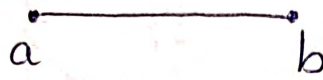


8/12/2018

PROJECTION OF STRAIGHT LINES

→ The shortest distance between two points is a straight line.



→ Straight lines can be divided into 3 ways

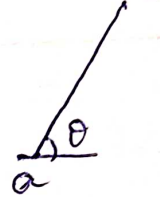
1) Horizontal



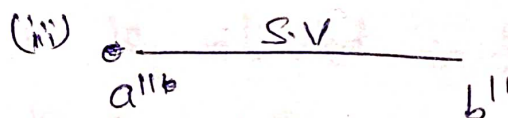
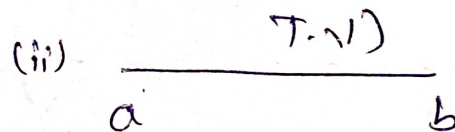
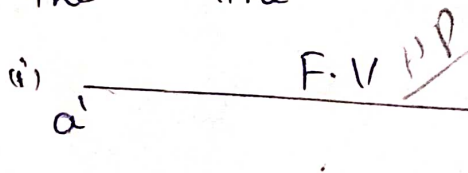
2) Vertical



3) Inclined.

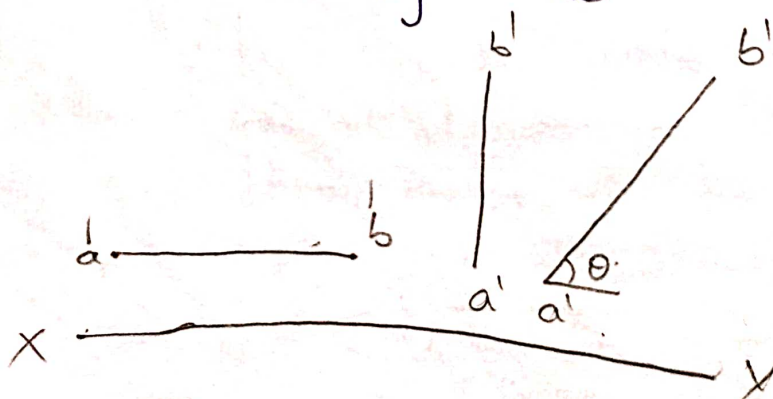


→ $a'b'$ is the front view of line. ab is the top view of line. $a''b''$ is the side view of the line

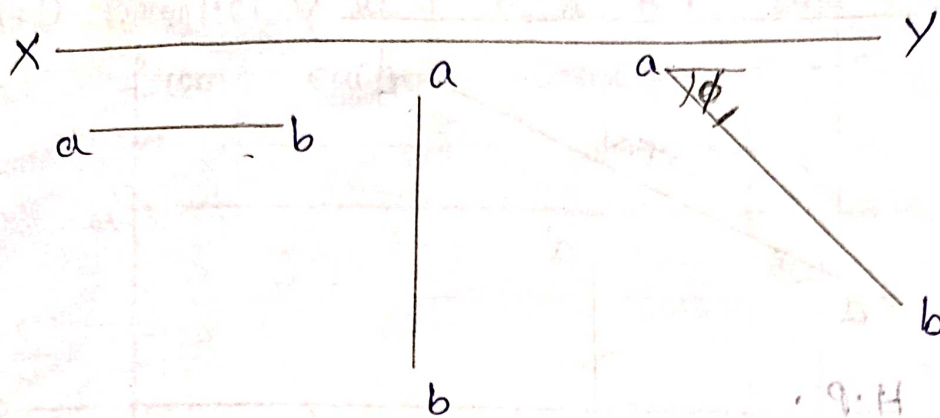


→ Since the first angle projection method is used in the following problems.

→ Relation with H.P is satisfied in the front view is above xy line.



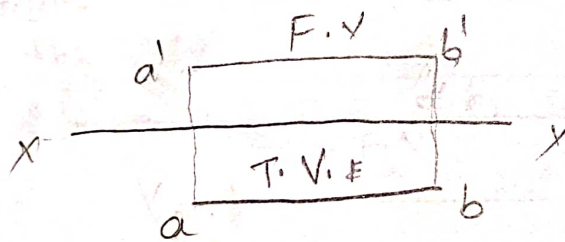
→ Relation with V.P is satisfied in the top view
 in the xy line.



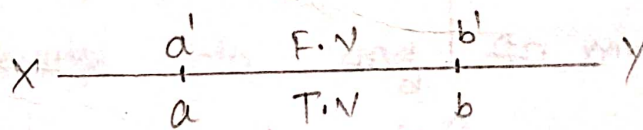
→ True length is the actual length of the line.

Positions and Possibilities:-

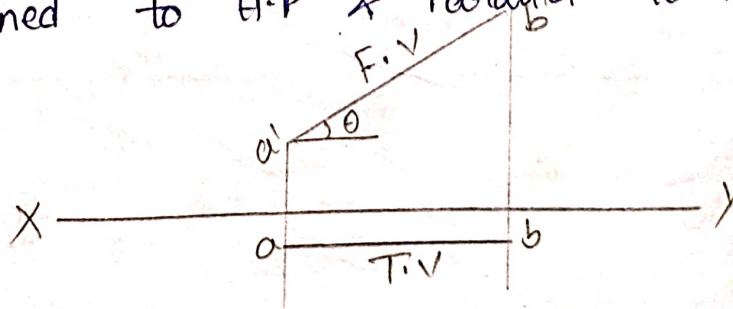
① Parallel to both H.P and V.P



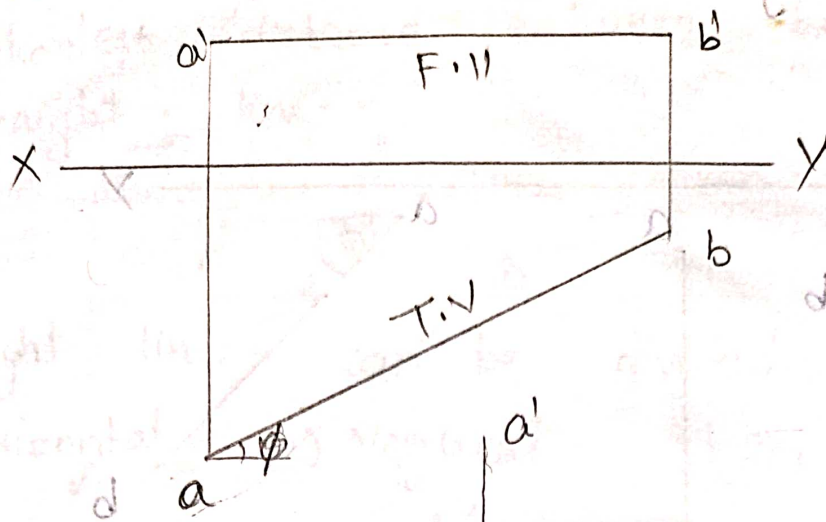
② In both H.P and V.P



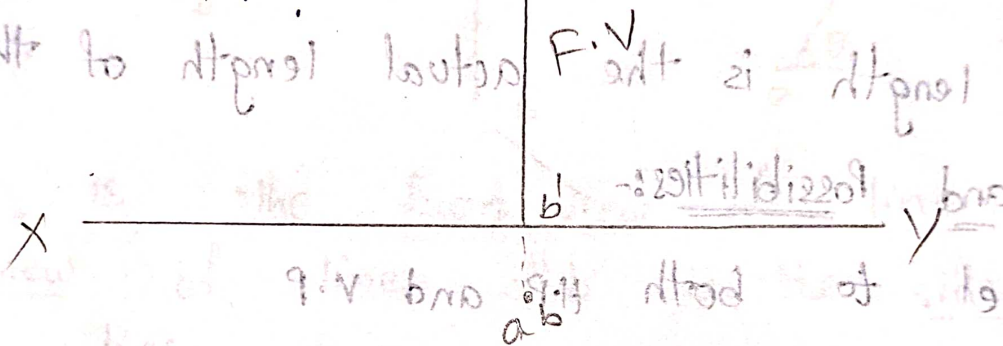
③ Inclined to H.P & Parallel to V.P



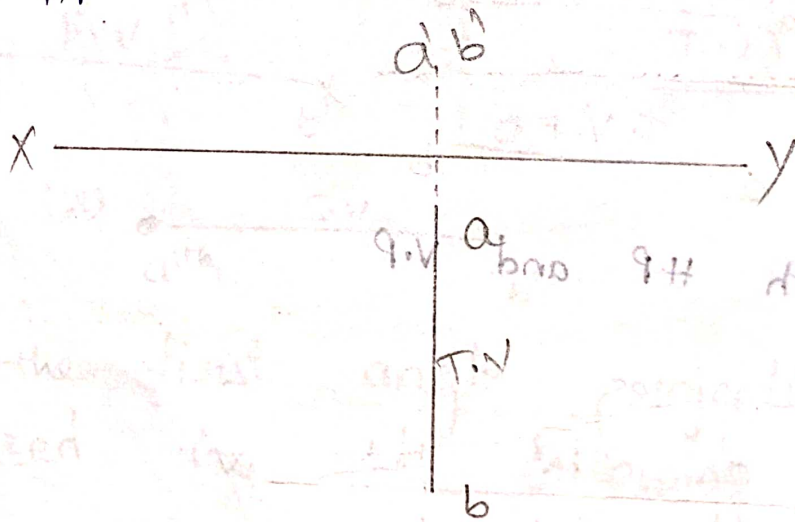
④ Inclined to V.P and Parallel to H.P.



