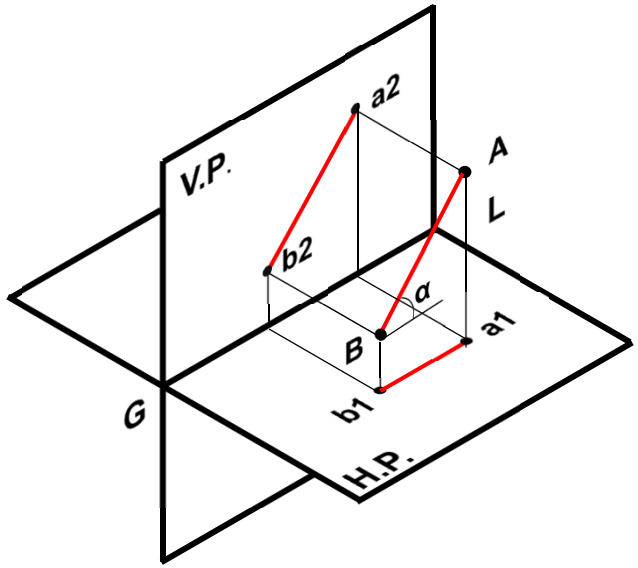
Case 2:
Line AB is perpendicular to the Vertical plane (V.P.)



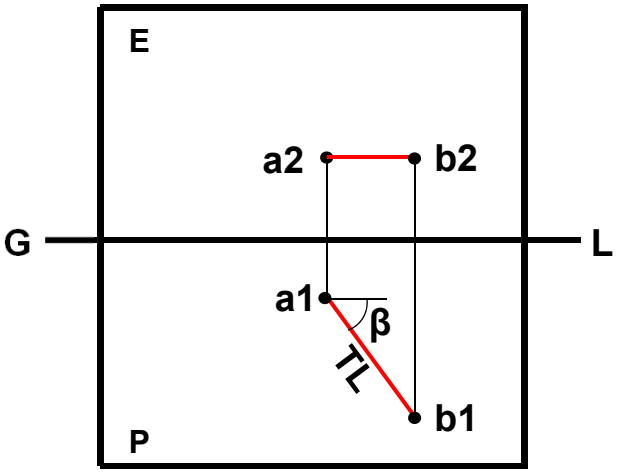


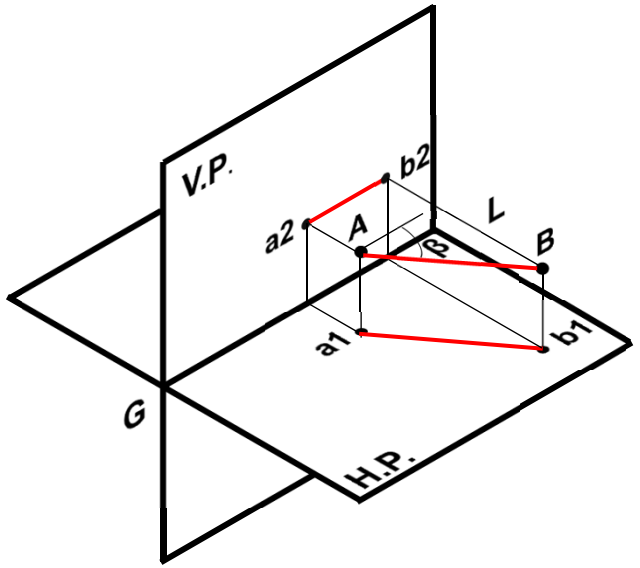
Case 3:
Line AB is parallel to the V.P. and having an angle (α) with H.P.





Case 4:
Line AB is parallel to the H.P. and having an angle (β) with V.P.





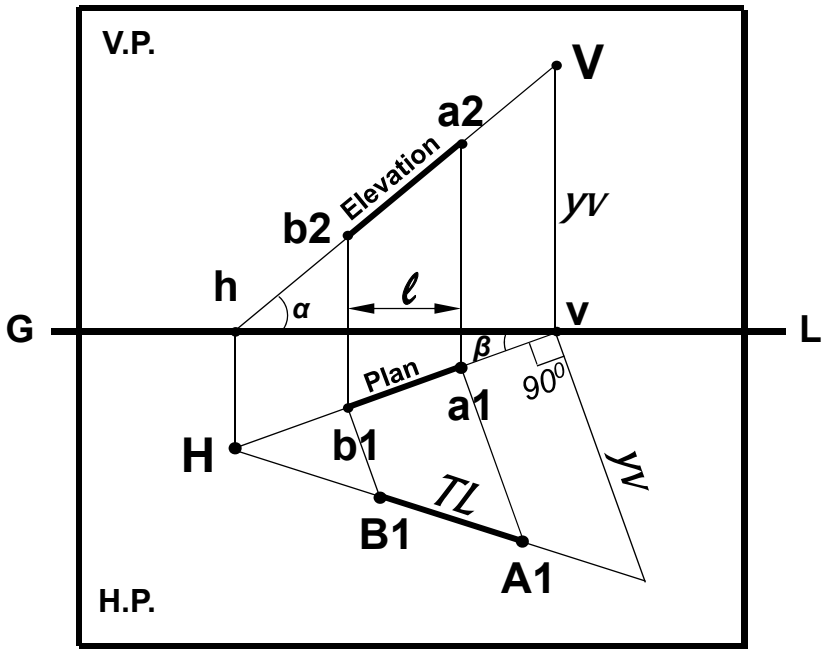
Case 5:

