

① Polygons - Regular Methods

② Conic Sections - Curves - General Method

I, - Ellipse

II, Parabola

III, Hyperbola

General Method

1, Arcs of circle method

2, oblong Method (or) rectangular Method

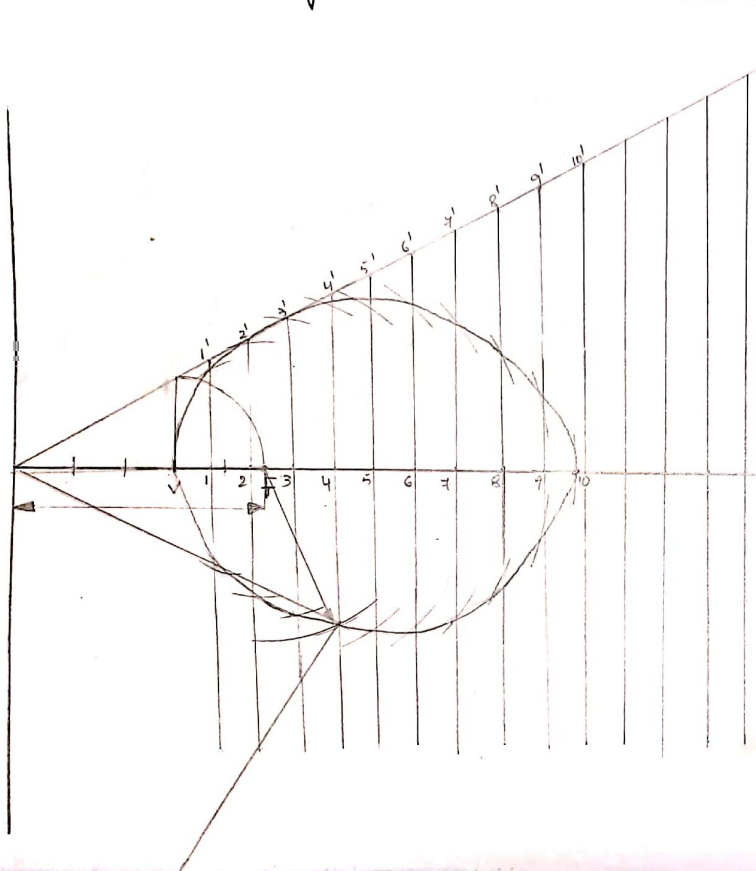
3, Parallelograms Method

4, Concentric circle method

③ Cycloids - Epi cycloids and Hypo-cycloid

Construction of curve from given points  
Construction of curve from given points

Q, Construct a elliptical curve by using of eccentricity is  $\frac{2}{3}$ . That distance between directrix and focus is 50mm. And also draw a tangent and normal on the curve using 35mm radius.

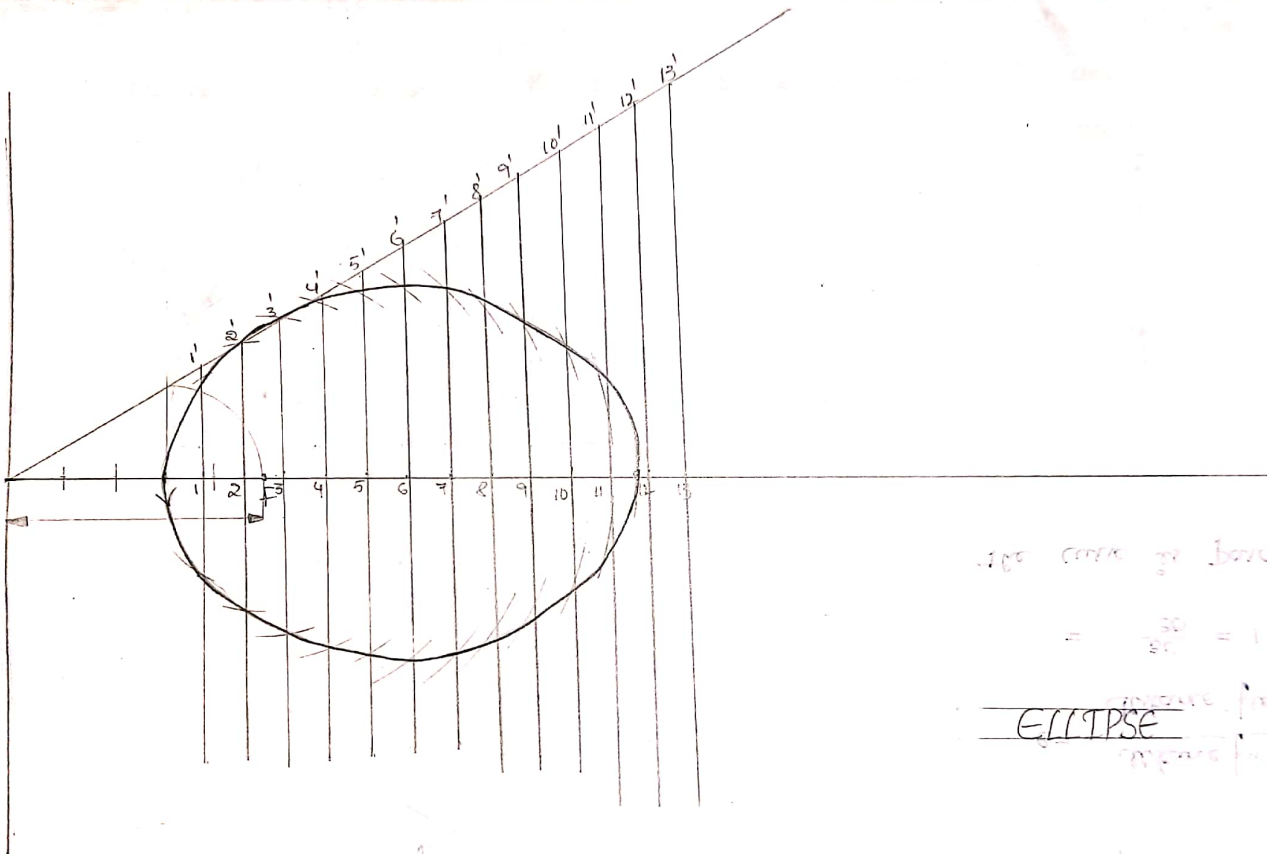


$$e = \frac{\text{distance from focus to Directrix}}{\text{distance from directrix to focus}}$$

$$= \frac{2}{3} = 0.6$$

General Method:-

1. Draw a horizontal line and a vertical line intersecting at point O. The vertical line is the axis of symmetry.
   
 2. Mark points 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 on the horizontal axis.
   
 3. Draw a vertical line at point 3, representing the focus.
   
 4. Draw a horizontal line at point 5, representing the directrix.
   
 5. Draw a semi-circle with center at 10 and radius 5, intersecting the directrix at points 1', 2', 3', 4', 5', 6', 7', 8', 9'.
   
 6. Draw vertical lines from points 1 through 10 on the axis to the directrix.
   
 7. Draw horizontal lines from points 1' through 9' on the directrix to the vertical line at 3.
   
 8. The intersection points of these horizontal lines and vertical lines are connected to form the ellipse.
   
 9. Draw a tangent line at point 1 on the ellipse.
   
 10. Draw a normal line at point 1, perpendicular to the tangent.
   
 11. The radius of the normal is 35mm.
   
 12. The word "ELLIPSE" is written below the diagram.



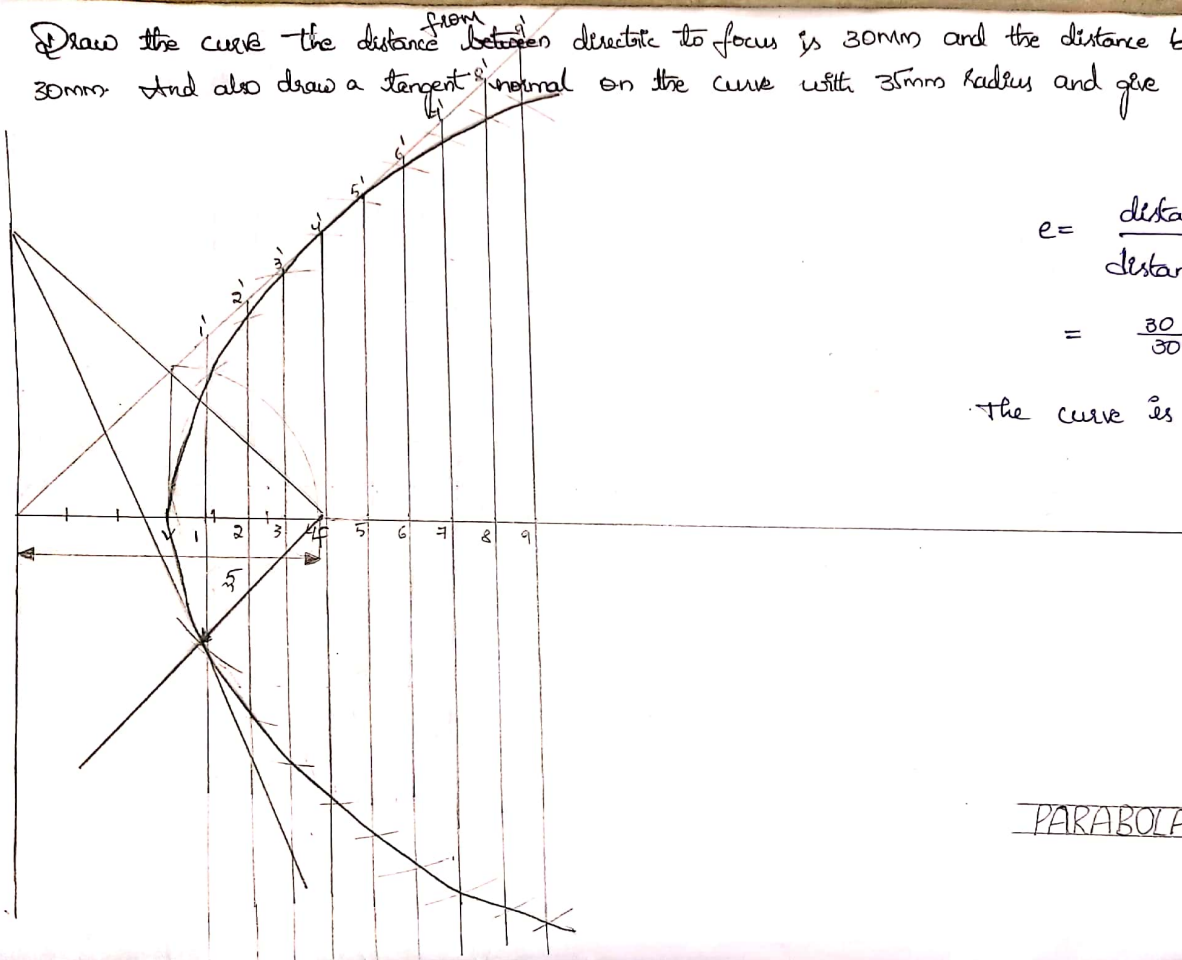
205 circle of bounding

$$= \frac{30}{25} = 1$$

ELLIPSE

Construct an ellipse with major axis AB and minor axis CD. Divide AB into 12 equal parts and CD into 6 equal parts. Draw vertical lines from the divisions on AB and horizontal lines from the divisions on CD. The intersection points of these lines are connected by a smooth curve to form the ellipse.

Q, Draw the curve the distance <sup>from</sup> between directrix to focus is 30mm and the distance <sup>from</sup> between focus to directrix is 30mm. And also draw a tangent & normal on the curve with 35mm radius and give curve name.



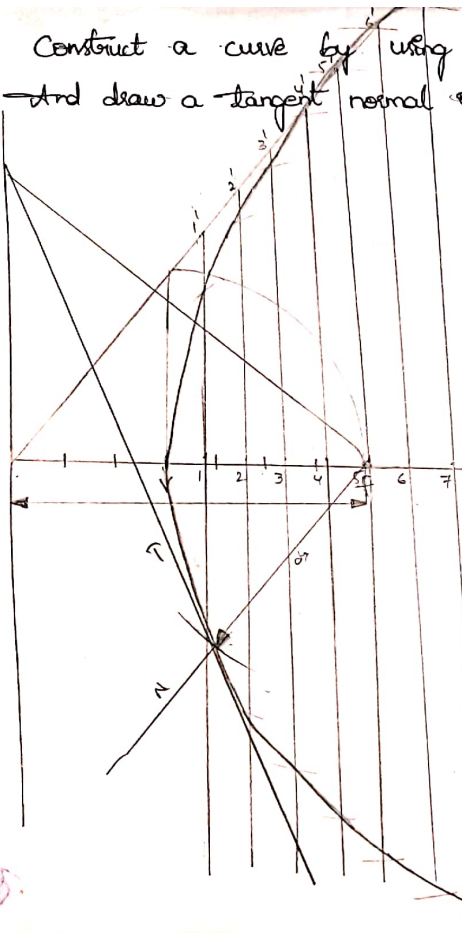
$$e = \frac{\text{distance from focus to directrix}}{\text{distance from directrix to focus}}$$

$$= \frac{30}{30} = 1$$

The curve is parabola

PARABOLA

Q. Construct a curve by using of eccentricity is  $\frac{4}{3}$  and the distance between directrix and focus is 70mm. And draw a tangent normal on the curve with the convenient radius and give a name for the curve.



$$e = \frac{\text{distance from focus to directrix}}{\text{distance from directrix to focus}}$$