⑤ Perpendicular to H.P.:



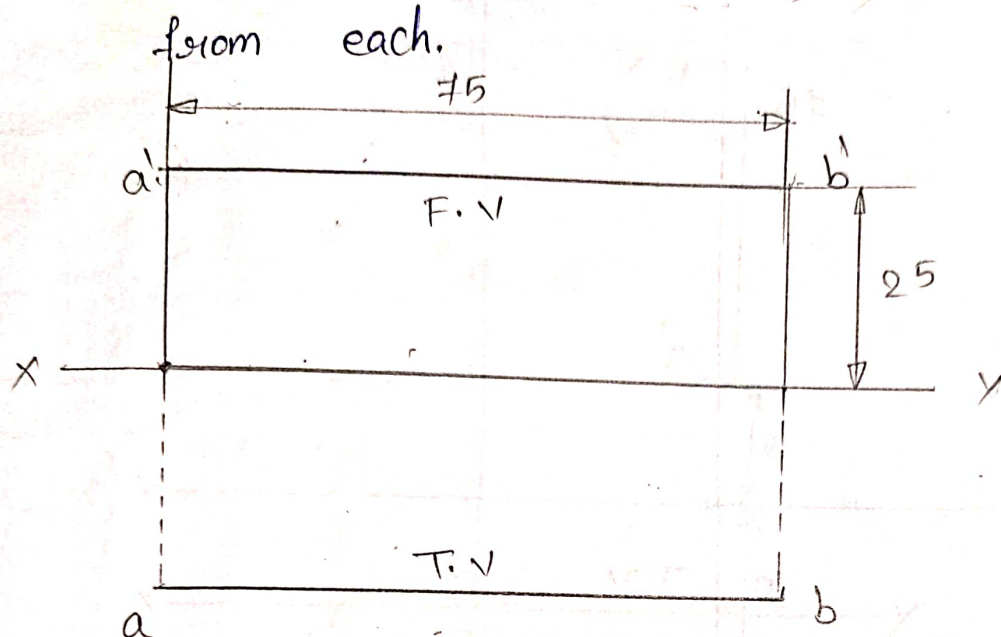
⑥ Perpendicular to V.P.



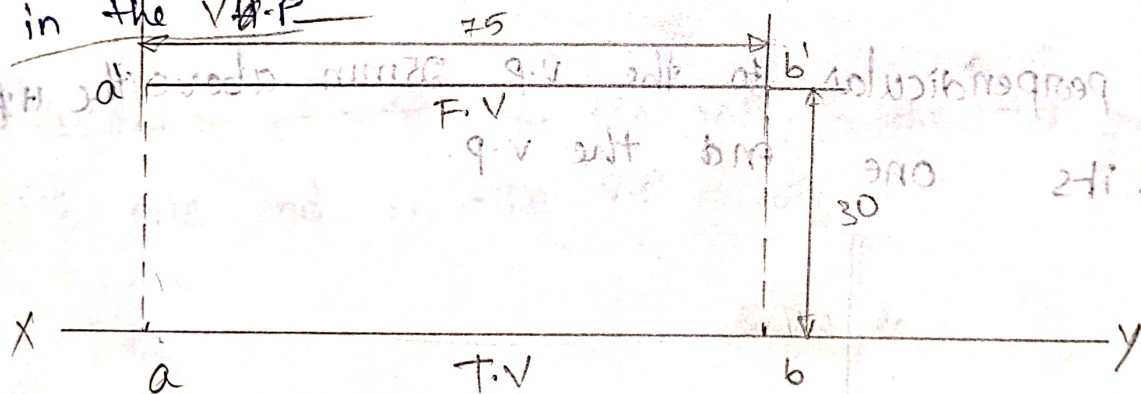
Problems:

1) Draw the projections of a 75 mm long straight line in the following positions.

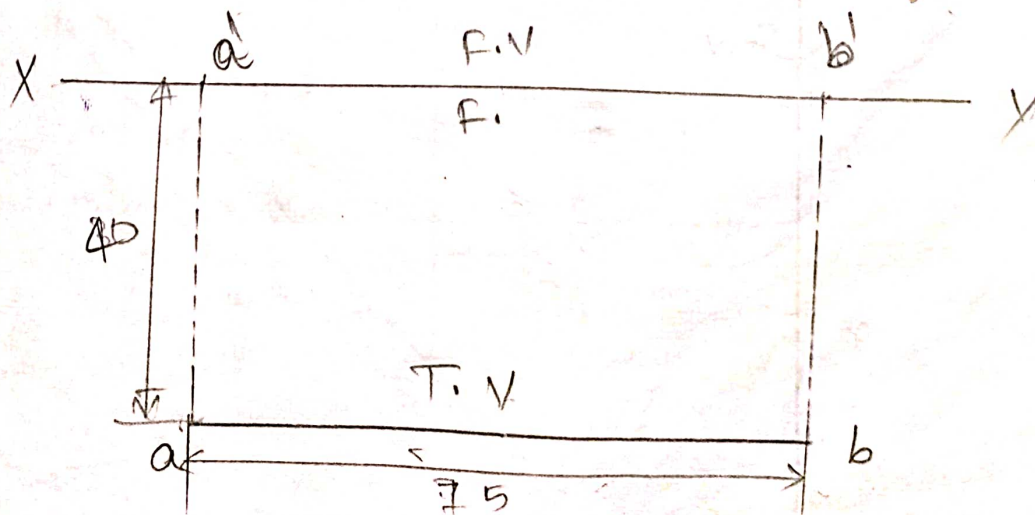
a) i) Parallel to both H.P and V.P and 25 mm from each.



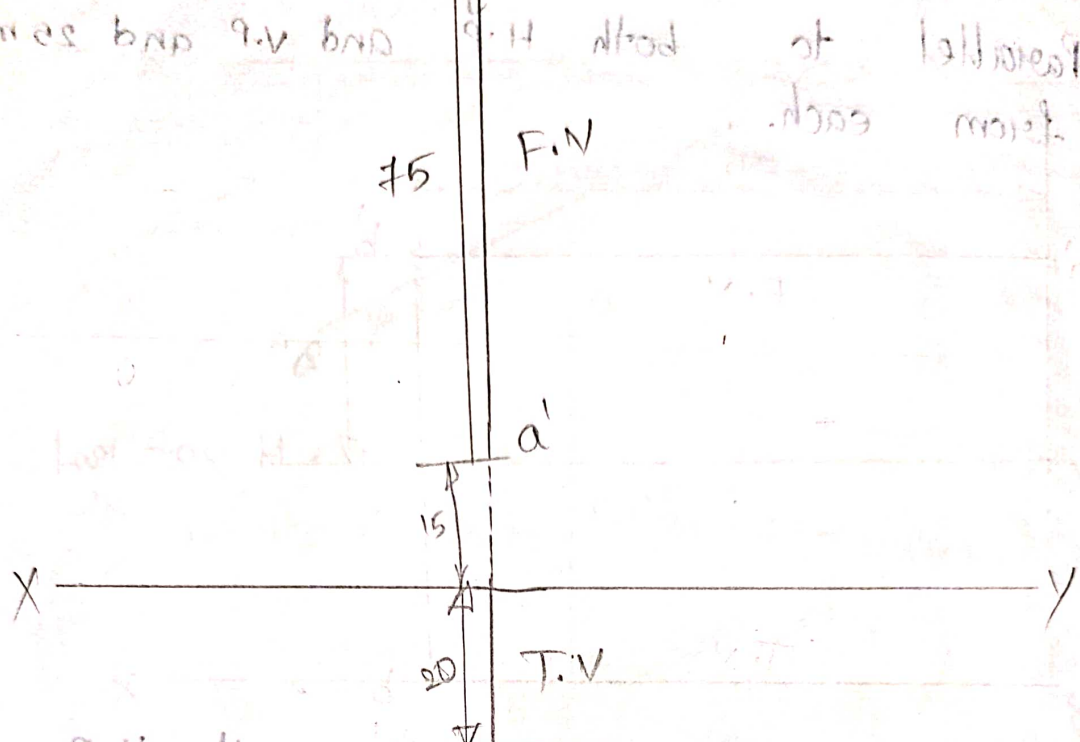
ii) Parallel to and 30 mm above the H.P and in the V.P



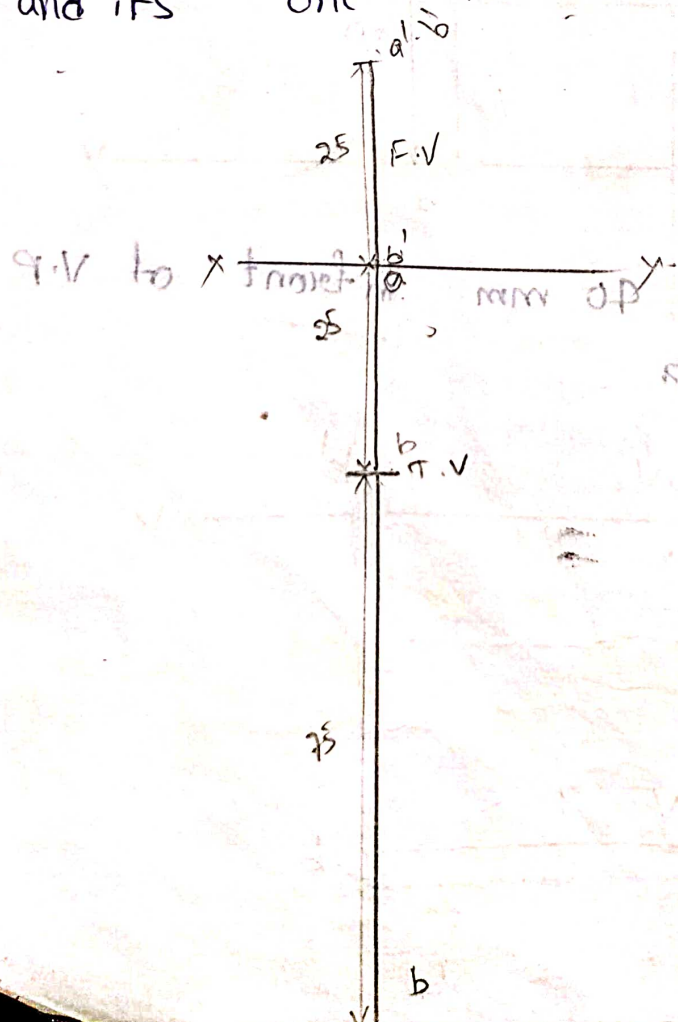
iii) Parallel to and 40 mm in front of V.P and in the H.P