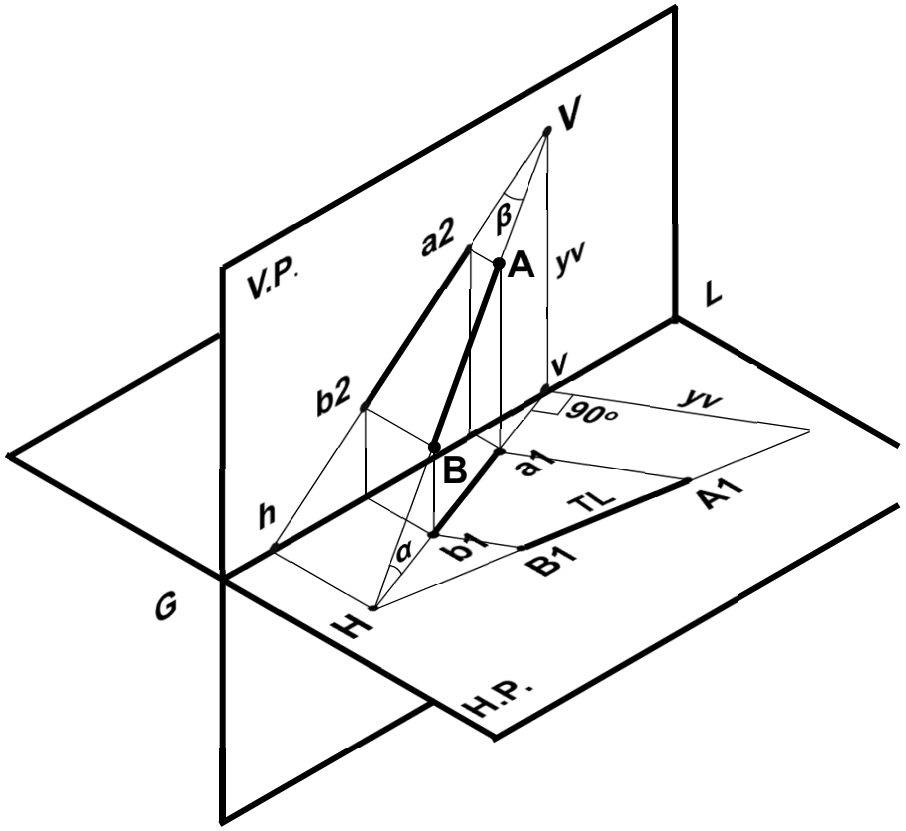
Line AB is making an angle with H.P. and also making an angle with V.P.

V: Vertical Trace **H: Horizontal Trace**

α : Inclination with H.P. **β : Inclination with V.P.**

TL : True Length **ℓ ; Distance between projectors**



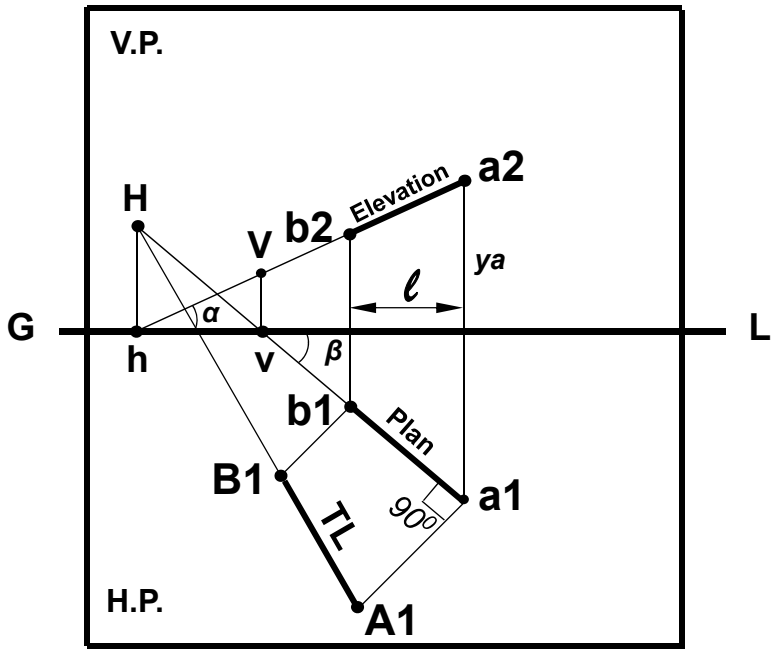


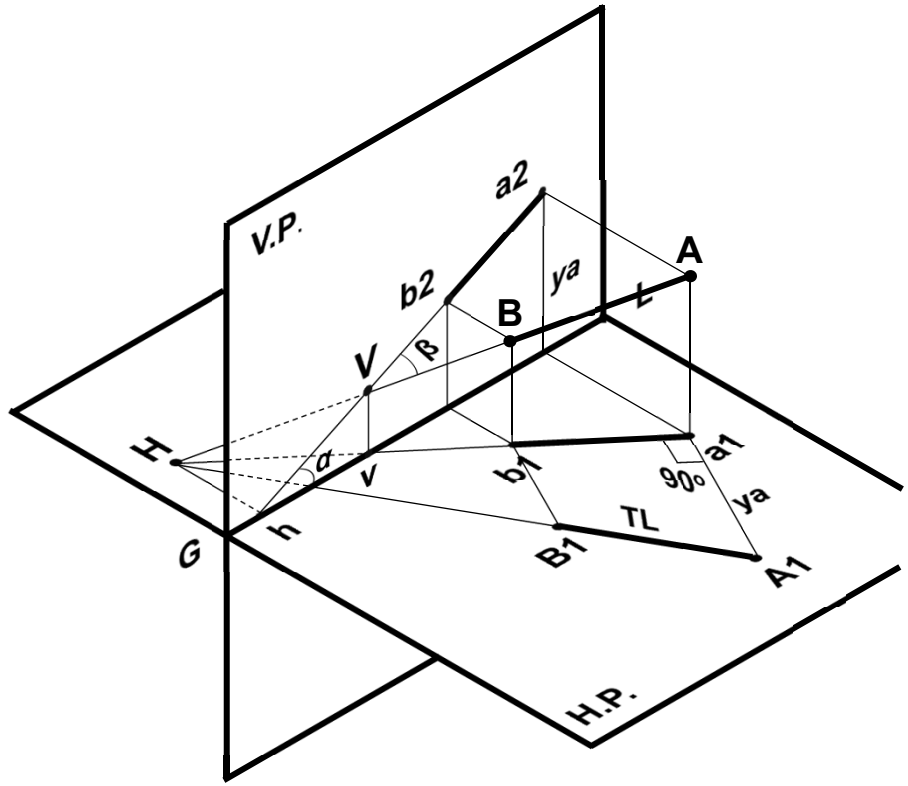
Case 6:
Line AB is making an angle with H.P. and also making an angle with V.P. , but in different position.