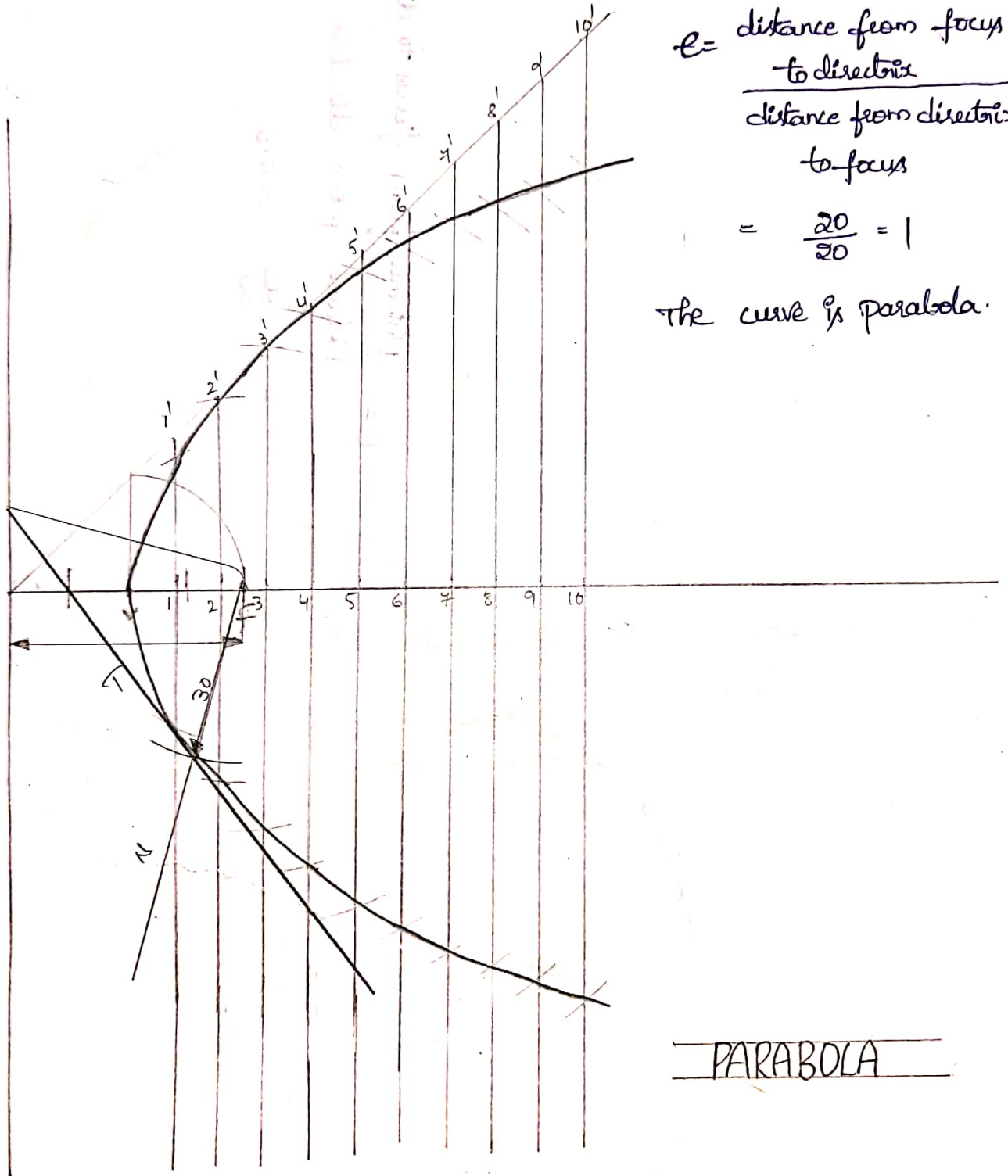
$$= \frac{4}{3} = 1.33$$

The curve is Hyperbola.

HYPERBOLA



Q, Construct a curve by using eccentricity ratio of a point makes equal distance from directrix to vertex and vertex to focus or focus to vertex. The distance between fixed straight line and fixed point is 40mm. Give a name for the curve and also draw a tangent normal on the curve with convenient radius.



$$e = \frac{\text{distance from focus to directrix}}{\text{distance from directrix to focus}} = \frac{20}{20} = 1$$

The curve is parabola.

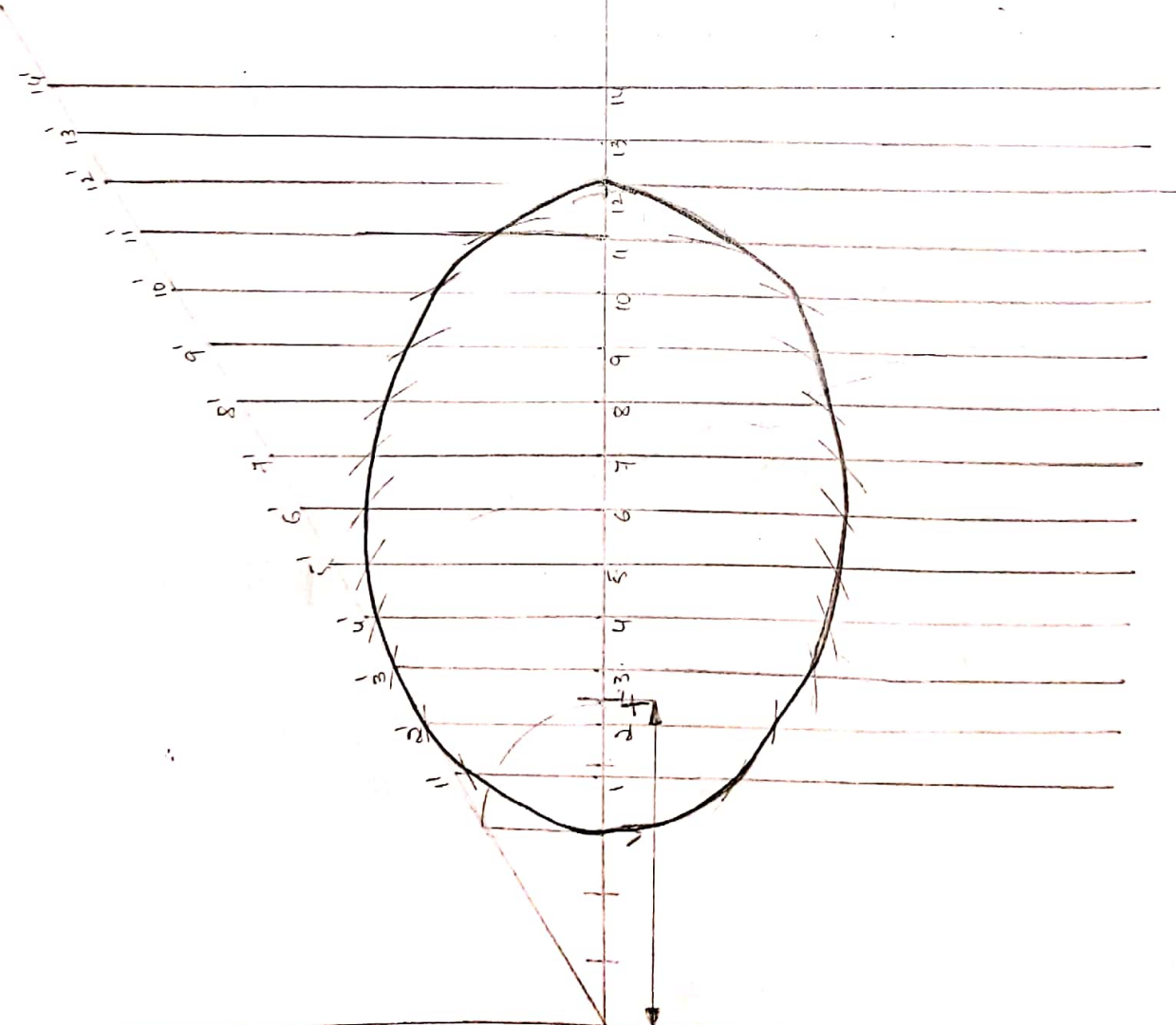
PARABOLA

Q. A point moves 30mm from the directrix to focus and also moves 20mm from focus to directrix and generate the curve and also give a name for the curve.

Proof:  $e = \frac{\text{Distance from focus to directrix}}{\text{Distance from directrix to focus}}$   
 $= \frac{30}{20} = 1.5$   
 $> 1$   
 The curve is a hyperbola.

$$e = \frac{\text{Distance from focus to directrix}}{\text{Distance from directrix to focus}} = \frac{30}{20} = 1.5$$

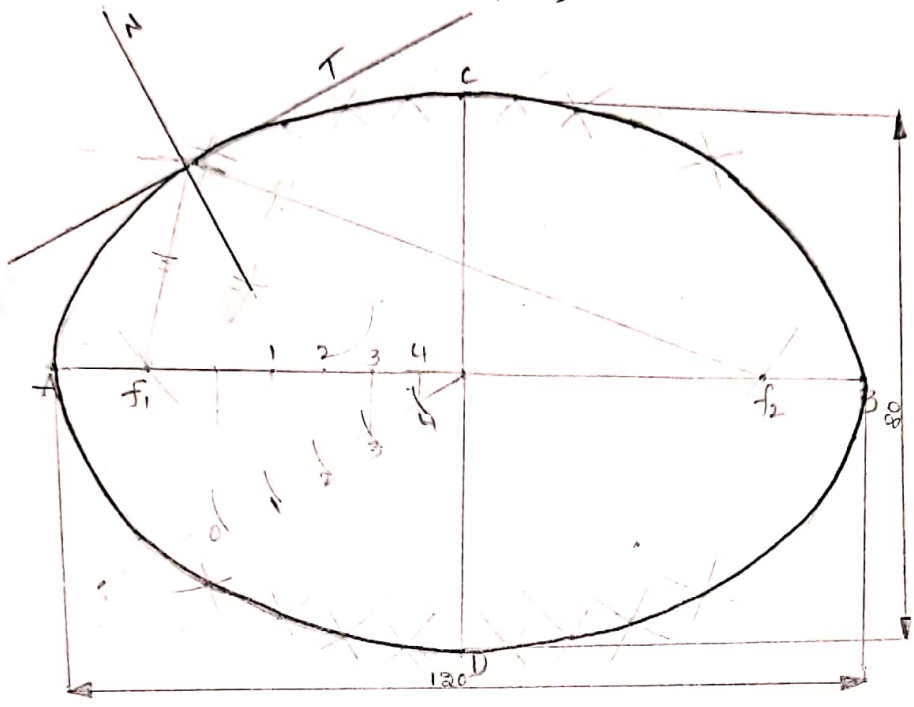
ELLIPSE



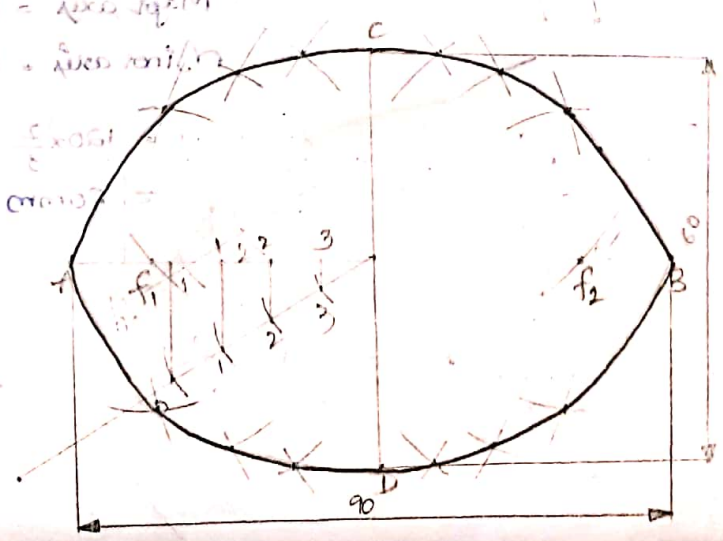


Arches of circle Method :

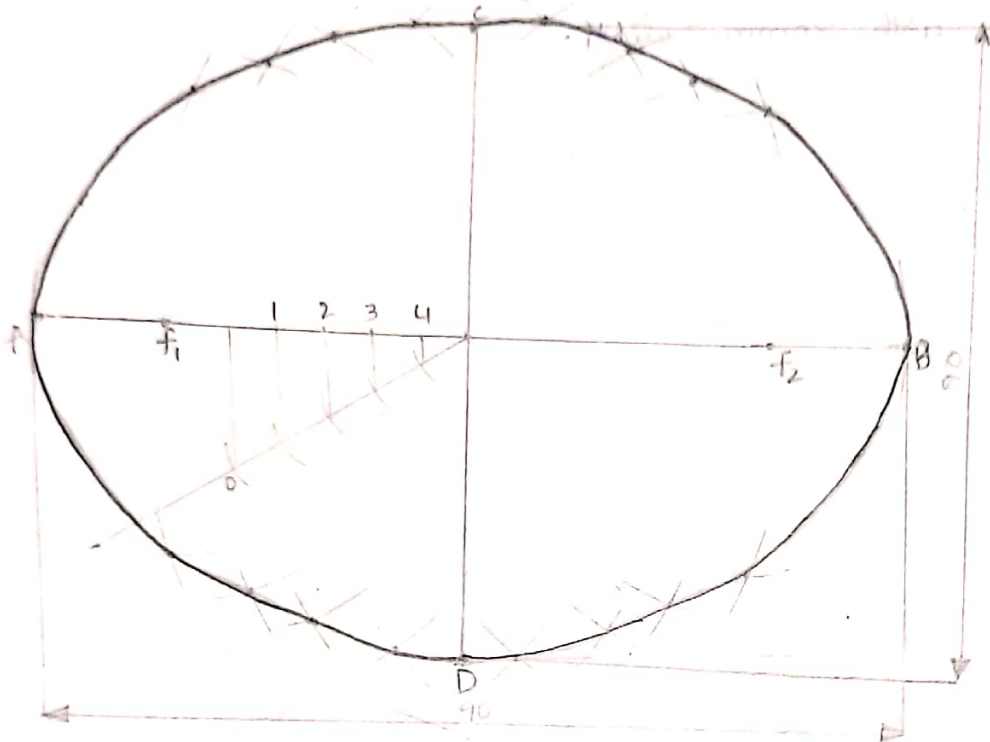
Q, The major axis of an ellipse is 120mm and the minor axis of an ellipse is 80mm. Draw the elliptical curve by using of Arches of circle Method and also draw a tangent normal on the curve with 30mm radius.