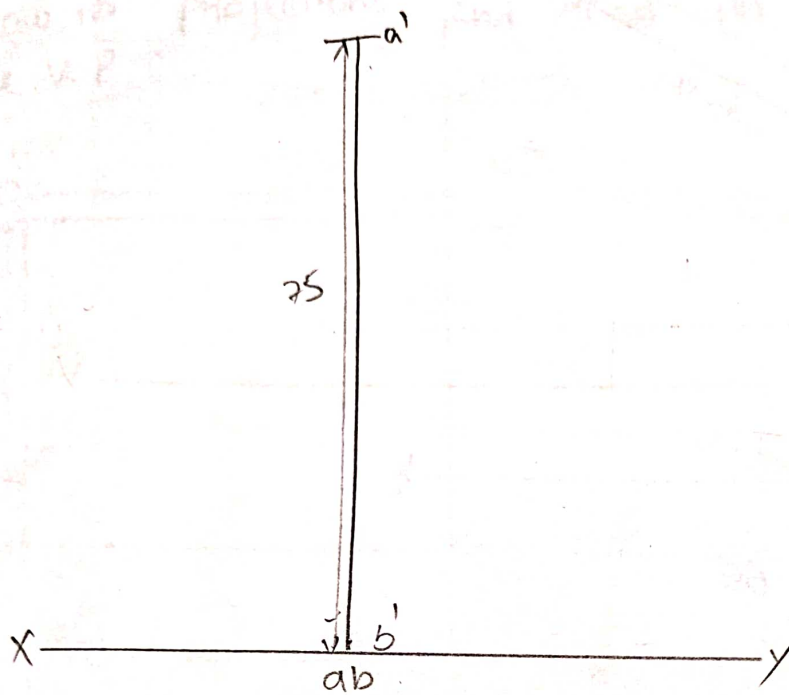
b)i) Perpendicular to the H.P. 20 mm in front of the V.P. and its one end 15 mm above the H.P.



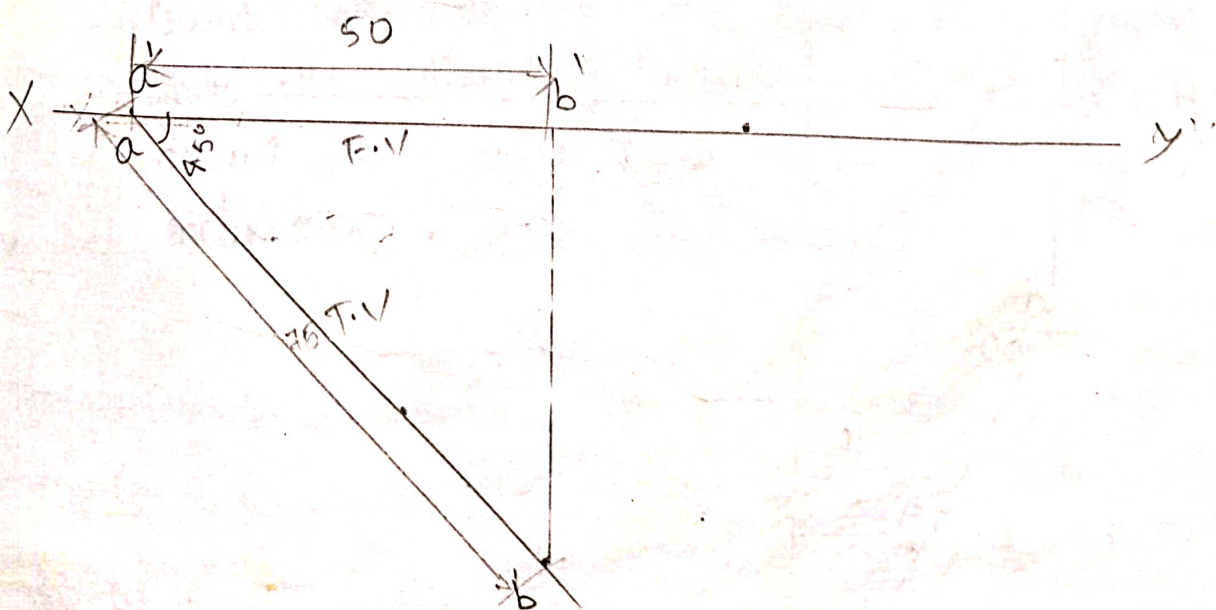
b)ii) perpendicular to the V.P. 25 mm above the H.P. and its one end the V.P.



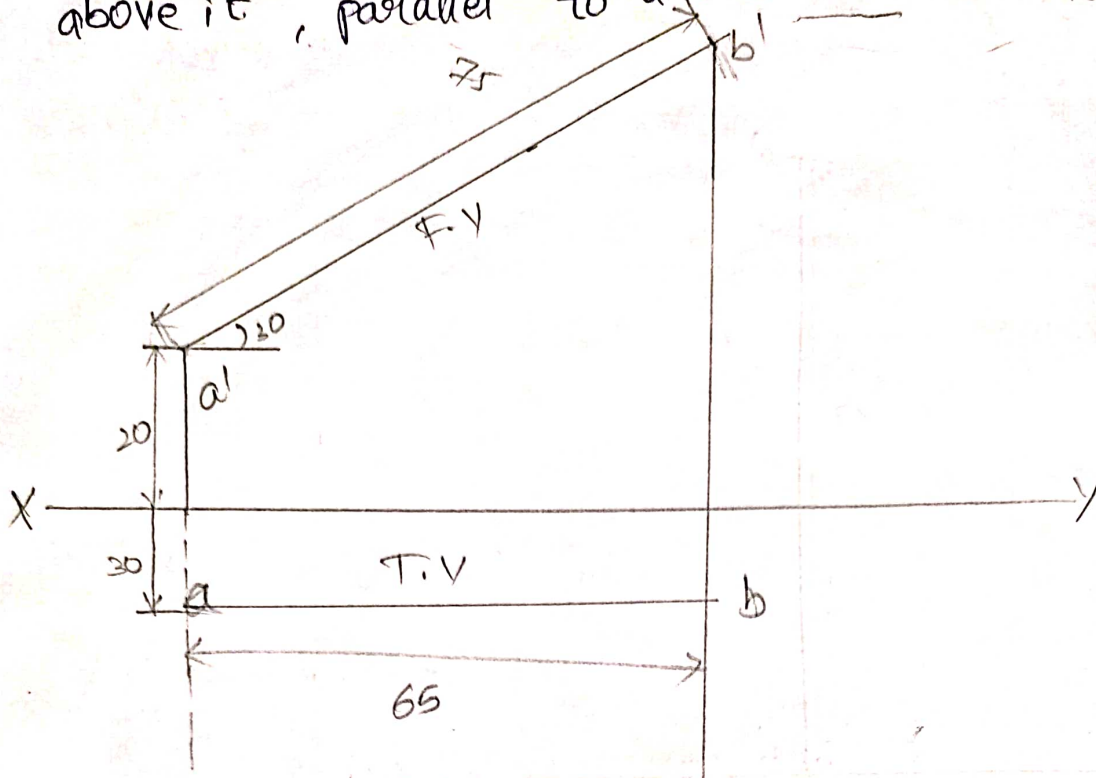
iii) $\perp$ to the H.P. in the V.P. and its one end in the V.P.