V: Vertical Trace **H: Horizontal Trace**

α : Inclination with H.P. **β : Inclination with V.P.**

TL : True Length **ℓ ; Distance between projectors**

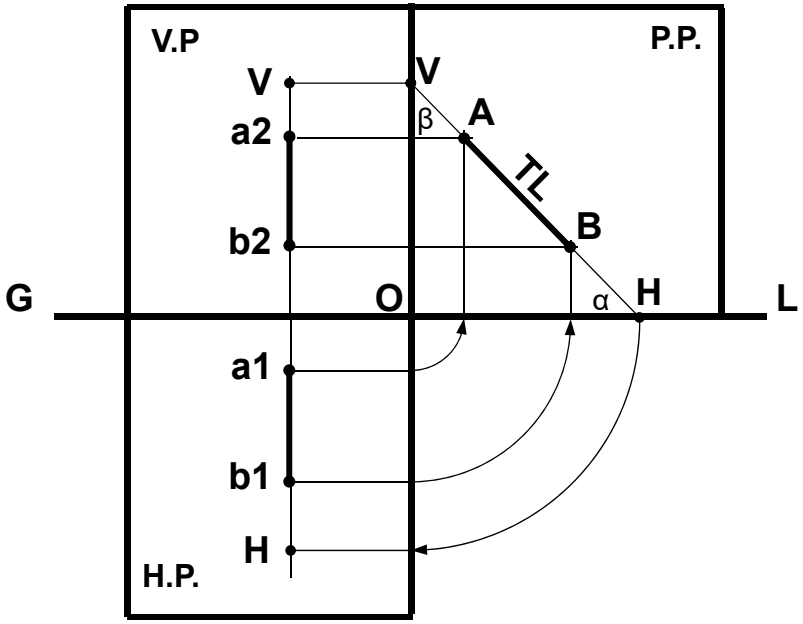


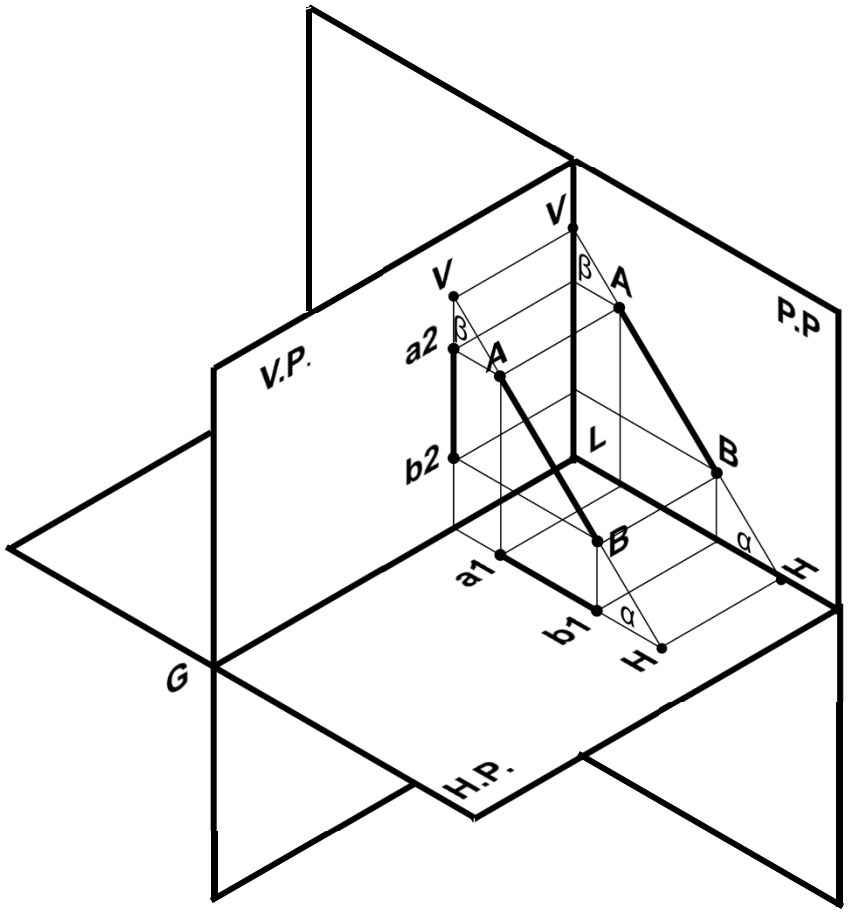


Case 7:

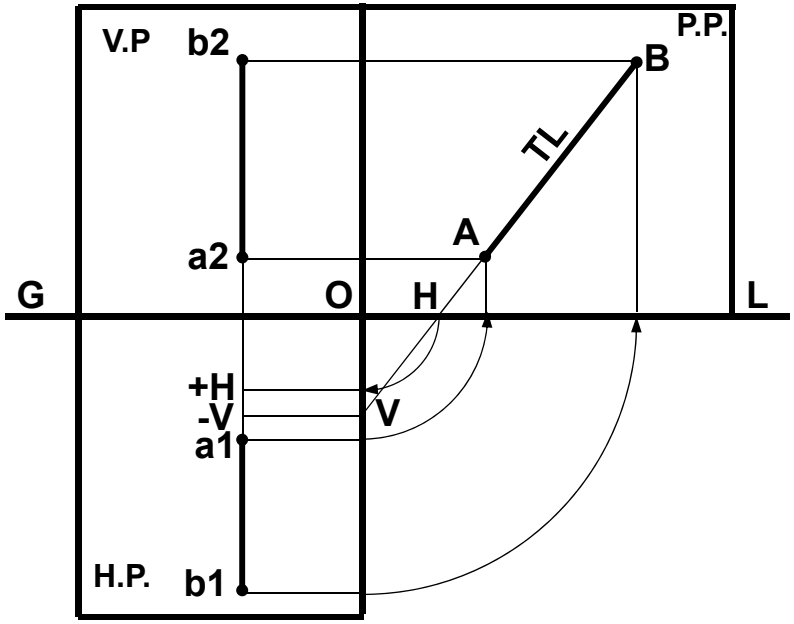
Frontal straight lines, means (distance between the projectors = 0) , for this purpose the third Plane (Auxiliary plane) required or can be defined as Profile plane (P.P)

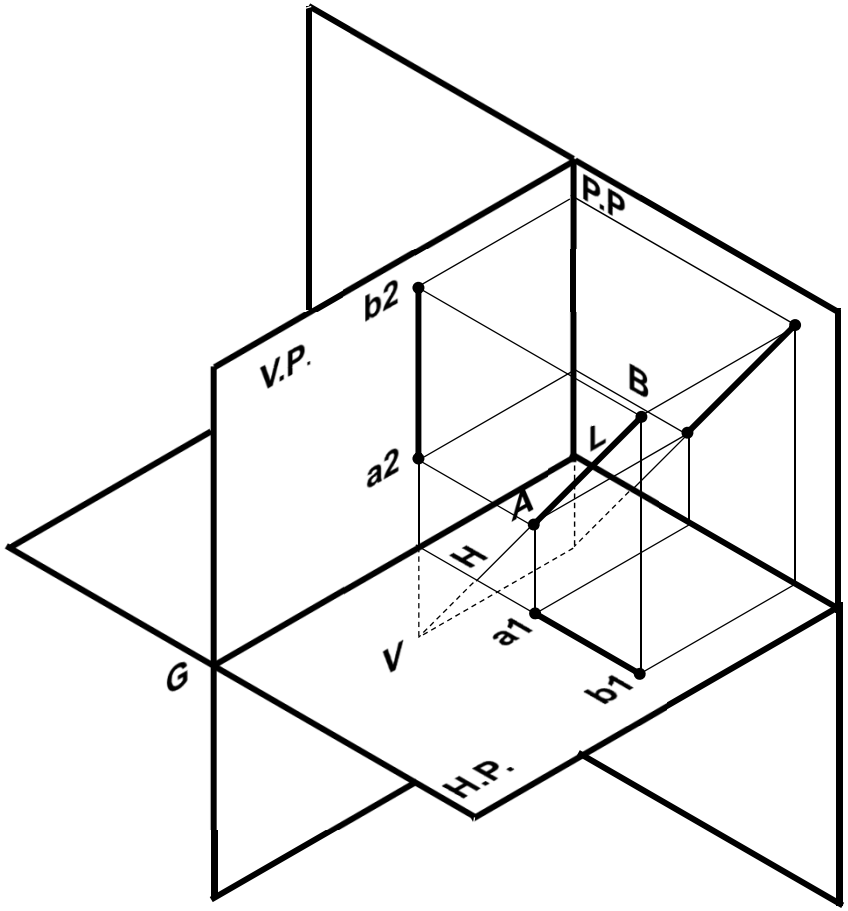
Case 7-a: Both traces are (+)