Q, Construct an ellipse the major axis is 90mm and the minor axis 60mm. Draw the curve passing through the points.

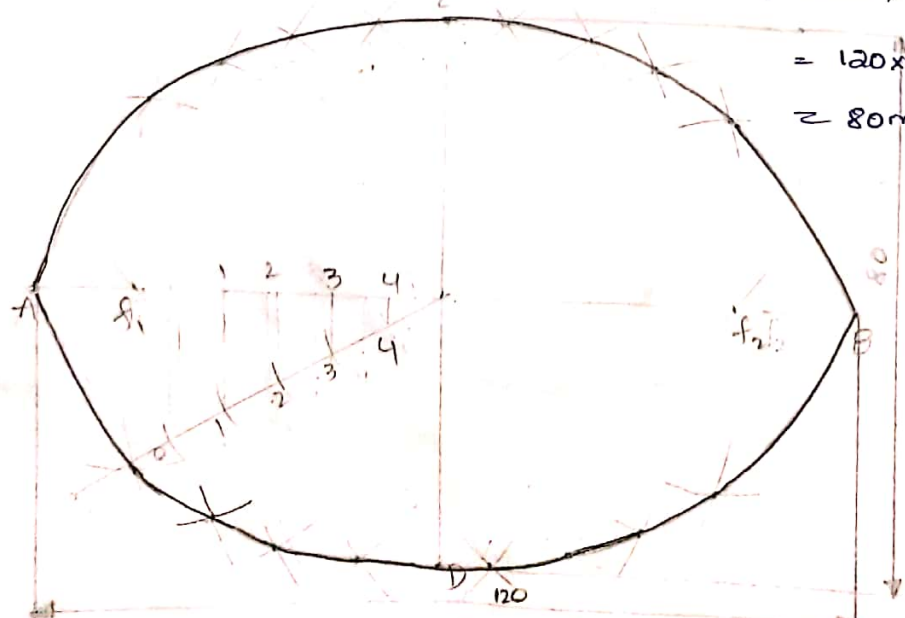


Q<sub>1</sub> The distance between two foci (fixed points) is 90mm apart and the minor axis of an ellipse is 90mm find out the major axis of ellipse.

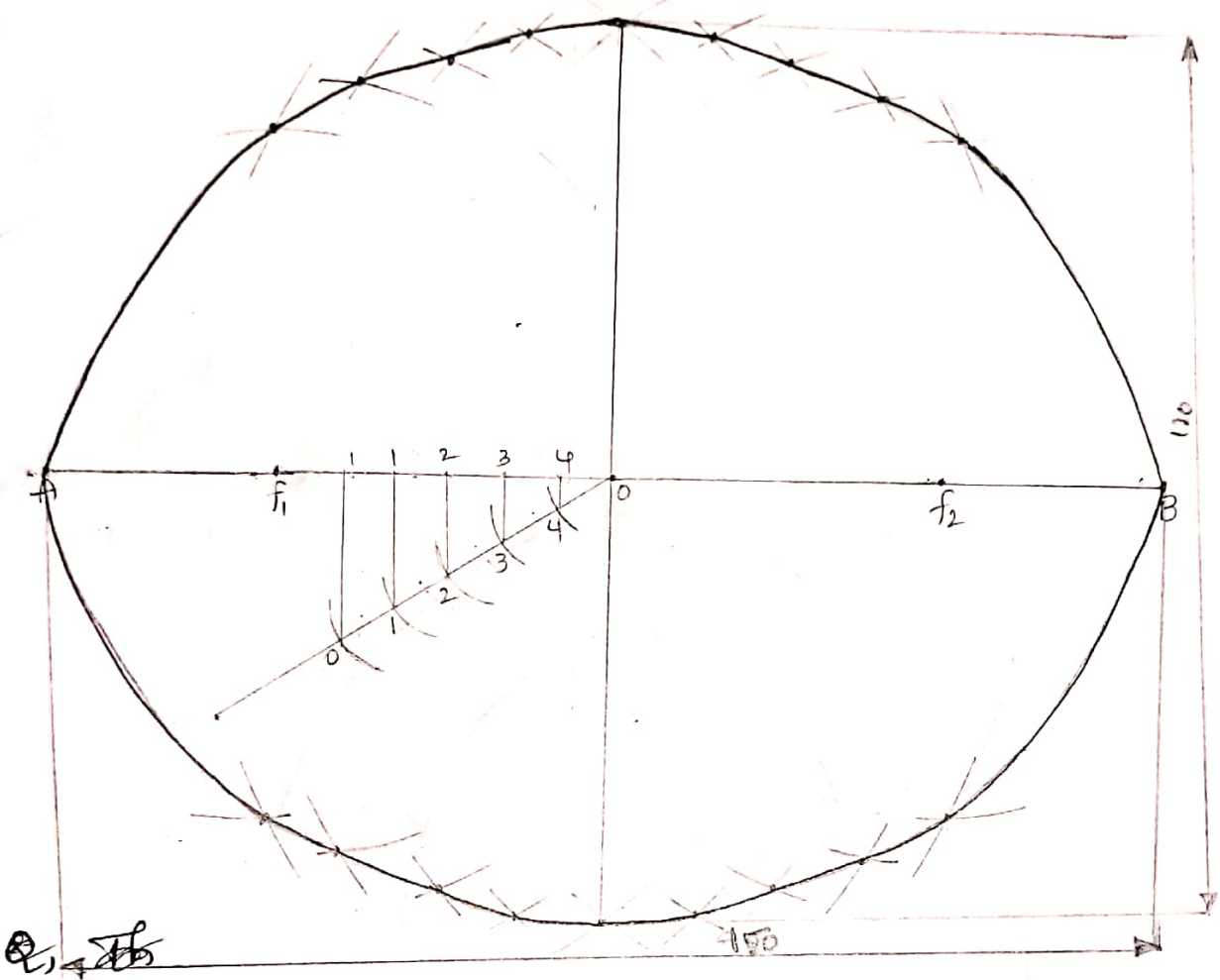


Q<sub>2</sub> The major axis of an ellipse is 120mm and the minor axis is  $\frac{2}{3}$  ratio of in the major axis find out the minor axis distance. Draw the elliptical curve by using arc's of circle method.

Major axis = 120mm  
 Minor axis =  $\frac{2}{3}$  of major axis  
 $= 120 \times \frac{2}{3}$   
 $= 80\text{mm}$



Q, The distance between two foci is 90mm apart and a point P is moves equal distance from the two focus is 30mm find out minor axis of an ellipse



The distance between two foci is 90mm. A point P moves equal distance from the two foci is 30mm. Find out the minor axis of the ellipse.

Q, The major axis of an ellipse is 120mm and a point is equally moved from two ends of major axis is equal to 25mm. find out the foci's distance and also minor axis. And draw parallel curve on above of with 20mm radius.

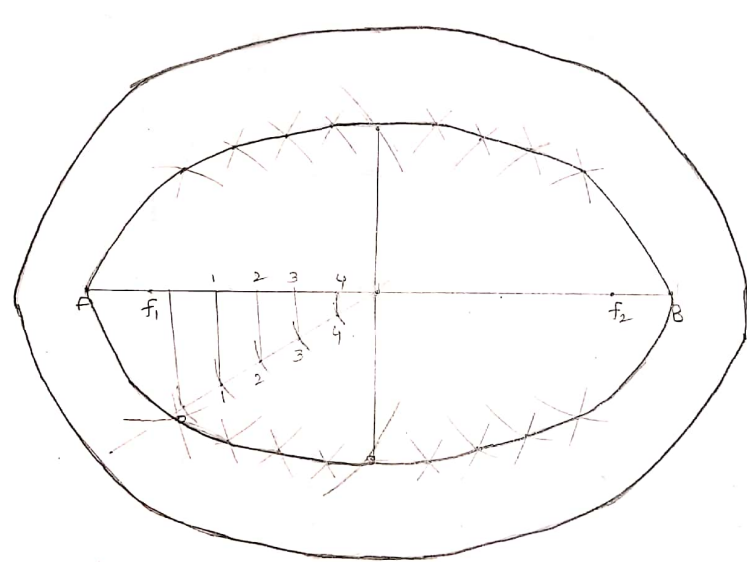
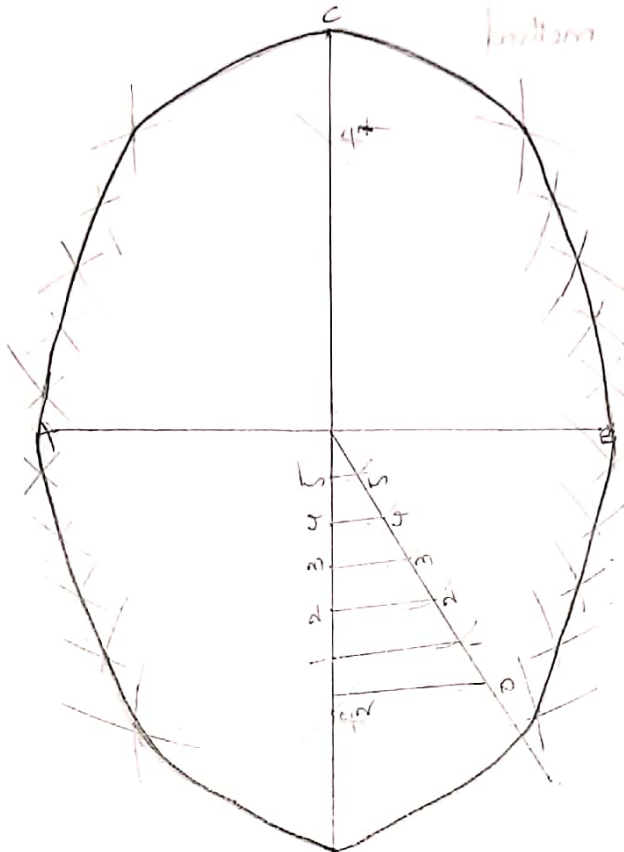


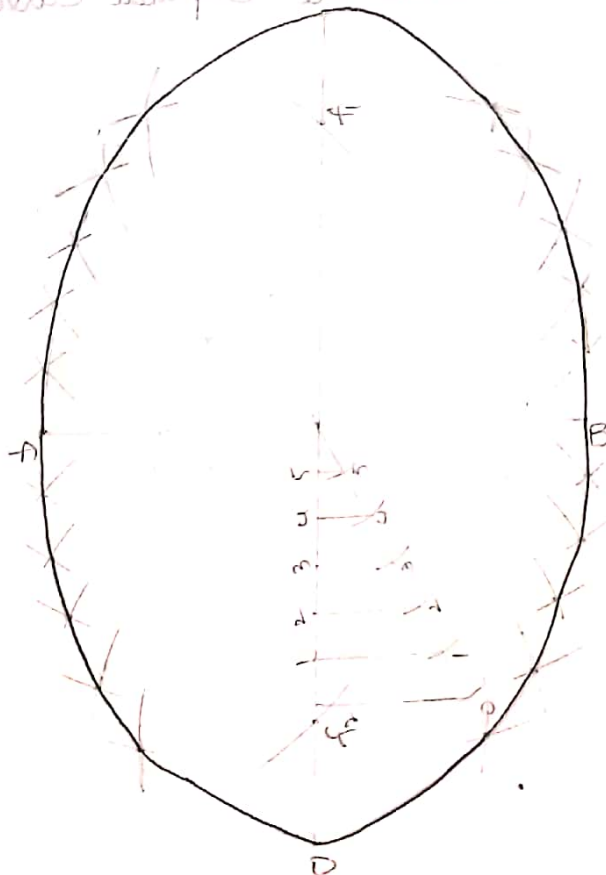
Fig. 10

... from ... in a ... and ... of ...  
 ... of ...  
 ... of ...  
 ... of ...

Q, The vertical major axis of an ellipse is 120mm and the horizontal minor axis 80mm. Draw the curve passing through the arcs.

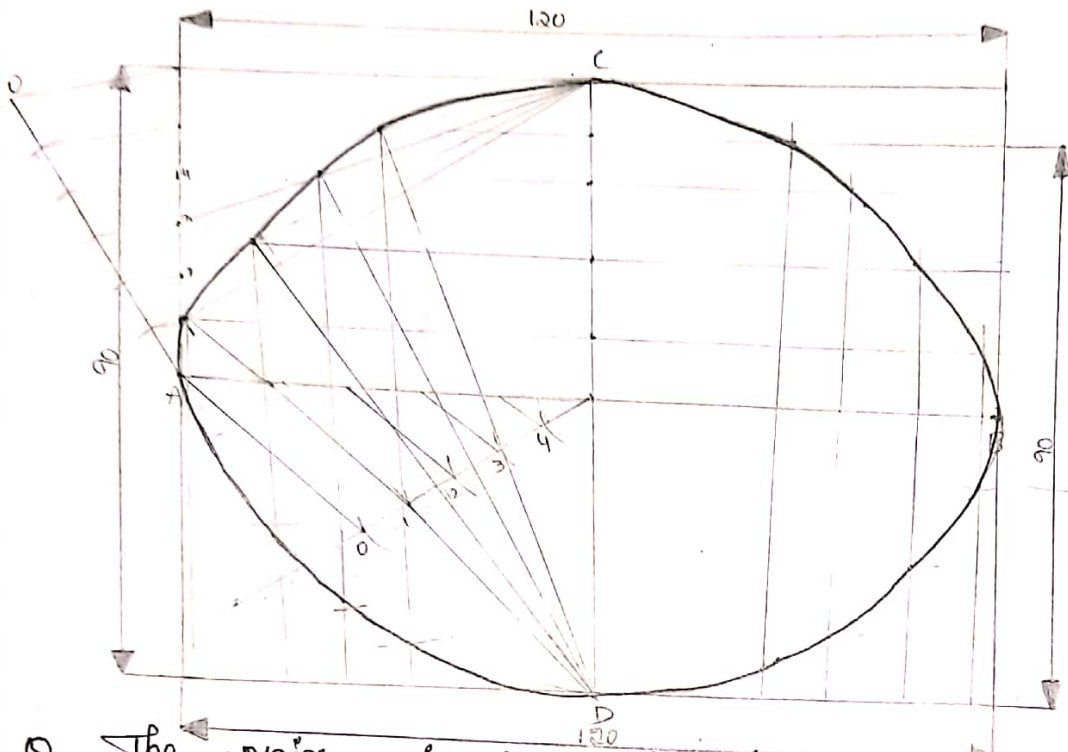


The major axis of an ellipse is 120mm and the minor axis is 80mm. Draw the curve passing through the arcs.