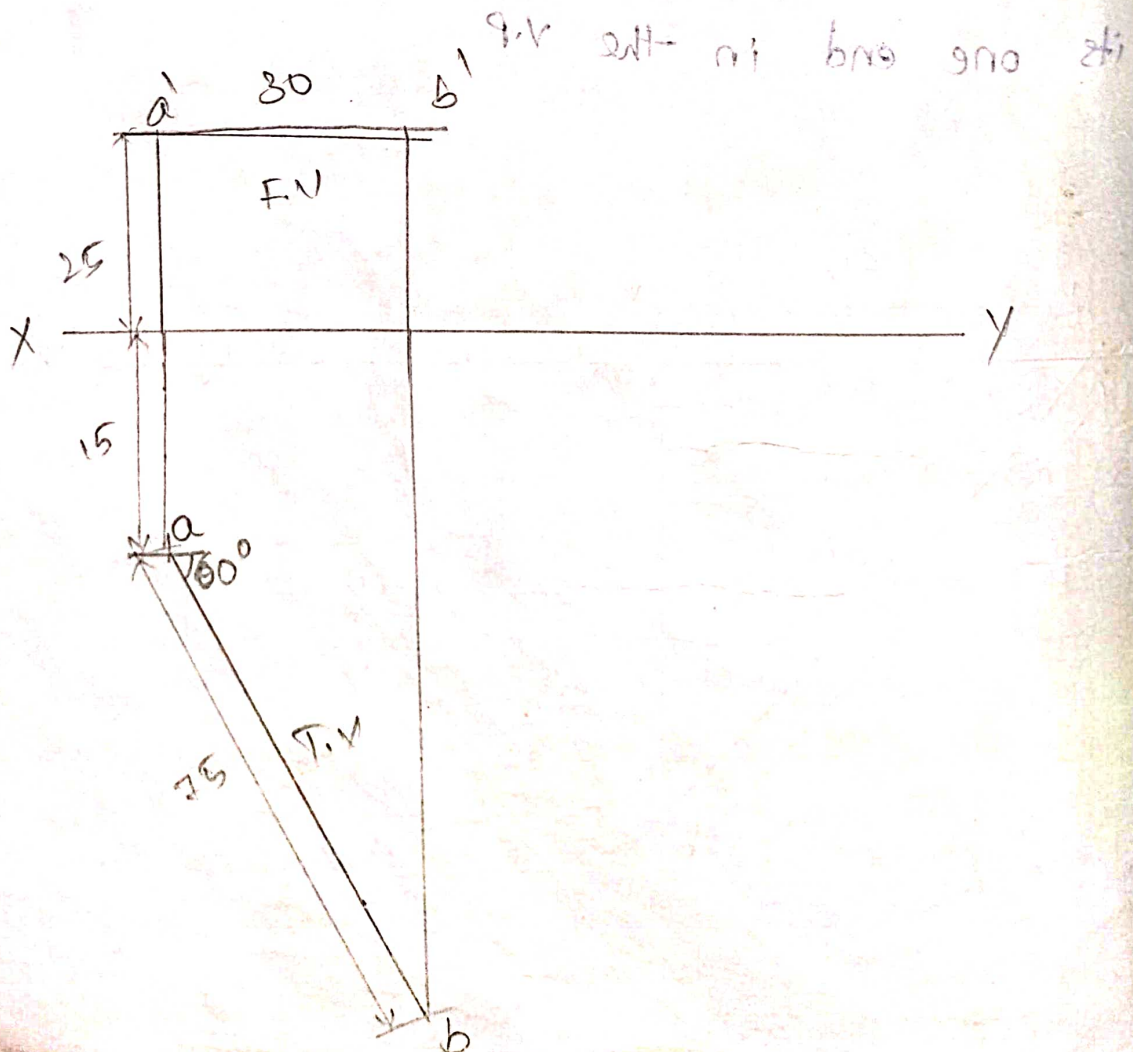
iv) Inclined at 45° to the V.P., in the H.P. and its one end in the V.P.



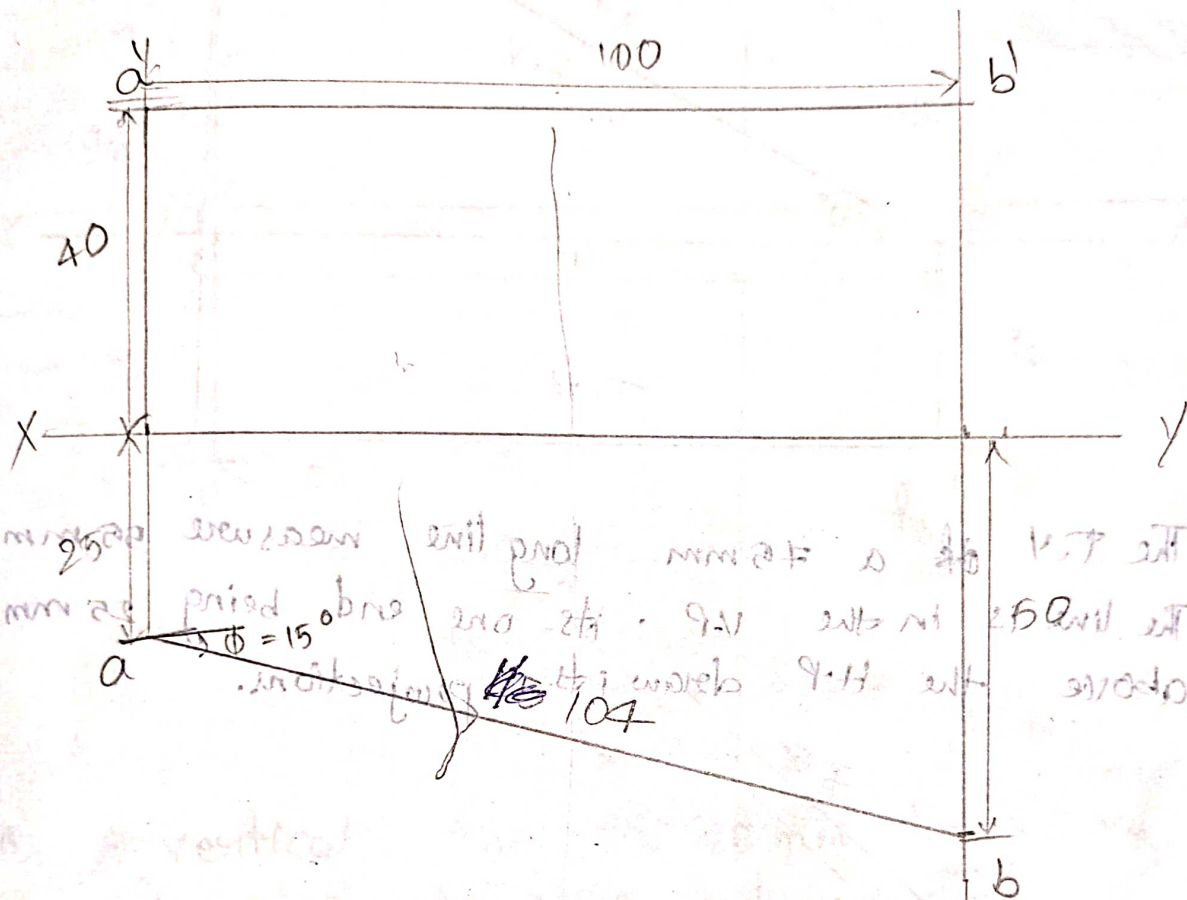
c) ii) Inclined at 30° to the H.P. and its one end above it, parallel to and 30 mm in front of V.P.



c) iii) Inclined at 60° to the V.P. and its one end 15 mm in front of it, parallel to and 25 mm above the H.P.

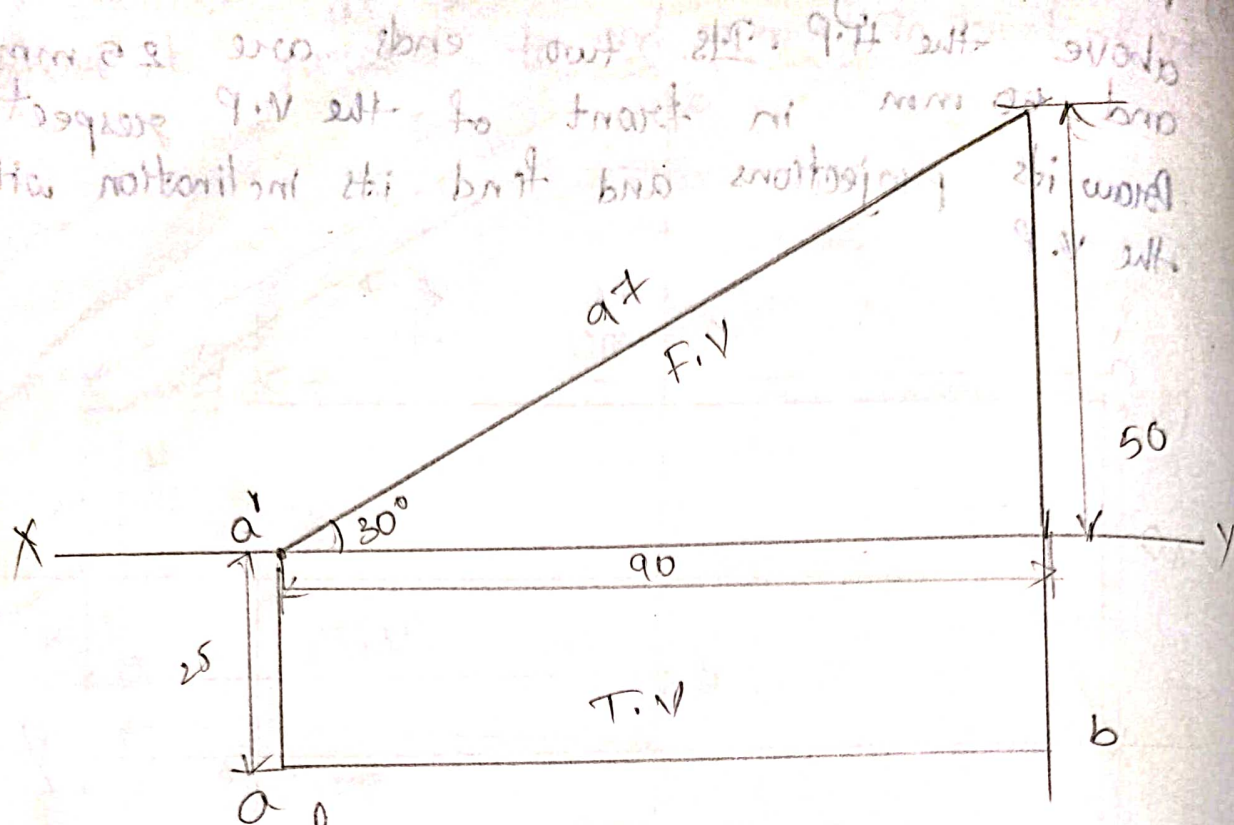


- 2) A 100 mm long line is $\parallel$ to and 40 mm above the H.P. Its two ends are 25 mm and 50 mm in front of the V.P. respectively. Draw its projections and find its inclination with the V.P.