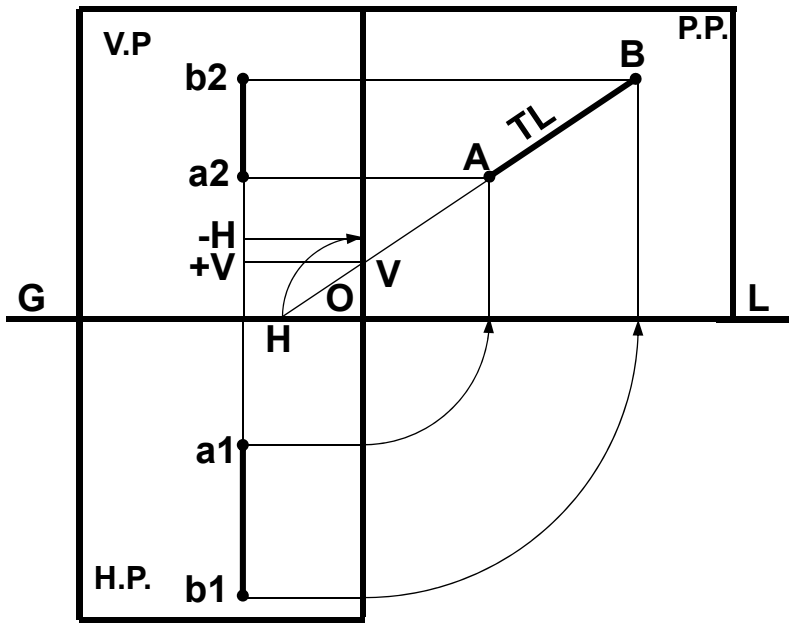


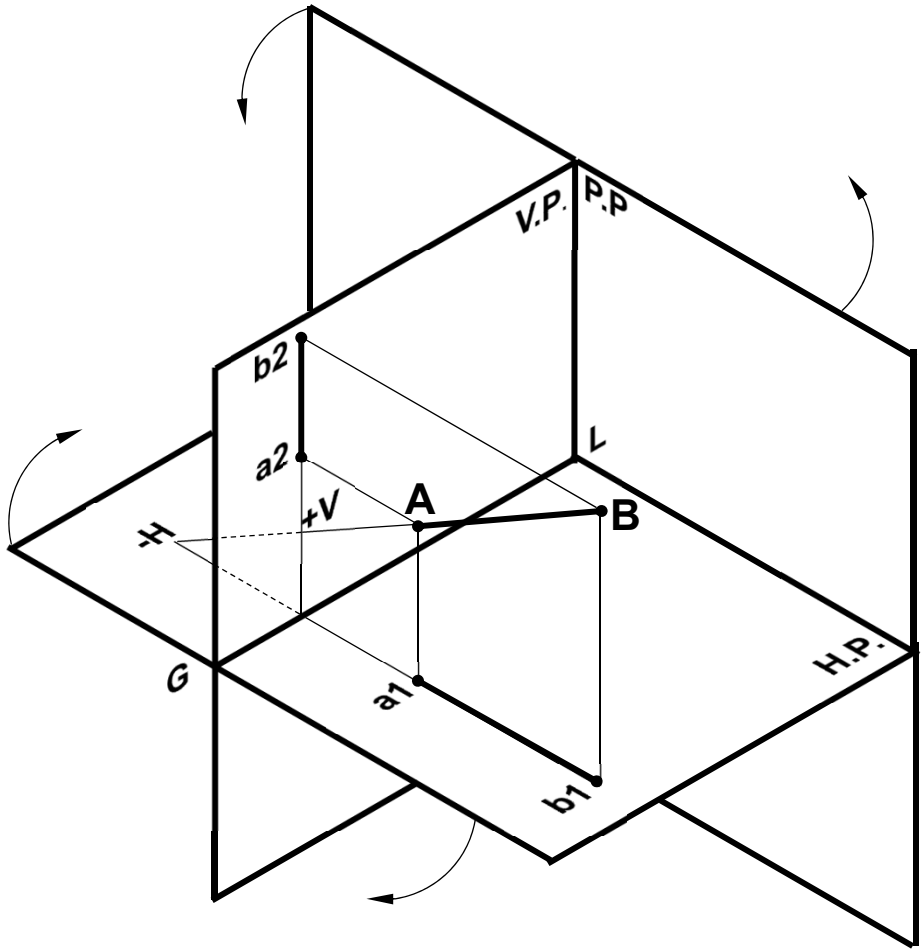
Case 7-b: Horizontal trace (+) and Vertical trace (-)