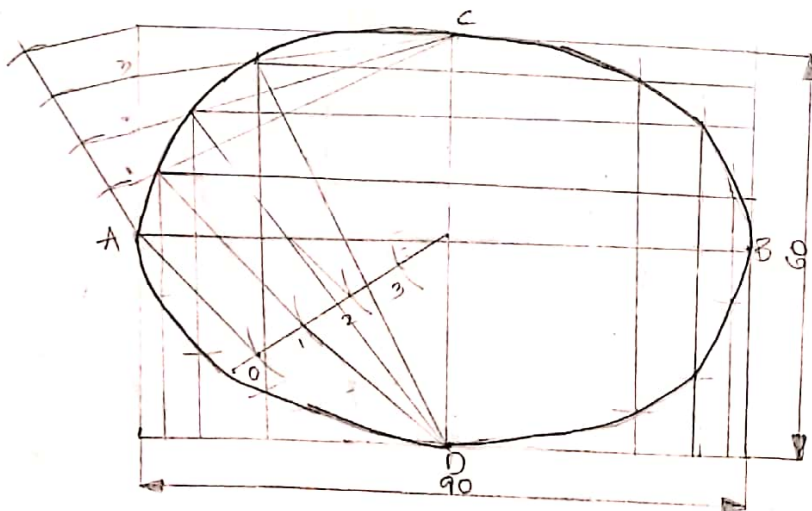


Oblong Method (or) Rectangular Method

Q, The major axis of an ellipse is 120mm and the minor axis of an ellipse is 90mm draw the elliptical curve in the rectangular method or oblong method



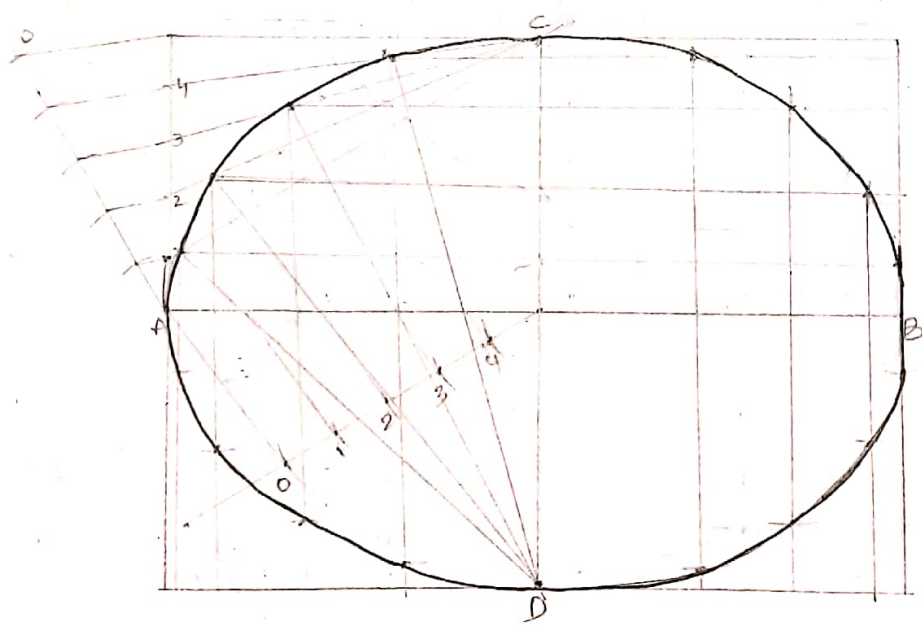
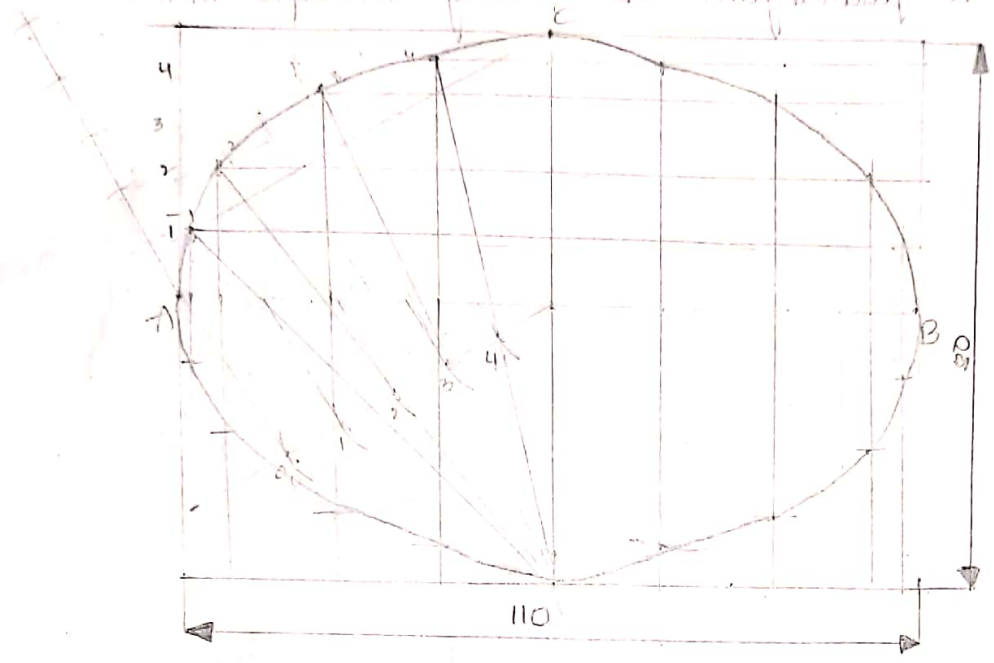
Q, The major axis of an ellipse is 90mm and the minor axis of an ellipse is 60mm draw the elliptical curve in the oblong method.



Q. A rectangular plot having  $110 \times 80$  mm make a elliptical ~~curve~~ <sup>curve</sup> ~~cut~~ <sup>cut</sup>.

At two corners of the rectangle, draw quarter circles of radii 55 mm and 40 mm respectively. The intersection of these two arcs will be the center of the ellipse. The ellipse is drawn by the method of concentric circles.

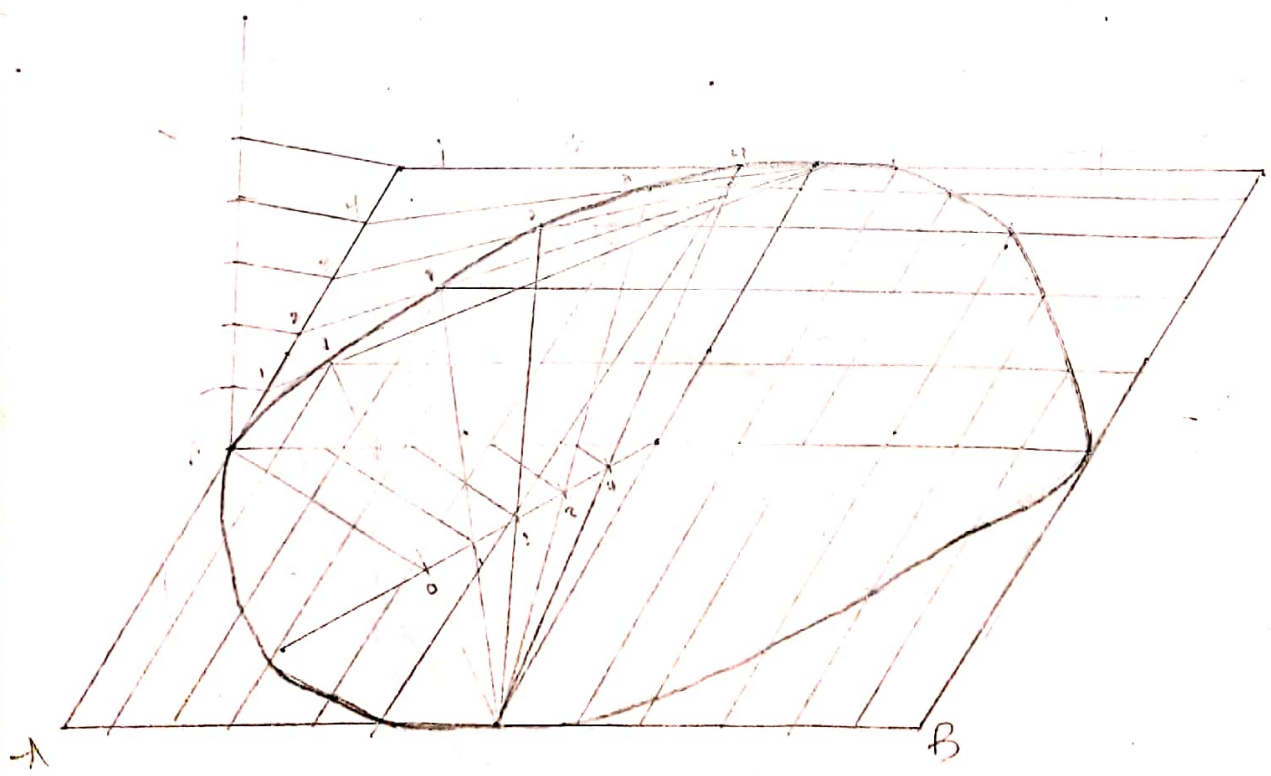
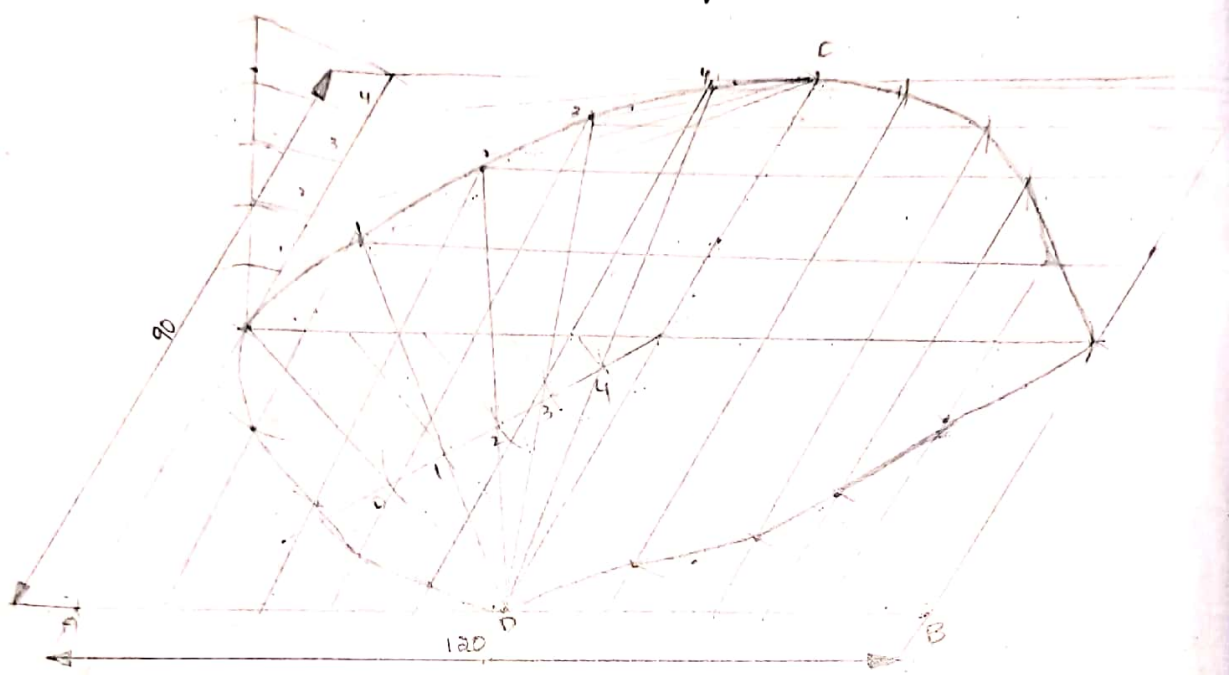
Let the center of the ellipse be O. The major axis is AB and the minor axis is CD. The ellipse is drawn by the method of concentric circles.