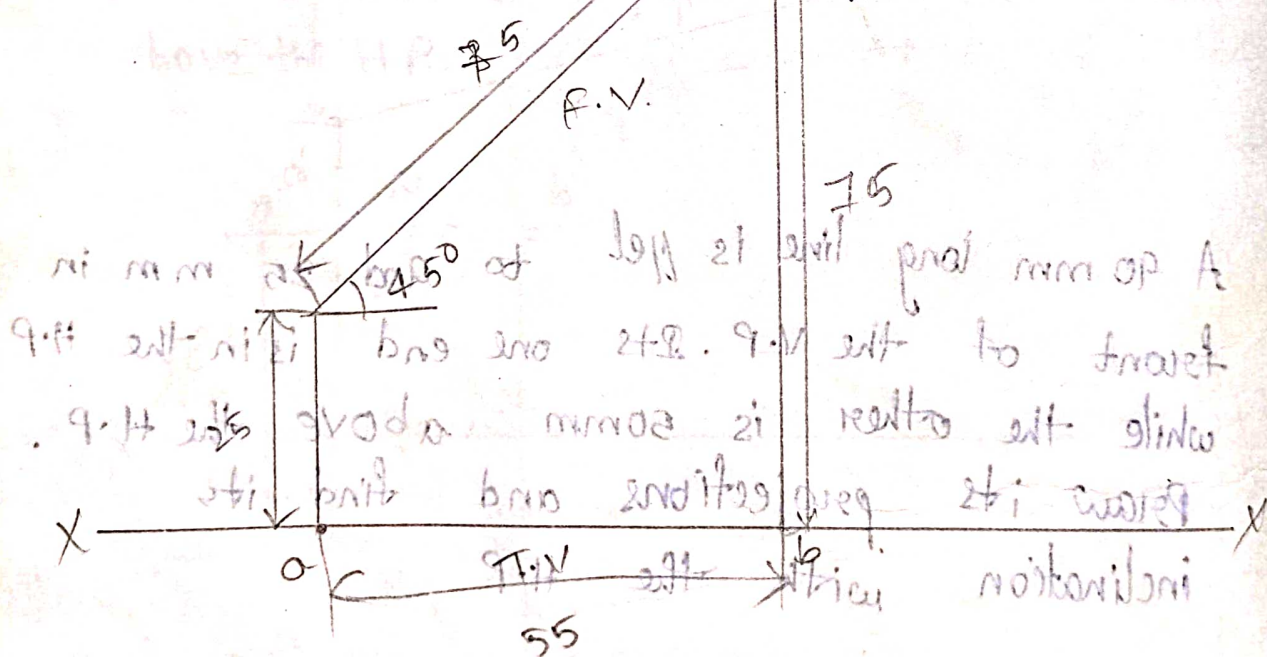


- 3) A 90 mm long line is $\parallel$ to and 25 mm in front of the V.P. Its one end is in the H.P. while the other is 50 mm above the H.P. Draw its projections and find its inclination with the H.P.

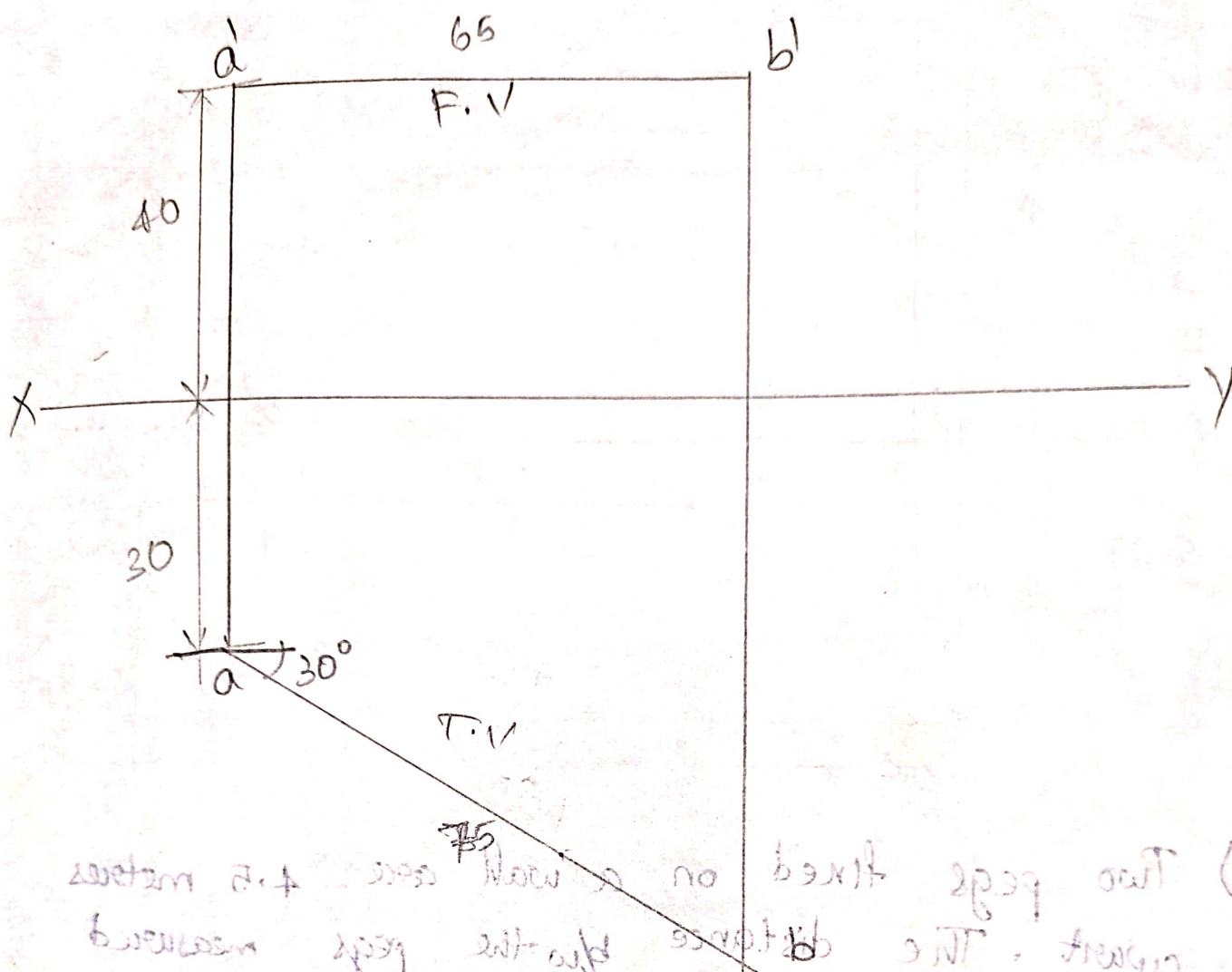
(a) The front view of a line inclined at 30° to the V.P. is 60 mm long. Below the projection of the line when it is $\parallel$ to and 40 mm above the H.P. is one end being 30 mm in front of V.P.



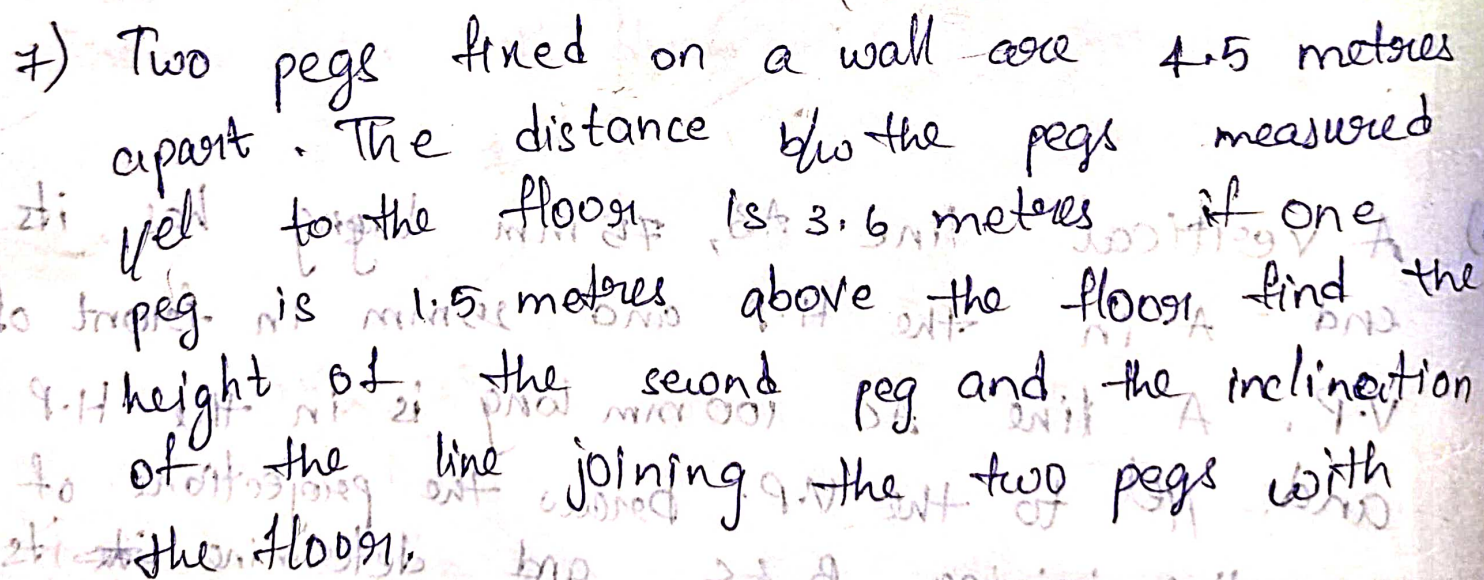
- 4) The T.V of a 75 mm long line measure 55 mm. The line is in the V.P. Its one end being 25 mm above the H.P. draw its projections.