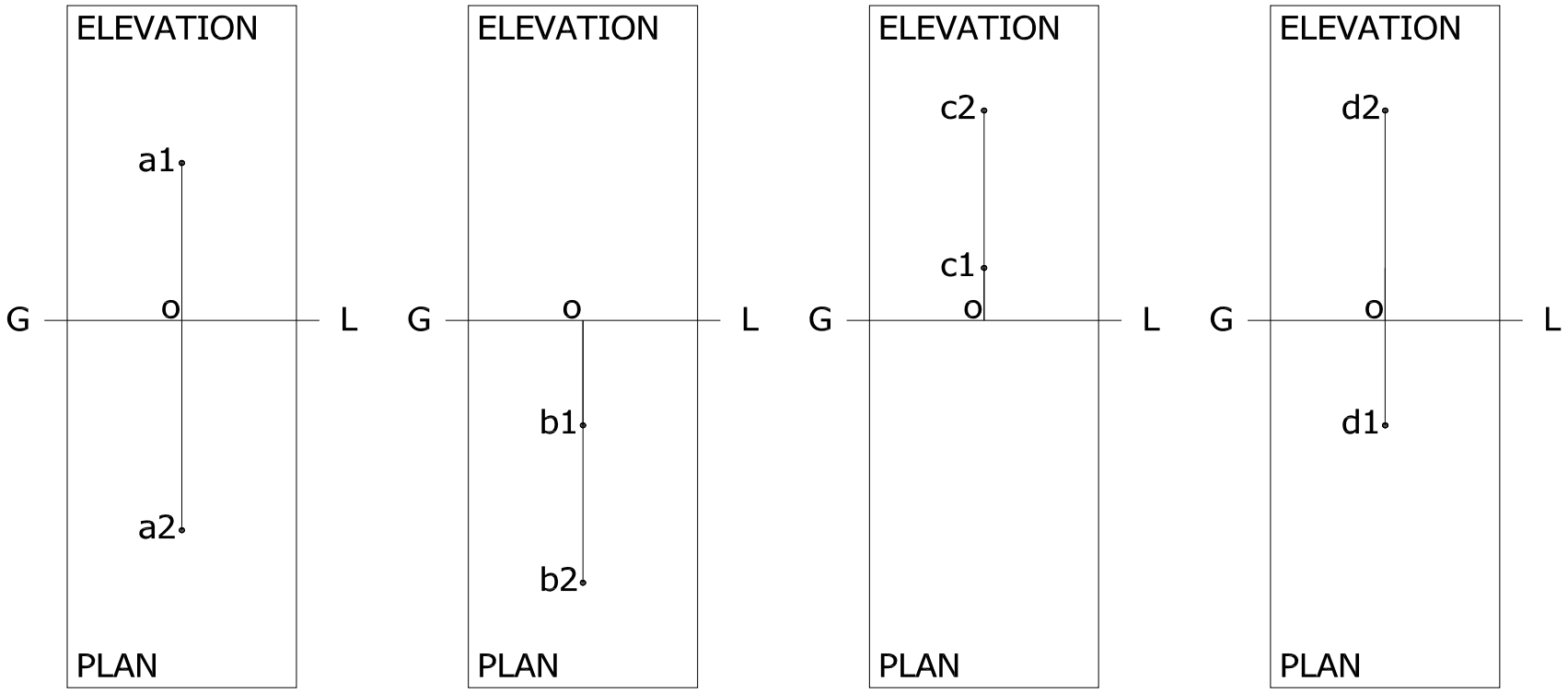


Case 7-C: Horizontal trace (-) and Vertical trace (+)





Draw the plan and elevation of points A,B,C,D & state the quadrants of each points falls :
A (-3,-4) , B (2,-5), C (-1, 4), D (2,4) Note: Values are in (cm)



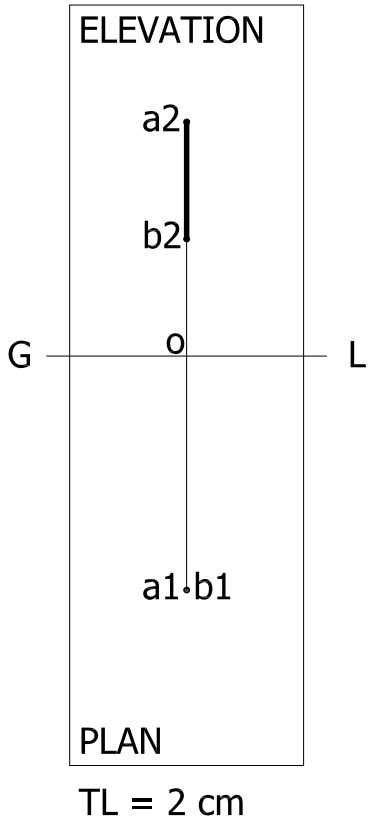
Point A Falls in 3rd quadrant

Point B Falls in 4th quadrant

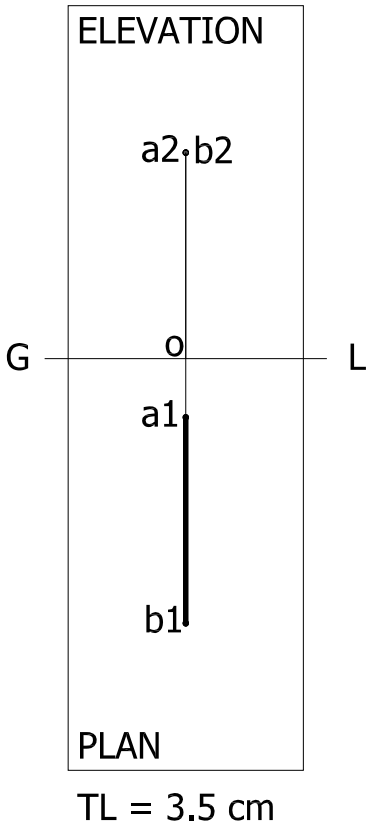
Point C Falls in 2nd quadrant

Point D Falls in 1st quadrant

Draw the plan and elevation of Line AB, Line AB is Perpendicular to Horizontal Plane and find the true length of Line AB , A (4 , 4) and B (4 , 2) , Note: Values are in (cm).



Draw the plan and elevation of Line AB, Line AB is Perpendicular to Vertical Plane and find the true length of Line AB , A (1 , 3.5) and B (4.5 , 3.5) , Note: Values are in (cm).



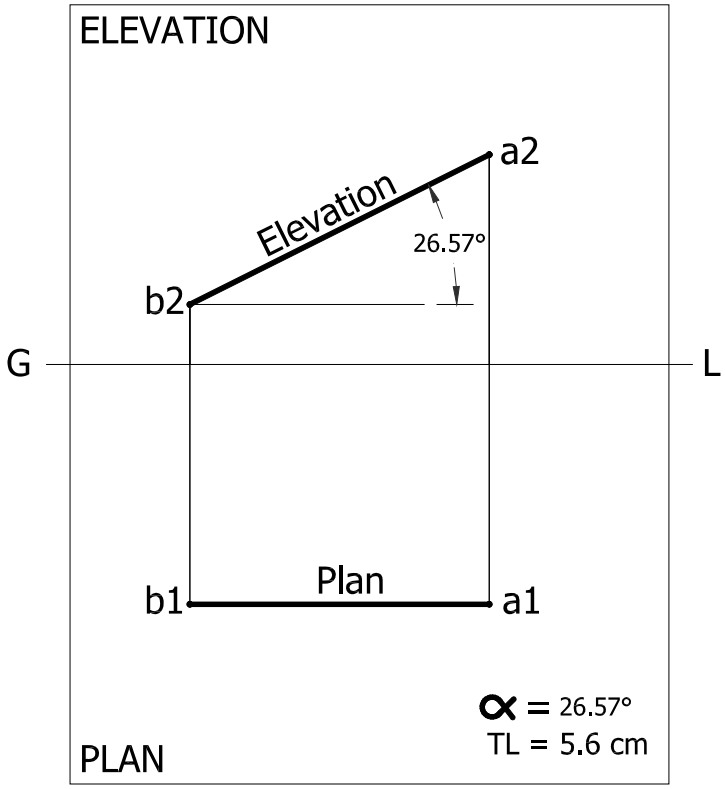
TL = 3.5 cm

Line AB is parallel to the vertical Plane, A (4 , 3.5) and B (4 , 1) and B is left of A and distance between the projectors = 5 cm , Note: the values are in (cm).