# \* Parallelogram Method

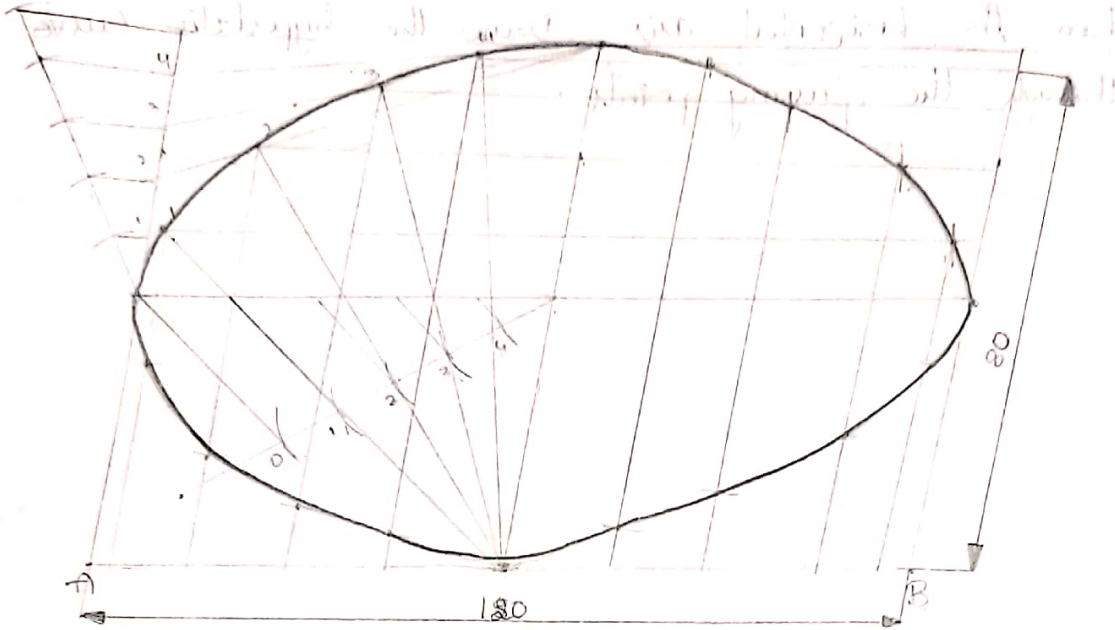
Q, Draw the ellipse in a parallelogram major axis is 120mm and the minor axis 90mm including 120° parallelogram angle

(or)  
The major axis 120mm and the minor axis 90mm including 120°  
Construct a parallelogram and inscribing an ellipse in it.



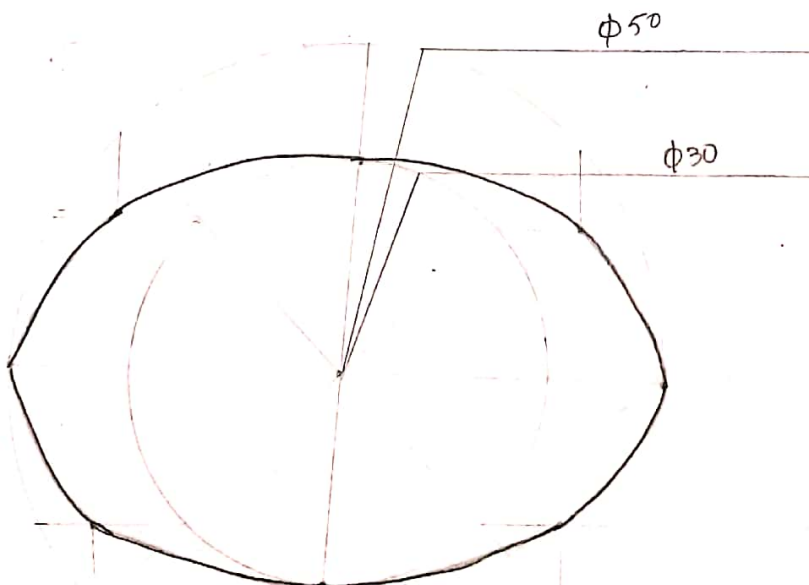


Q, The major axis 120mm and the minor axis 80mm including  $80^\circ$ . Construct a parallelogram and inscribing an ellipse in it.



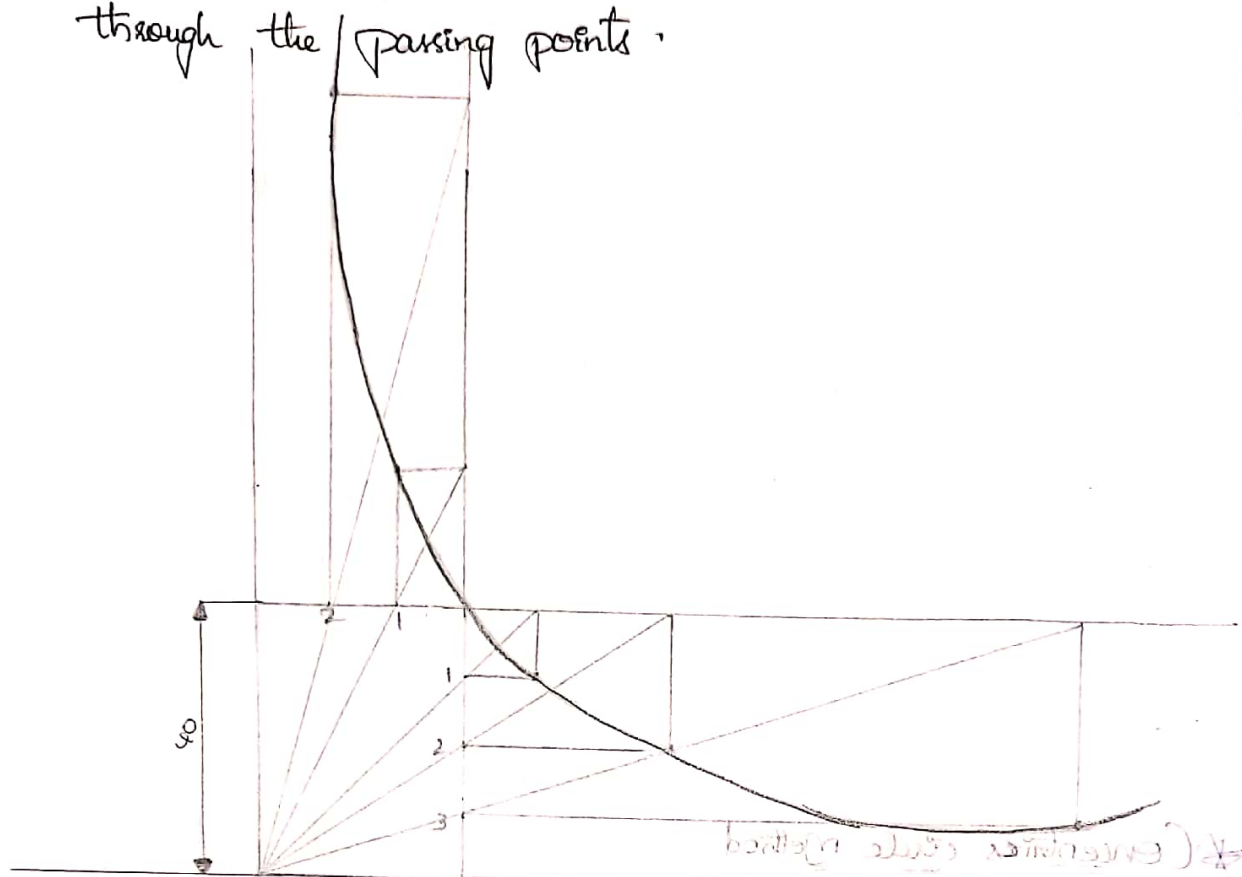
### Concentric circle method

Q, A circle having 100mm diameter and draw another circle in it with 70mm diameter. Draw an elliptical curve through the points by using of concentric circle method.

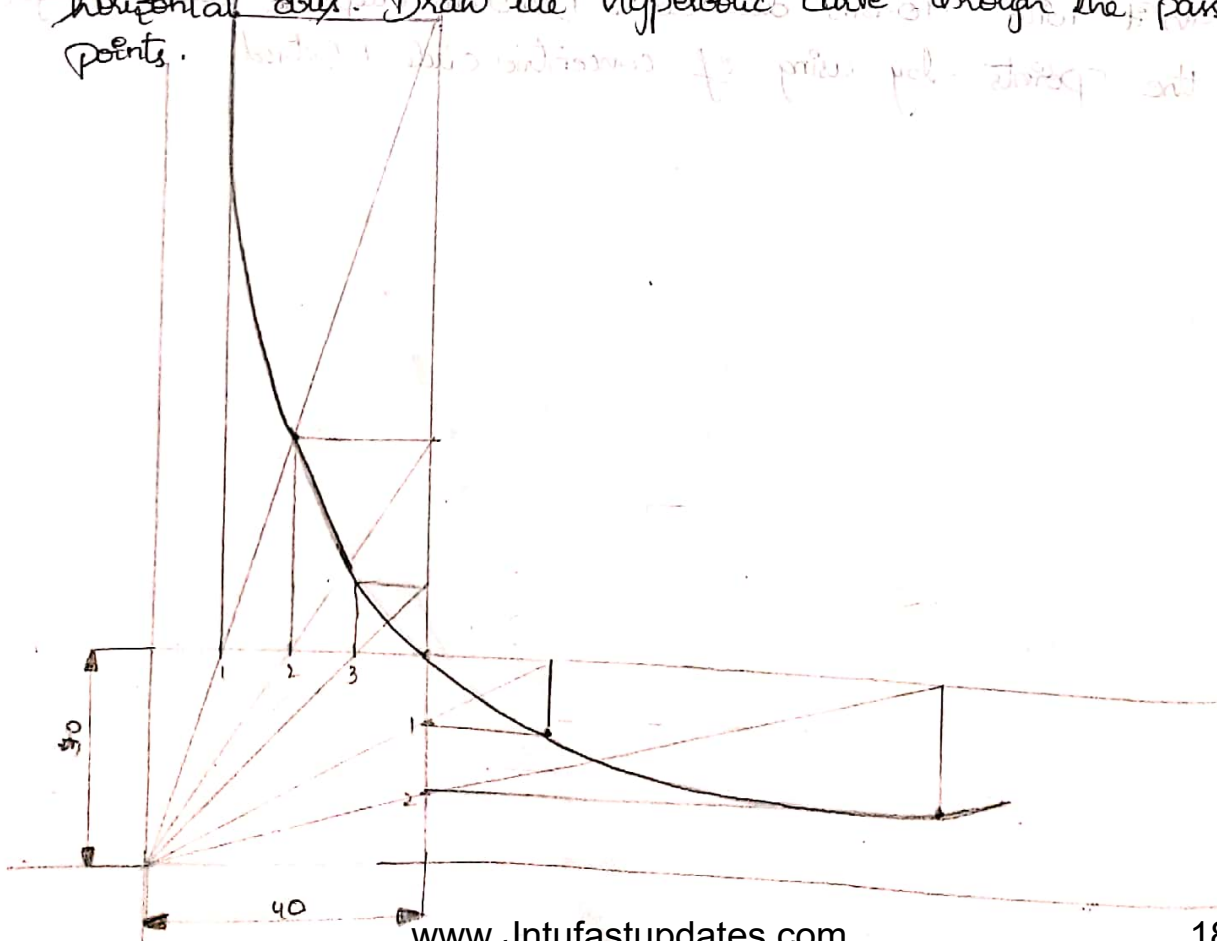


# \* Hyperbola (b) Rectangular Method

1, A point 'p' is 30mm from the vertical axis and 40mm from the horizontal axis. Draw the hyperbolic curve through the passing points.



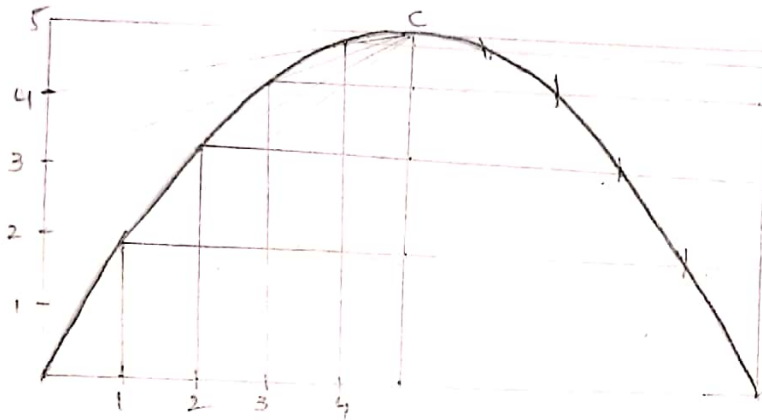
2, A point is 40mm from the vertical axis and 30mm from the horizontal axis. Draw the hyperbolic curve through the passing points.



# Parabola - Rectangle Method

12/10/2018

Q. A cricketer throw a ball to the keeper the distance between cricketer and keeper is 100mm and the ball travelling height is 50mm. Draw the projectile curve and give a name for that.

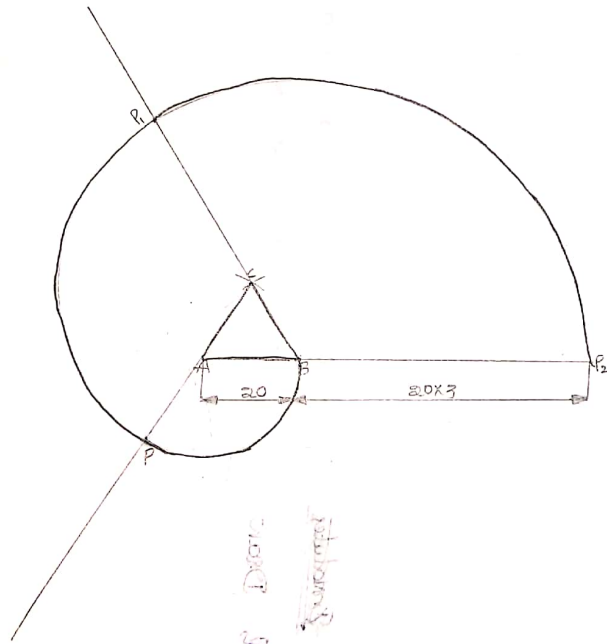


## Procedures

Q. Draw

Draw a rectangle between a circle and a vertical line. Divide the rectangle into four equal horizontal segments. Draw horizontal lines from the midpoints of these segments to the circle. A smooth curve is drawn through the origin, the midpoints, and the top of the circle. This curve is the parabolic projectile curve.

Q, Draw a triangular involute with 20mm sides and draw a rounded threaded curve through the passing points.