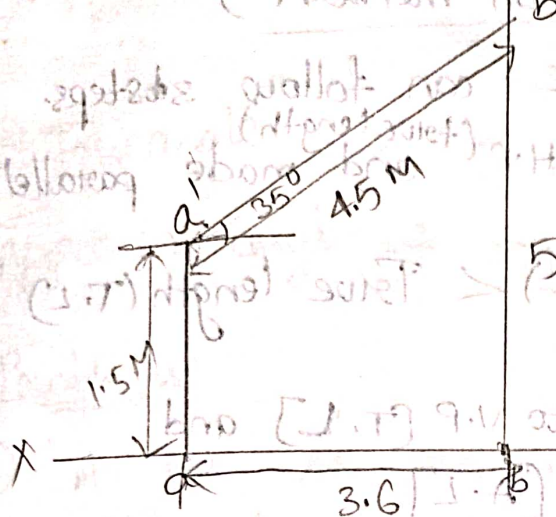


- 5) The front view of a line, inclined at 30° to the V.P. is 65 mm long. Draw the projections of the line when it is 40 mm above the H.P. and 30 mm in front of V.P. Its one end being

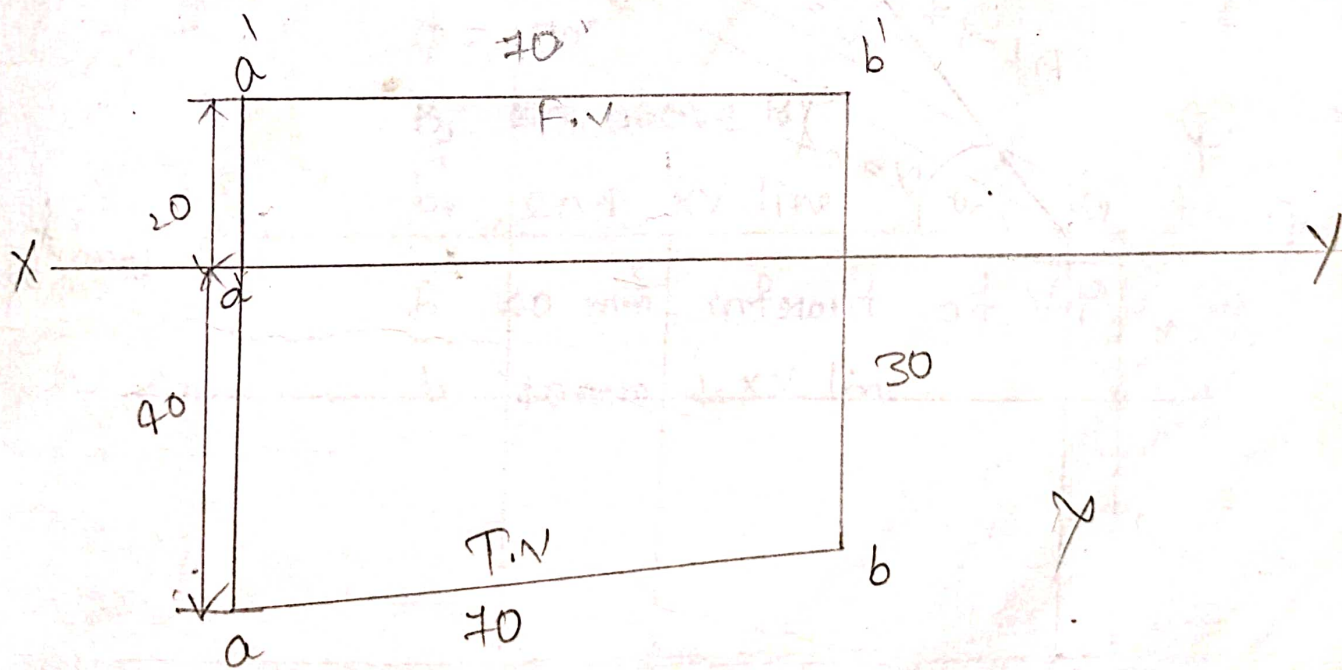


- 6) A vertical line AB, 75 mm long has its end A in the H.P. and 25 mm in front of V.P. A line AC 100 mm long is in the H.P. and $\parallel$ to the V.P. Draw the projections of the line joining B & C, and determine its inclination with H.P.





- 8) A 70 mm long line is held to and 30 mm above the H.P. Its two ends are 20 mm and 40 mm in front of V.P. ~~is parallel to V.P. above the H.P.~~



UNIT-III

LINE INCLINED TO BOTH PLANES [H.P & V.P] Oblique Planes

LVR Method! (Line View Rotation method:-)

In LVR method we can follow 3 steps.

- 1) Line is inclined ' θ° ' to H.P. (True length) and made parallel to V.P. (Apparent length)

$$\text{Apparent length (A.L)} < \text{True length (T.L)}$$

- 2) Line is inclined ' ϕ° ' to V.P. (T.L) and made parallel to H.P. (A.L)

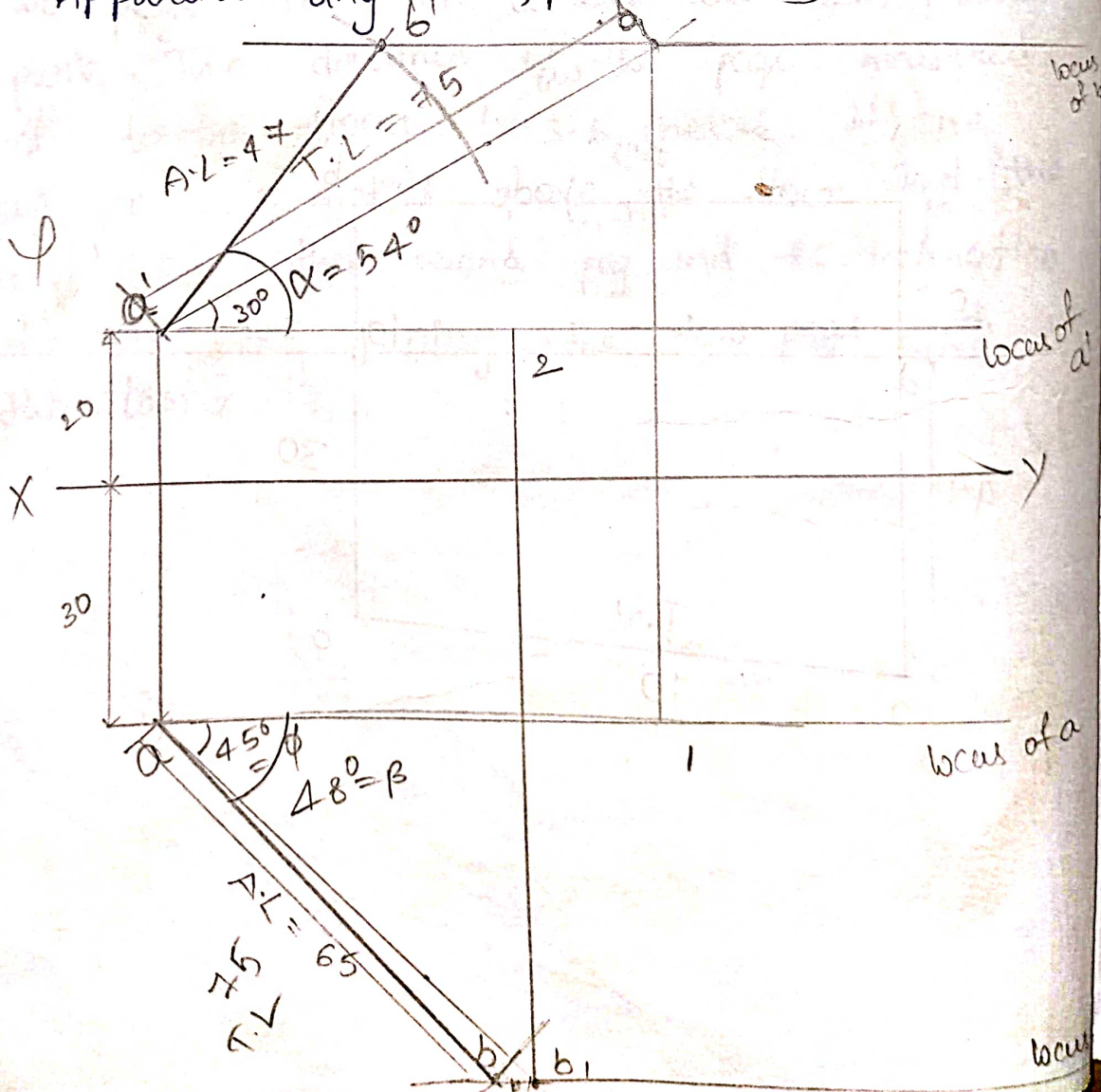
$$\text{A.L} < \text{T.L} \text{ will prod. loci of A}$$

- 3) Find apparent angles.

$$\text{True inclinations} = \theta, \phi \quad \left[\begin{array}{l} \alpha > \theta \\ \beta > \phi \end{array} \right]$$

$$\text{Apparent angle} = \alpha, \beta \quad \left[\begin{array}{l} \alpha > \theta \\ \beta > \phi \end{array} \right]$$

Eg:



True lengths $\Rightarrow a'b' = ab$

Apparent lengths $\Rightarrow a'b' = a'2$
 $\Rightarrow ab = a1$

True angle $\Rightarrow \theta, \phi$

Apparent angle $\Rightarrow \alpha, \beta$

Problems:

- 1) A line AB, 75 mm long, is inclined 45° to the H.P and 30° to the V.P. Its one end B is ^{20 mm} above the H.P and 40 mm in front of the V.P. Draw its projections and determine (its traces.)