1- Draw the Plan and Elevation of Line AB.

2- Find the inclination of line AB with the Horizontal plane.

3- Find the true length of Line AB.

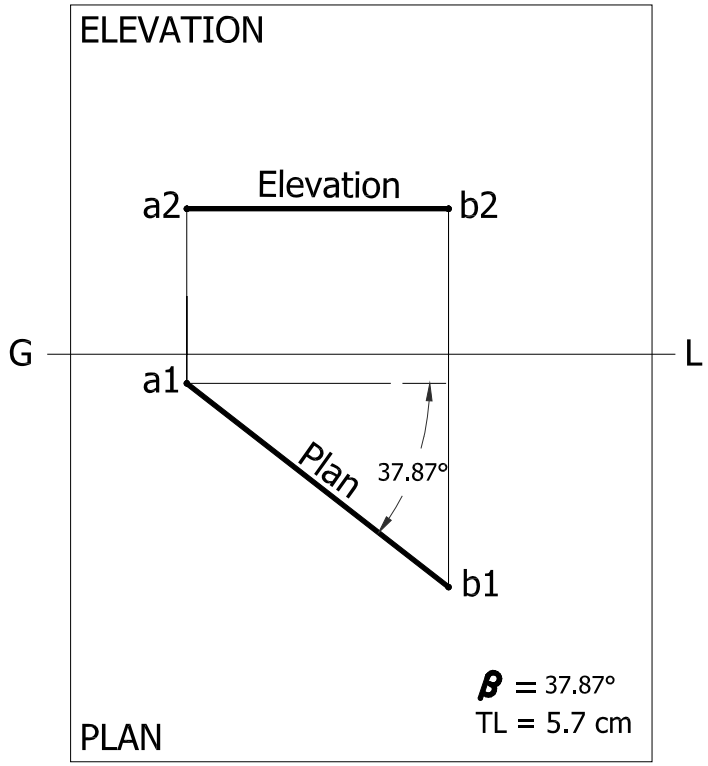


Line AB is parallel to the Horizontal Plane, A (0.5 , 2.5) and B (4 , 2.5) and A is left of B and distance between the projectors = 4.5 cm , Note: the values are in (cm).

1- Draw the Plan and Elevation of Line AB.

2- Find the inclination of line AB with the Horizontal plane.

3- Find the true length of Line AB.



The straight line AB is placed such that :

A (4 , 0.5), B (1 , 3) and B is Right of A and distance between projectors = 5.0 :

1- Draw the plan and elevation of AB

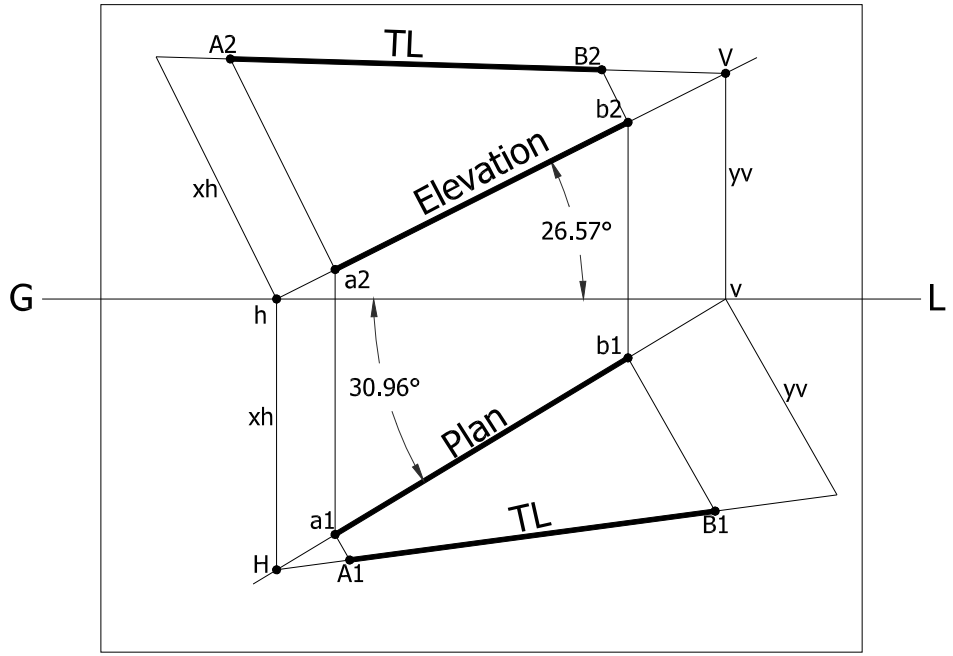
2- Find the horizontal and vertical traces of AB

3- Find the inclination angle of line AB with horizontal and vertical plane .