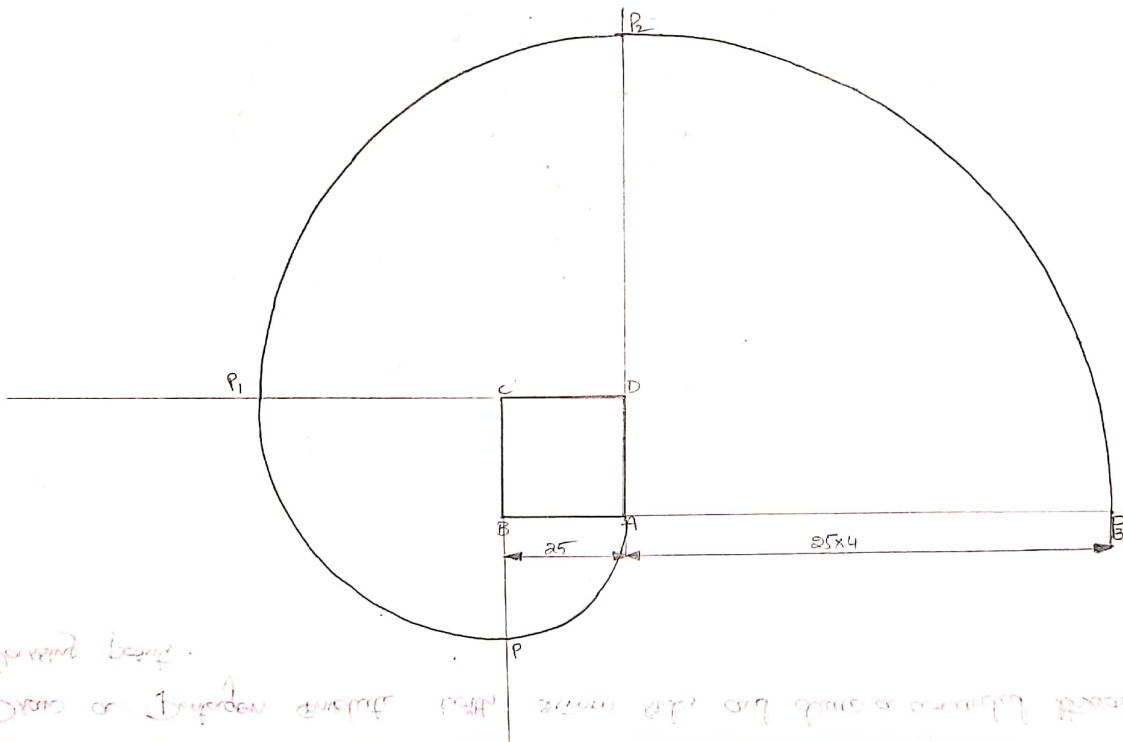
of Diagram  
 Involute

Involute

Involute of a circle

Involute of a circle is a curve traced by a point on a straight line as it rolls without slipping on a circle. The curve is smooth and continuous. It is used in the design of involute gears. The involute of a circle is a curve that is tangent to the circle at every point. The involute of a circle is a curve that is tangent to the circle at every point. The involute of a circle is a curve that is tangent to the circle at every point.

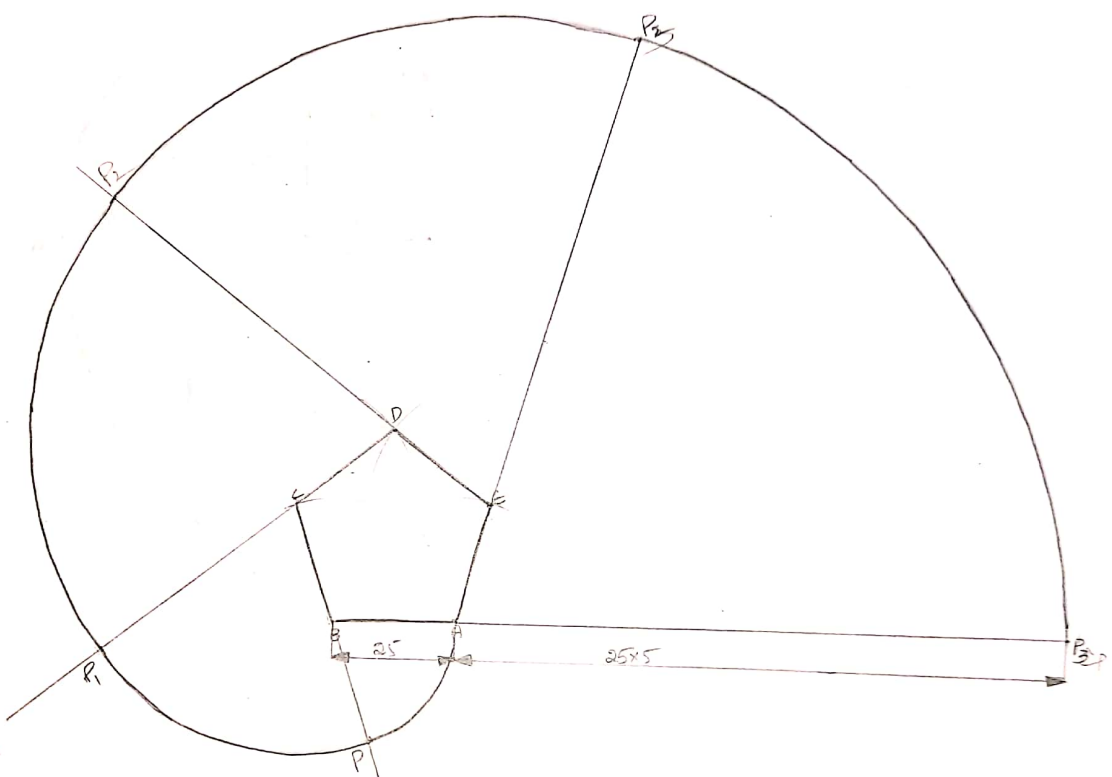
Q, Draw a Square Envelope with 25mm Sides and draw a rounded threaded curve through the passing points.



forward being.

Q' Draw a Square Envelope with 25mm Sides and draw a rounded threaded curve through the passing points.

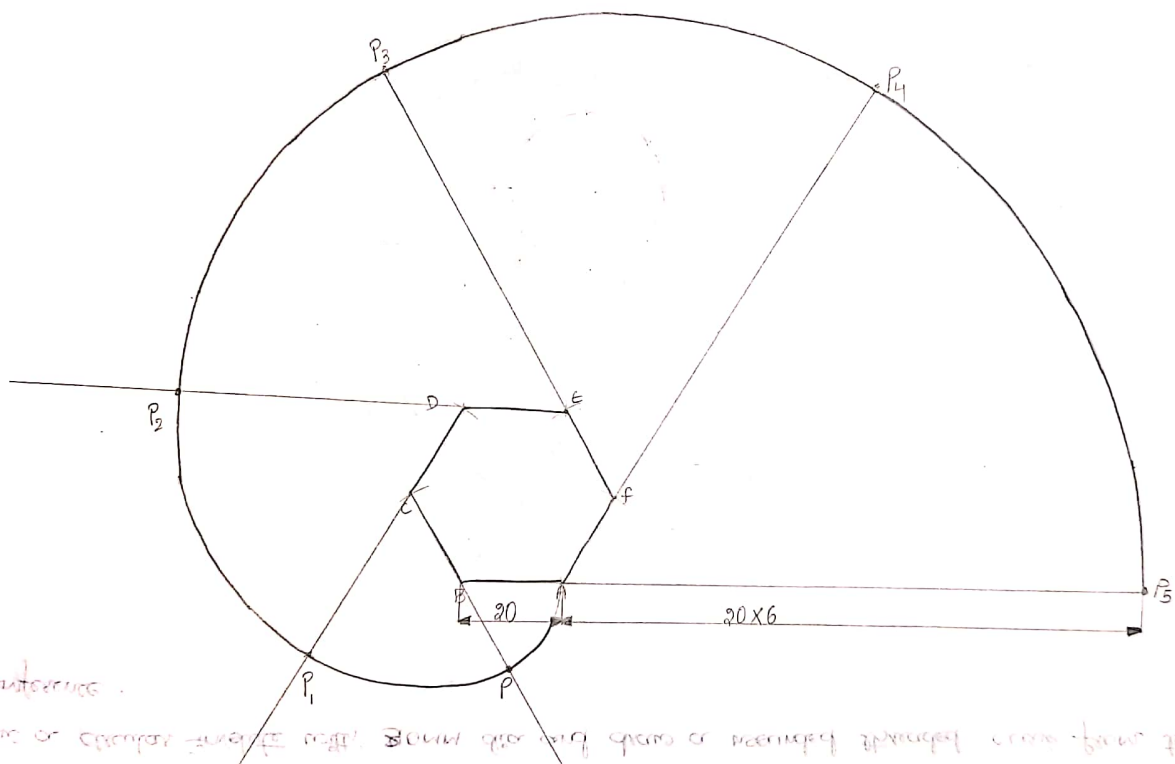
Q, Draw a Pentagon Inscribed with 25mm Sides and draw a wounded threaded curve through the Passing points.



Handwritten notes and a mirrored question are present at the bottom of the page. The mirrored text reads: "Q, Draw a Pentagon Inscribed with 25mm Sides and draw a wounded threaded curve through the Passing points." There are also some faint handwritten notes on the left side.

Q. Draw a Hexagon Envelope with 20mm Sides and draw a rounded threaded curve through the passing points.

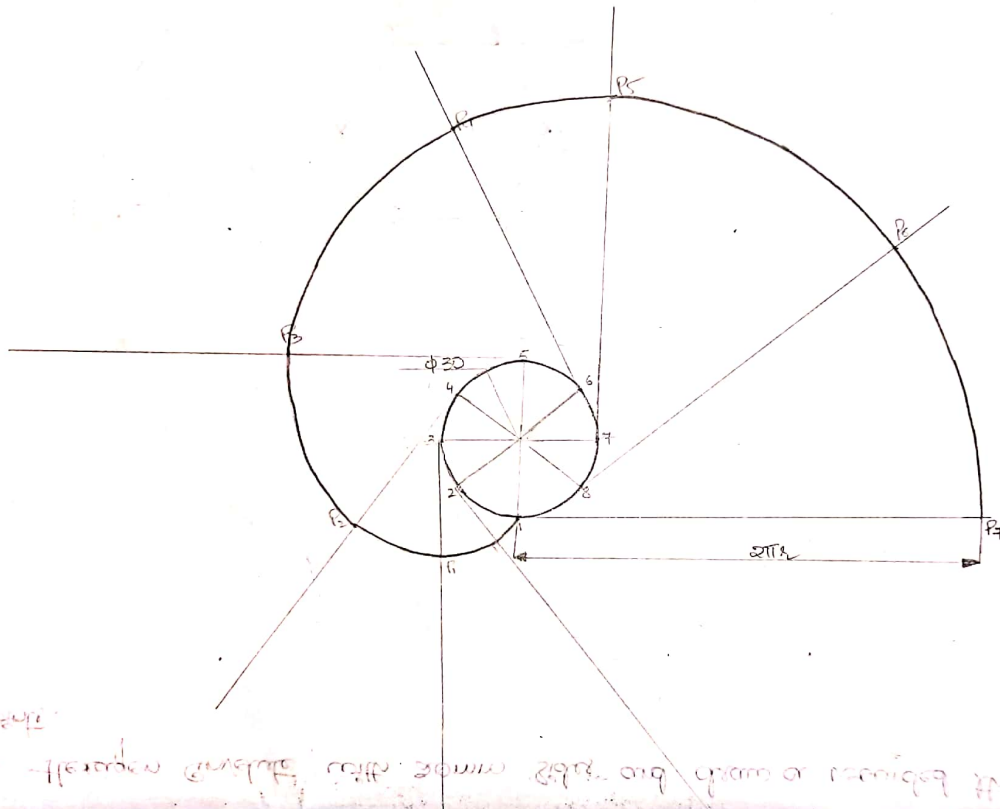
$$\frac{360}{6}$$



Construction:

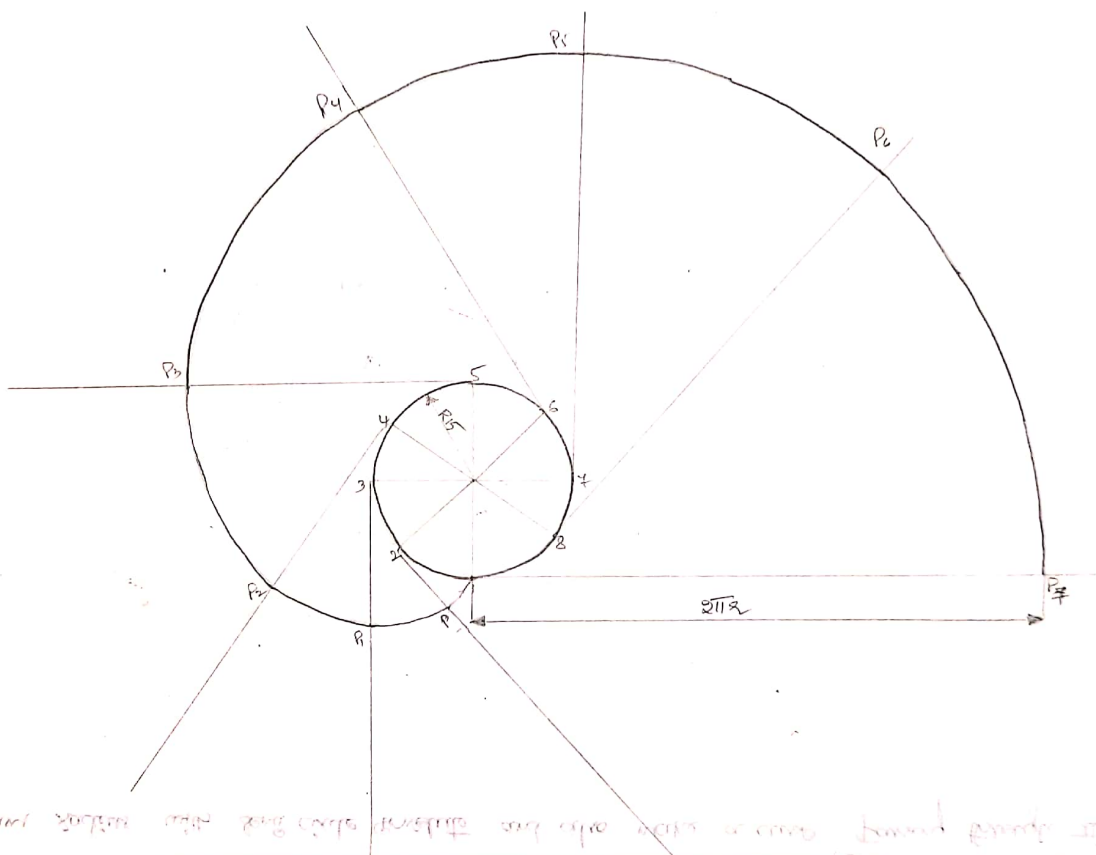
1. Draw a circle of diameter 120mm. Divide the circumference into 6 equal parts. The points are labeled P1, P2, P3, P4, P5, P6.