Given data,

$$AB = 75 \text{ mm}$$

$$\theta = 45^\circ$$

$$\phi = 30^\circ$$

B_1 20 above H.P

b'_1 20 $\uparrow$ XY line

B 40 mm in front of V.P

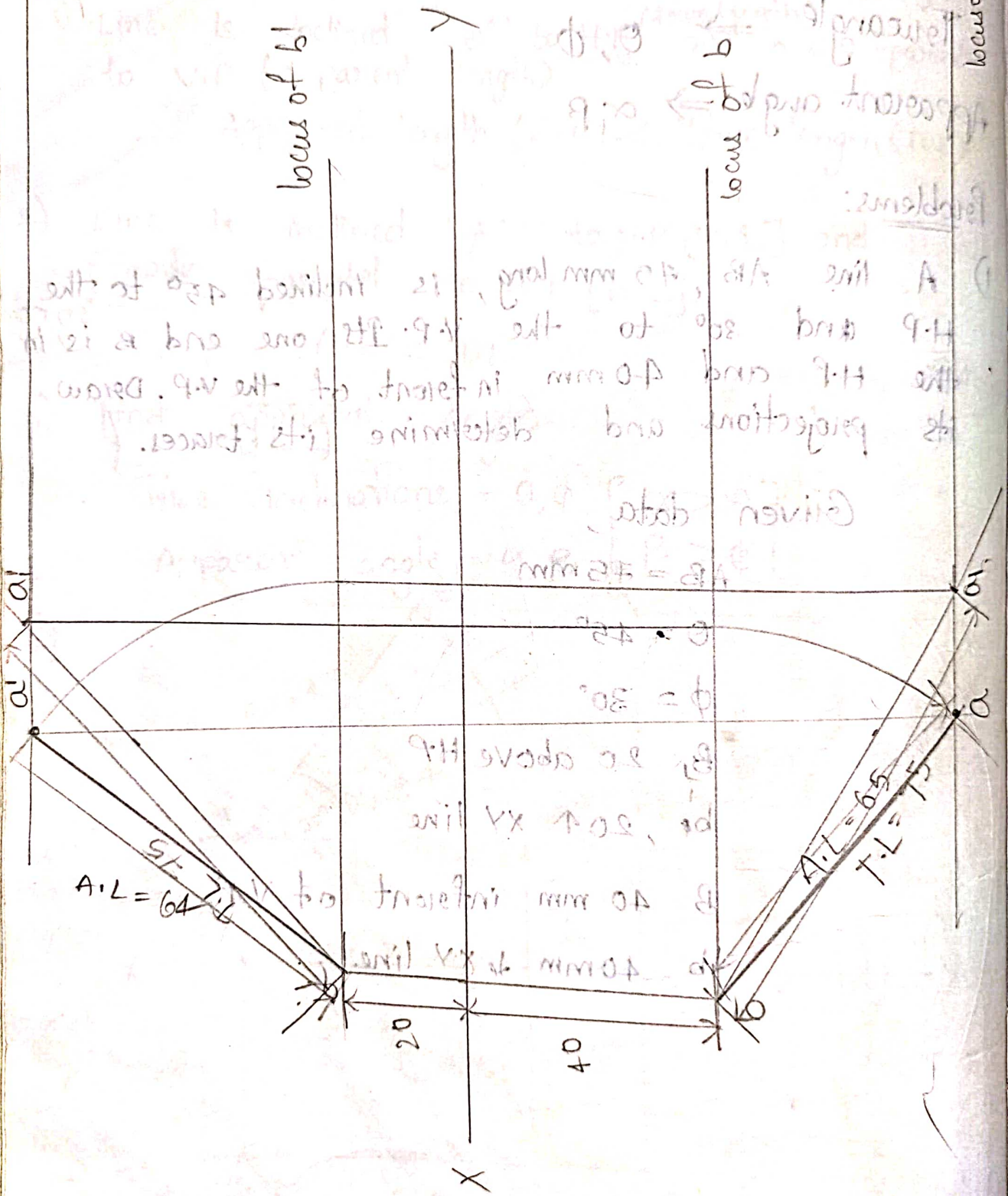
b 40 mm $\downarrow$ XY line

locus of a.

locus of b.

locus of b.

locus of a.



Q. A line AB, 40 mm long, is inclined 30° to the H.P. and 30° to the V.P. The end A is in the H.P. and the end B is in the V.P. Determine the projections and determine its true length.

Given data

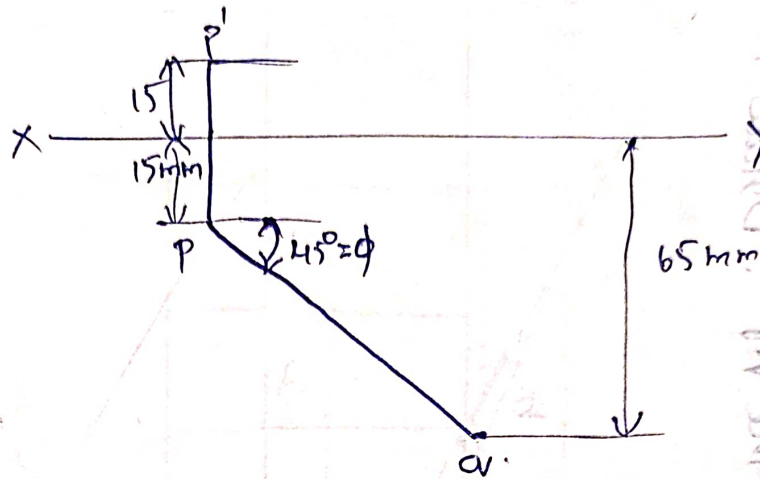
$\phi = 30^\circ$

$\theta = 30^\circ$

AB 40 mm incline to H.P. and 30° above H.P.

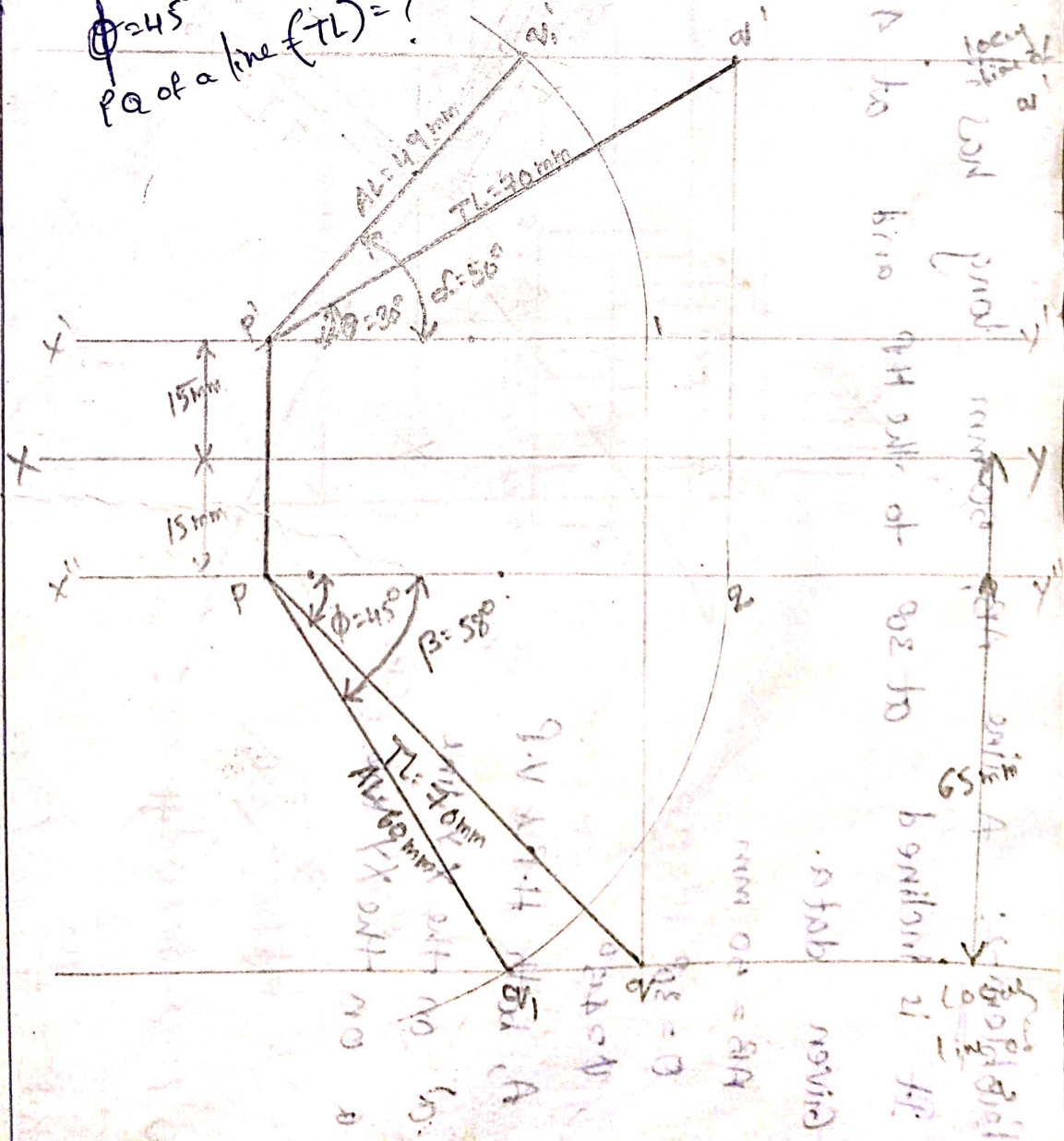
40 mm incline to V.P. and 30° above V.P. line.