4- Find the true length of the line AB

Note: Values are in (cm)

H (4.6,0)
V (0,3.83)
α = 26.57°
β = 30.96°
TL = 6.3 cm



The straight line AB is placed such that :

A (3.5 , 4), B (1.5 , 2.5) and A is Right of B and distance between projectors = 3.0 :

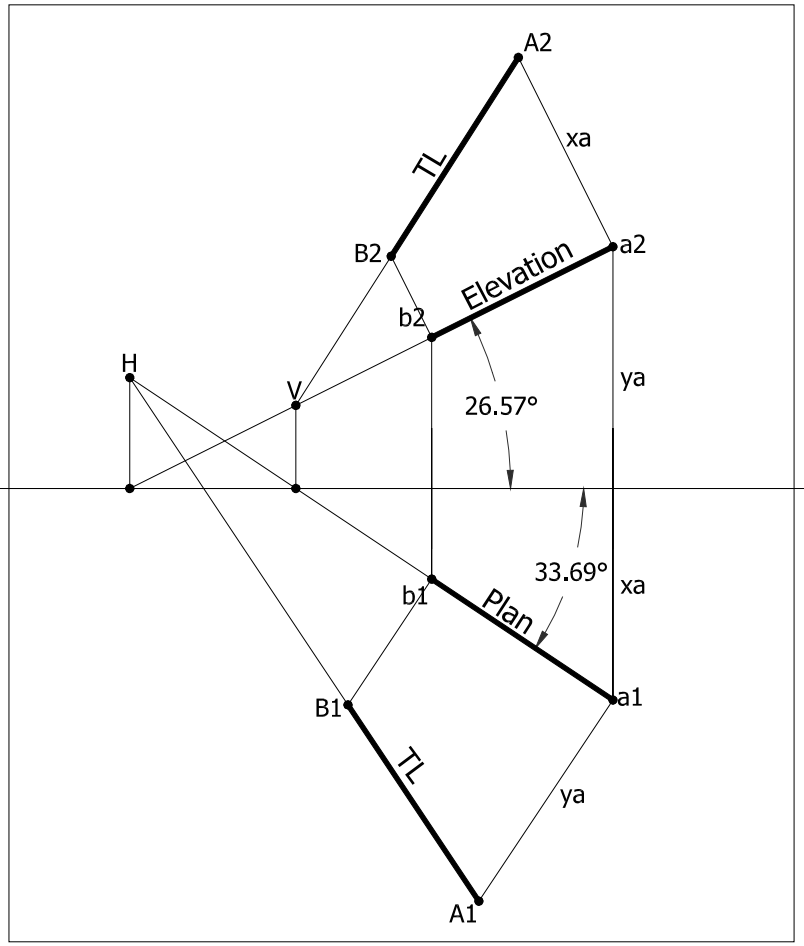
1- Draw the plan and elevation of AB.

2- Find the horizontal and vertical traces of Line AB.

3- Find the inclination angle of line AB with horizontal and vertical plane .

4- Find the true length of the line AB.

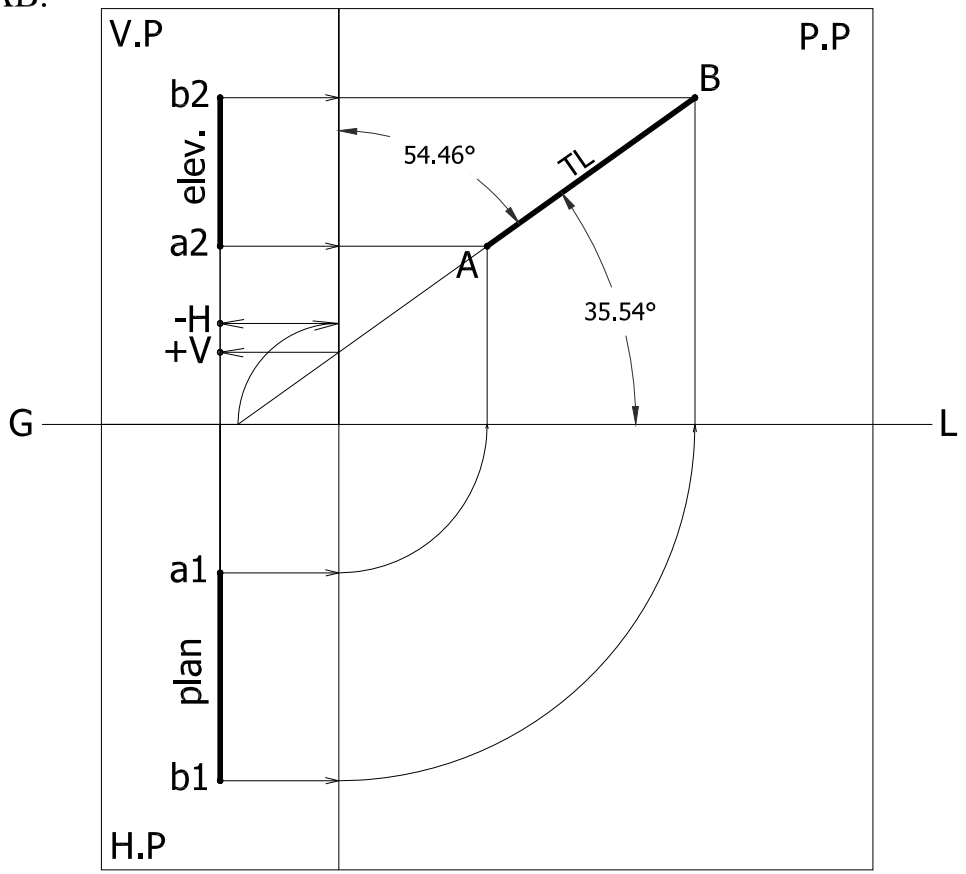
Note: Values are in (cm)



H (- 1.83 , 0)
V (0 , 1.37)
α = 26.57°
β = 33.69°
TL = 3.9 cm

For the Frontal straight line AB : A (2.5 , 3), B (6 , 5.5)

1- Draw the plan and elevation of AB.
2- Find the horizontal and vertical traces of Line AB.
3- Find the inclination angle of line AB with horizontal and vertical plane .
4- Find the true length of the line AB.



H (- 1.7 , 0)
V (0 , 1.2)
α = 35.54°
β = 54.46°
TL = 4.3 cm