Q, Draw a circular involute with 30mm dia and draw a rounded threaded curve from the points of Circumference.



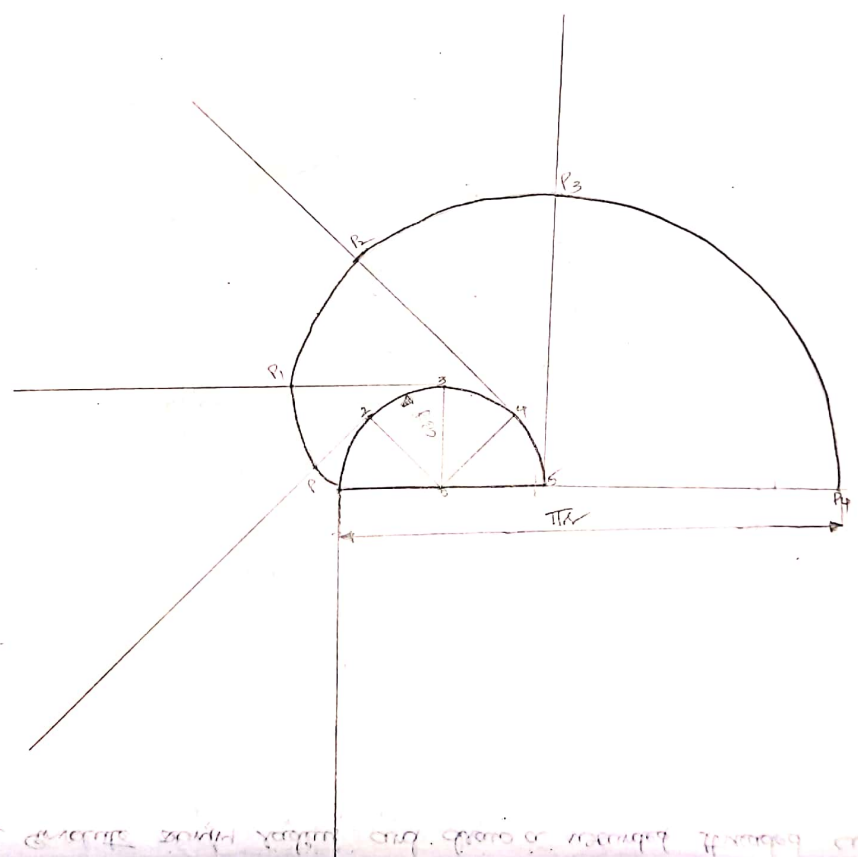


Q, Draw a circular Epicycloid 20mm radius and draw a rounded stretched curve from the points of circumference.



Let us draw a curve from the points of circumference of the circle of radius 20mm and draw a rounded stretched curve from the points of circumference.

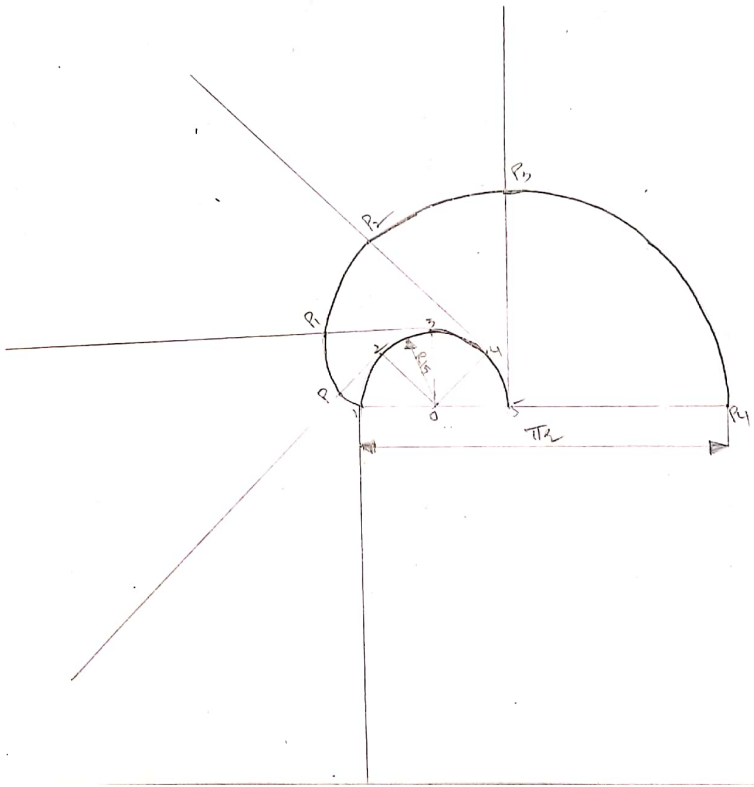
Q, Draw a 20mm radius with semi circle envelope and also make a curve passing through the point.



Construction

Q, Draw a 20mm radius with semi circle envelope and also make a curve passing through the point.

Q, Draw a 30mm dia semi circle Envelope and also make a curve passing through the points.



Handwritten notes in Hindi, likely describing the construction steps for the envelope and curve.

Q, A point having 30mm dia is rolls on a 70mm dia disc. find out the cycloid name and also generating a curve through the points

Q, A 30mm dia circular mirror is generating on a way without flipping and draw the cycloidal curve through the points.

19/9/17

# Scales :-

A Scale is measures the distance between two points (long distances and short distances).

The scales are classified as

1, Plane Scale

2, Diagonal Scale

3, Vernier Scale. - I. forward vernier scale (or) Direct Vernier Scale (n-1)

II Backward vernier scale (or) Retrograded Vernier Scale (n+1)

## Conversions

1cm = 10mm.

10cm = 100mm (or) 1 decimeter

100cm = 1000mm (or) 1 meter

10 meter = 10000mm (or) 1 decameter

1000 meters = 1 km

1 mile = 8 furlongs

1 furlong = 1720 Yards

1 Yard = 3 feet

1 feet = 12 inches

1 inch = 2.54cm (or) 25.4mm

1 minute = 60 sec

## Formula

1, Representation fraction (Rf) =  $\frac{\text{length of the drawing}}{\text{actual length of the drawing}}$   
(or) Scaling fraction (Sf)

3) Length of the Scale (L.S) = R-f x maximum length (read upto, show upto, enough upto, measure upto)

*(Faint handwritten notes in red ink, mostly illegible)*

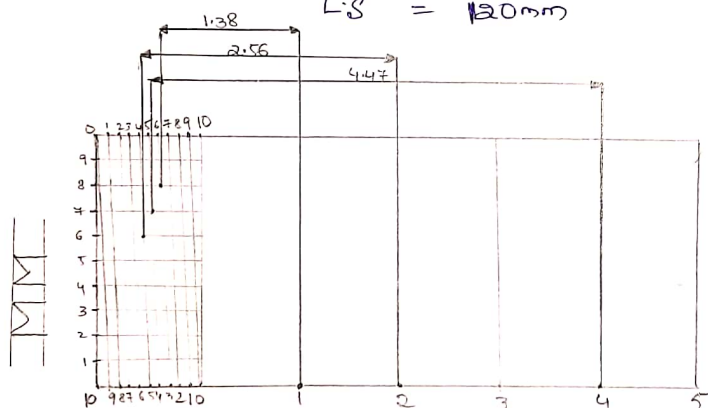
Conclusion

- 1) ...
- 2) ...
- 3) ...
- 4) ...
- 5) ...
- 6) ...
- 7) ...
- 8) ...
- 9) ...
- 10) ...

Q, construct a diagonal scale to read metres, the tenths of a metre or a centimetre to a scale of  $\frac{1}{50}$ . The maximum length is measure upto 6m. And mark on the scale distance is 4.47m, 2.56m, 1.38m.

$$R.f = \frac{\text{Length of drawing}}{\text{actual length of drawing}} = \frac{1}{50}$$

$$\begin{aligned} \text{Length of the scale} &= R.f \times \text{maximum length} \\ &= \frac{1}{50} \times 6m \times 100cm \times 10mm \\ L.S &= 120mm \end{aligned}$$



Q, An area of 144 sq cm on a map represents an area 36 sq km on the field. find the Rf of the scale of this map and draw a diagonal scale to show km, m, cm. Indicating on the scale a distance of 6 km, 7 m, 5 cm

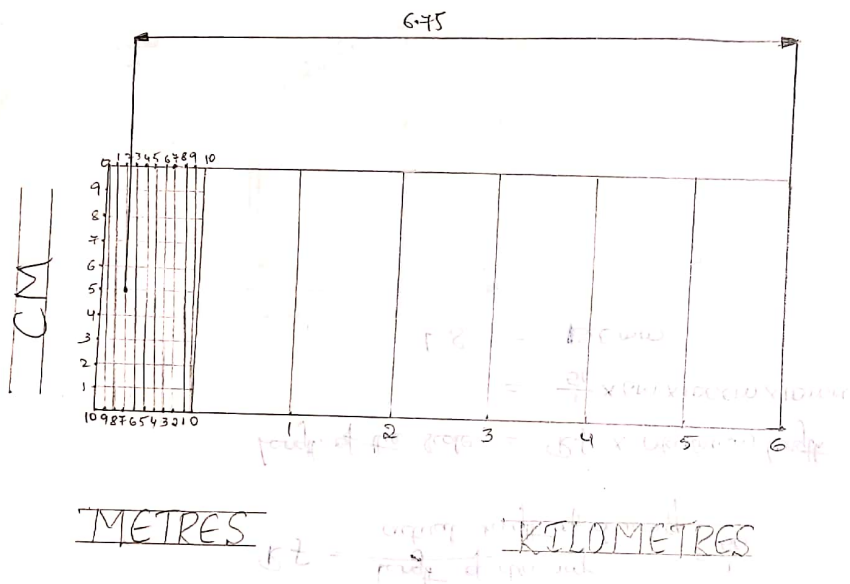
$$Rf = \frac{\text{length of the drawing}}{\text{Actual length of drawing}}$$

$$= \frac{144 \text{ sq cm}}{36 \text{ sq km}} = \frac{2 \text{ cm}}{6 \text{ km}}$$

$$= \frac{2 \text{ cm}}{1 \text{ km}} = \frac{2}{1000 \times 100}$$

$$= \frac{2}{100000} = \frac{1}{50000}$$

$$= 2 \times 10^{-5}$$



$$L.S = Rf \times \text{maximum length}$$

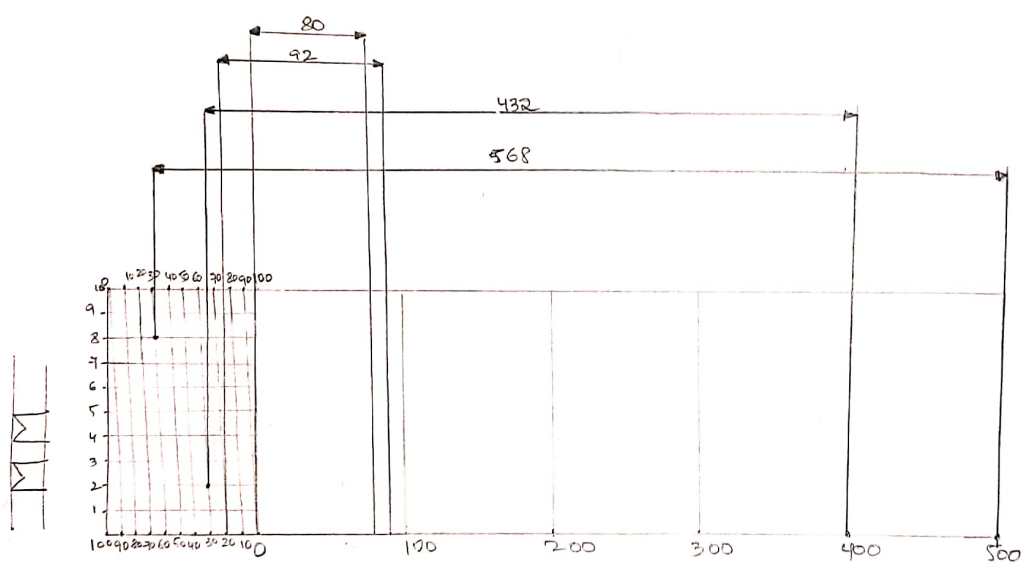
$$= 2 \times 10^{-5} \times 7 \text{ km} \times 1000 \times 100 \times 10$$

$$L.S = 140 \text{ mm}$$

1.824  
 The maximum length of the scale is 7 km. The scale is drawn in such a way that the distance of 6 km, 7 m, 5 cm is indicated on the scale.