- 1) incomplete projection of a line PQ, inclined at 30° to the H.P. are given - Fig. complete the projection and determine the true length of PQ and its inclination with the V.P.



Ans:-

$\phi = 45^\circ$
PQ of a line (TL) = ?



Problem-2: A line AB, 50 mm long has its end A in both the H.P and V.P. It is inclined at 30° to the H.P and at 45° to the V.P. Draw its projection.

Given data.

$$AB = 50 \text{ mm}$$

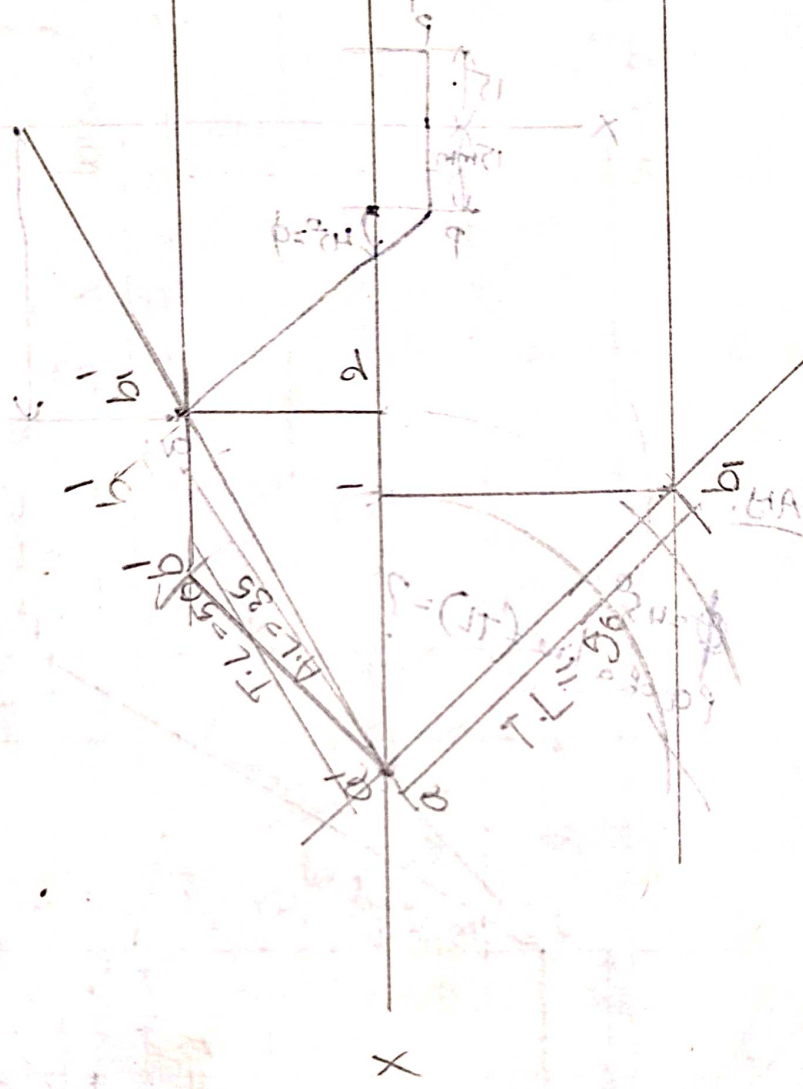
$$\theta = 30^\circ$$

$$\phi = 45^\circ$$

A, both H.P & V.P

a' on the XY line

a on the XY line



Draw the H.P and V.P

Draw the H.P and V.P

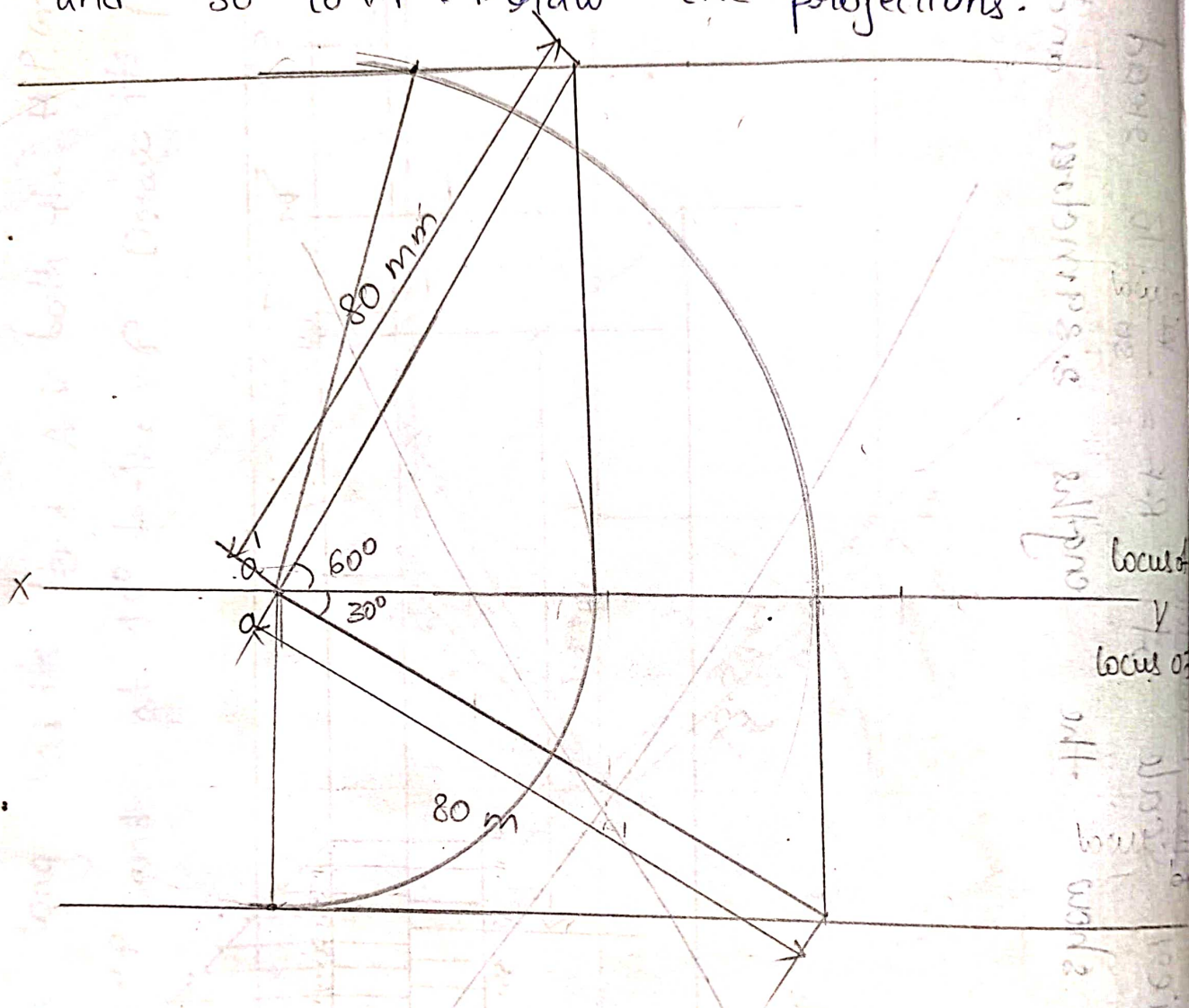
Draw the H.P and V.P

18/12/2018

UNIT-III (continuation)

cse.

- 1) A line AB 80 mm long its ends are in the H.P and V.P. It is inclined at 60° to H.P and 30° to V.P. Draw the projections.



10.00

0.00

0.00

0.00 X 10, CM

0.00 X 10, CM

0.00 X 10, CM

0.00

TRACES OF A LINE:

TRACE: When a line is inclined to a reference plane it will meet that plane, produce if necessary. The point at which the line or line produced meet the plane is called trace.

H.T = Horizontal trace

V.T = Vertical trace.

→ H.T is a point of intersection of the line or line produced with H.P.

→ V.T is a point of intersection of the plane or plane line produced with V.P.

Problem: A line CD measuring 80 mm is inclined at an angle of 30° to H.P and 45° to V.P. The point 'C' is 20 mm above H.P and 30 mm in front of V.P. Draw the projections and also indicate the traces.

$$CD = 80 \text{ mm}$$

$$\theta = 30^\circ$$

$$\phi = 45^\circ$$

End points

$$C' = 20 \text{ mm above H.P}$$

$$C = 30 \text{ mm in front of V.P}$$