Q, The actual length is 500m is represented by a line of 15cm on a drawing construct a diagonal scale to read upto 600meter. Mark on a length of 568 meters, 432m, 22m, 80m



$$R.f = \frac{\text{length of drawing}}{\text{Actual length of drawing}}$$

$$= \frac{15}{500 \times 100}$$

$$R.f = 3 \times 10^{-4}$$

$$L.S = R.f \times \text{maximum length}$$

$$= 3 \times 10^{-4} \times 600 \times 10$$

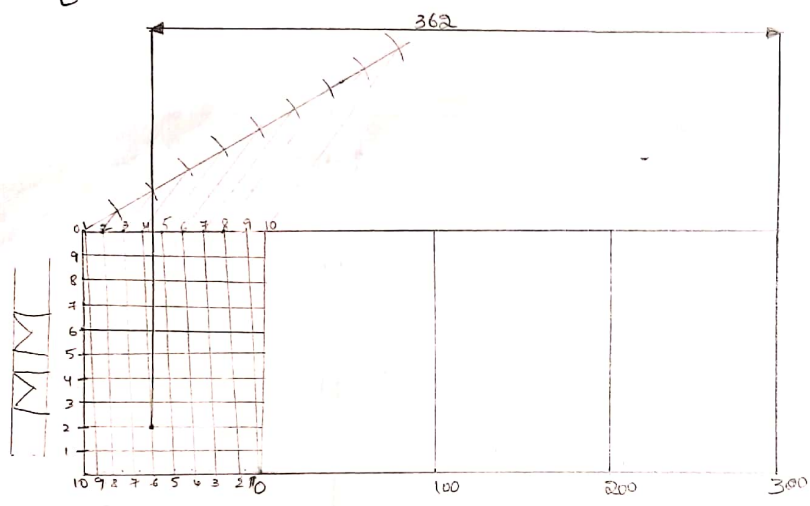
$$L.S = 180 \text{ mm}$$

of scale CM

METRES

Draw a diagonal scale to read upto 600 meter. Mark on a length of 568 meters, 432m, 22m, 80m

Q, A rectangular field of 2500 m<sup>2</sup> on a map by a rectangle of  $\frac{5\text{cm}}{100\text{m}}$  <sup>by 4cm</sup> scale calculate the R.F.  
 Draw a diagonal scale to read upto single meter and long enough measure upto 500 m. Mark a length of 362 m on a scale.



$$R.f = \frac{\text{length of the drawing}}{\text{actual length of the drawing}}$$

$$= \frac{20\text{cm}}{\frac{2500\text{m}^2}{250}}$$

$$= \frac{\sqrt{250}\text{cm}}{\sqrt{25000}} \frac{1\text{cm}^2}{150\text{m}^2}$$

$$= \frac{1}{353.5} \times 100$$

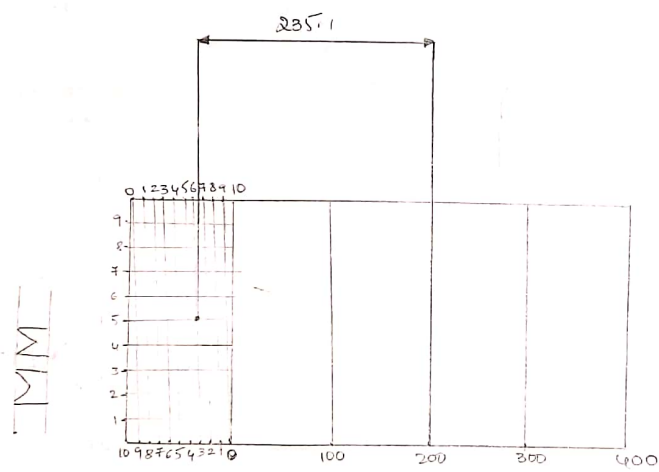
$$= 2.8$$

$$L.S = R.f \times \text{Maximum length}$$

$$= 2.8 \times 500 \times 100 \times 10$$

$$= 140000$$

5, The area of field is 50000 sqm the length and breadth of the field on the map 10cm and 8cm respectively, construct a diagonal scale which can be read upto 1m mark the length of 235m on the scale what is the Rf of the scale.



$$R_f = \frac{\text{length of the drawing}}{\text{Actual length of the drawing}}$$

$$= \frac{80\text{cm}^2}{50000\text{m}^2}$$

$$= \frac{\sqrt{80\text{cm}}}{\sqrt{50000\text{m}}}$$

$$= \frac{8.94\text{cm}}{223.6 \times 100}$$

$$= 3.9\text{cm}$$

$$L.S = R_f \times \text{Maximum value should read upto 250}$$

$$= 3.9 \times 250 \times 100$$

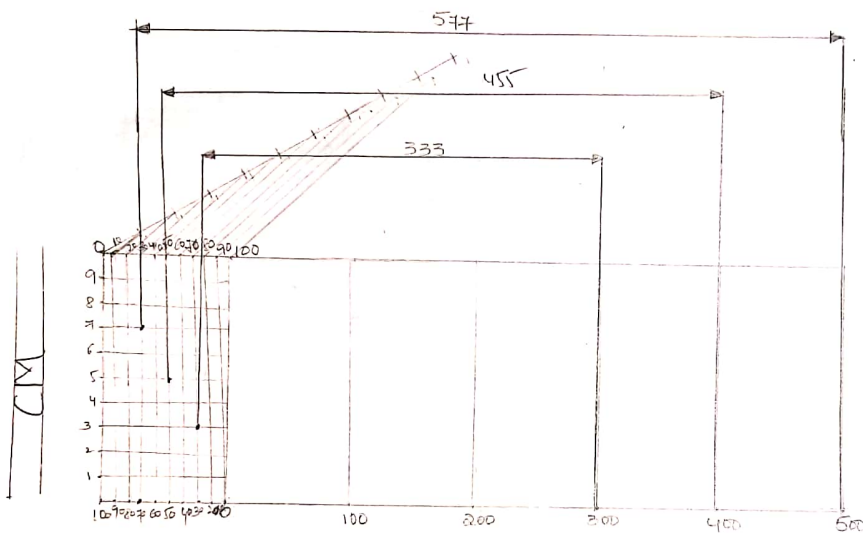
$$= 975$$

$$= 1000\text{cm}$$

CM

METRES

Q, The distance between two stations A and B is 100 km and its equivalent distance on a railway map measures 2.5 cm what is the R.f.? Draw a diagonal scale showing single km and show on the scale the following distances are 577 km, 455 km, 333 km



$$R.f = \frac{\text{length of the drawing}}{\text{Actual length of the drawing}}$$

$$= \frac{2.5 \text{ cm}}{100 \text{ km}}$$

$$= \frac{2.5}{100 \times 1000 \times 1000}$$

$$= 2.5 \times 10^{-7}$$

$$L.S = R.f \times \text{maximum length}$$

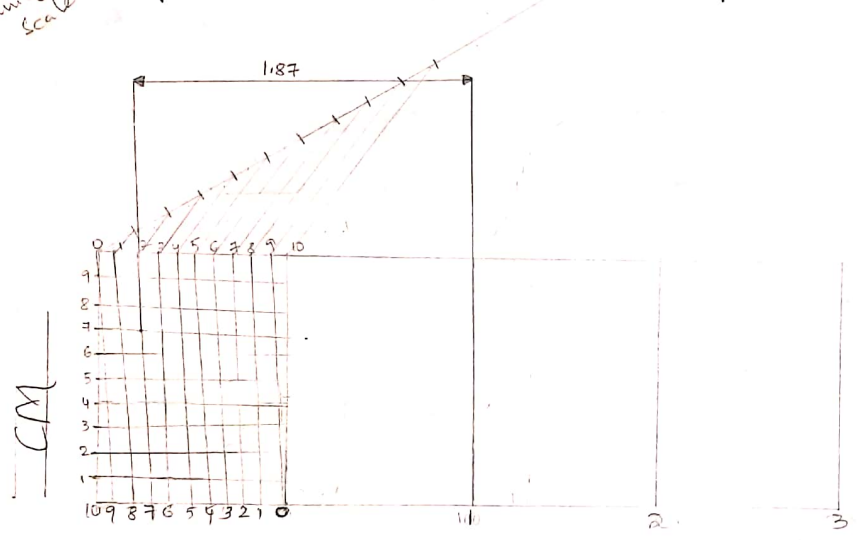
$$= 2.5 \times 10^{-7} \times 600 \times 1000 \times 100 \times 10$$

$$= 150 \text{ mm}$$



Q. An area of  $63 \text{ cm}^2$  on a map represents an area of  $1.75 \text{ km}^2$  on a field. Construct a scale to measure upto  $2.5 \text{ km}$  and capable to show  $100^{\text{th}}$  of  $\text{km}$ . Indicate  $1.87 \text{ km}$  on the scale.

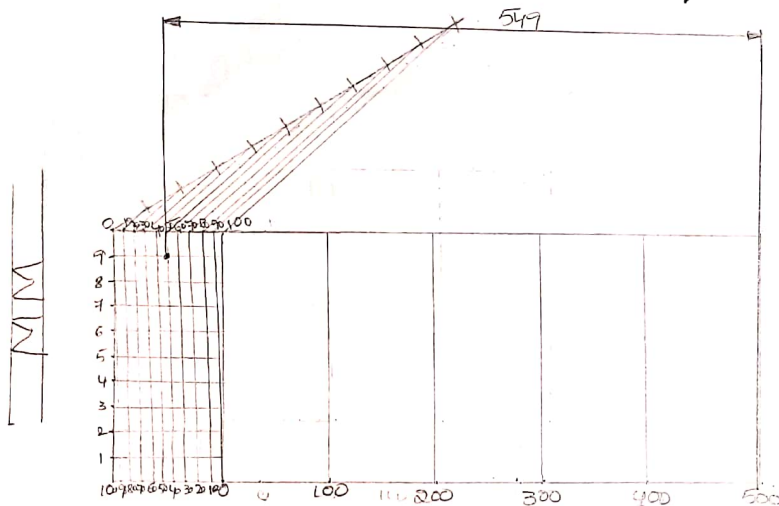
Vertical scale



$$\begin{aligned}
 R.F &= \frac{\text{length of the drawing}}{\text{actual length of drawing}} \\
 &= \frac{63 \text{ cm}^2}{1.75 \text{ km}^2} = \frac{\sqrt{63} \text{ cm}}{\sqrt{1.75} \text{ km}} \\
 &= \frac{7.9 \text{ cm}}{1.3 \times 1000 \times 100} \\
 &= 6.07 \times 10^{-5} \\
 L.S &= R.F \times \text{Maximum length} \\
 &= 6.07 \times 10^{-5} \times 2.5 \times 1000 \times 100 \times 10 \\
 &= 151 \text{ (rounded to 150)}
 \end{aligned}$$

Handwritten notes at the bottom of the page, which are mostly illegible due to being upside down or too faint. Some words like 'Scale', '100th', and 'km' are visible.

Q. The area of square shaped land is equal to 0.6561 Hectares which is represented on a map by a similar square shape of 9.84 cm. Calculate the R.F of the Map based on the R.f value, construct a diagonal scale to read upto maximum of metre on the map. The require maximum scale to be measure 700 m. Show a dimensions of 549 m in the scale.



10 M = 1 decametre  
 $R.f = \frac{\text{Length of the drawing}}{\text{Actual length}}$

$$= \frac{9.84 \text{ cm}}{0.6561 \text{ Hectares}}$$

$$= \frac{\sqrt{9} \text{ cm}}{\sqrt{0.6561} \text{ Hec}} = \frac{3 \text{ cm}}{0.81 \text{ Hec}}$$

$$= \frac{3}{0.81 \times 10^4 \text{ cm}} = 3.7 \times 10^{-4}$$

$$L.S = R.f \times \text{maximum length}$$

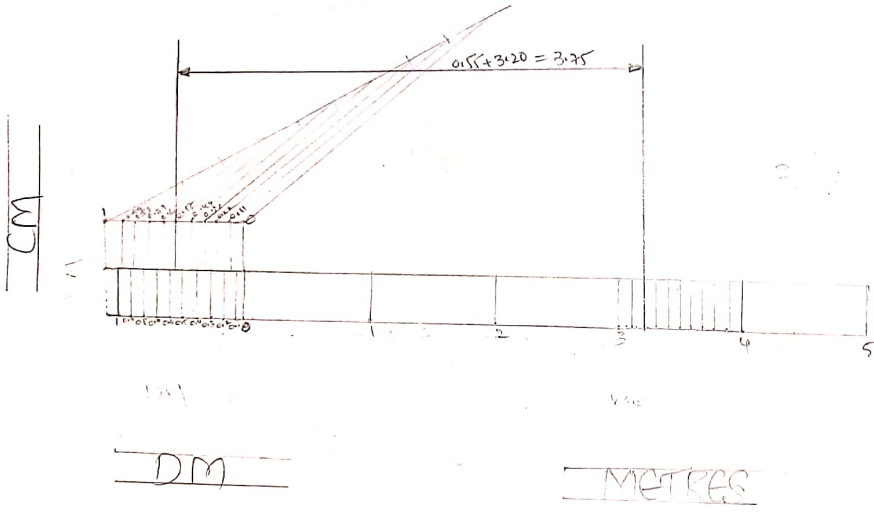
$$= 3.7 \times 10^{-4} \times 700 \times 100 \times 10$$

$$= 259 \text{ mm (round upto 260)}$$

CM METRES  
 130  
 130  
 1:2 ratio

Q, A vernier scale

↳ Draw a vernier scale of R.f  $\frac{1}{75}$  to show metres, Decimetres, centimetres and to measure upto 6m.  
 Mark the length of 3.75m



(20)  
 - Increasing Scale to 100  
 2:1  
 $R.f = \frac{\text{length of the drawing}}{\text{Actual length of drawing}}$   
 $= \frac{1}{75}$

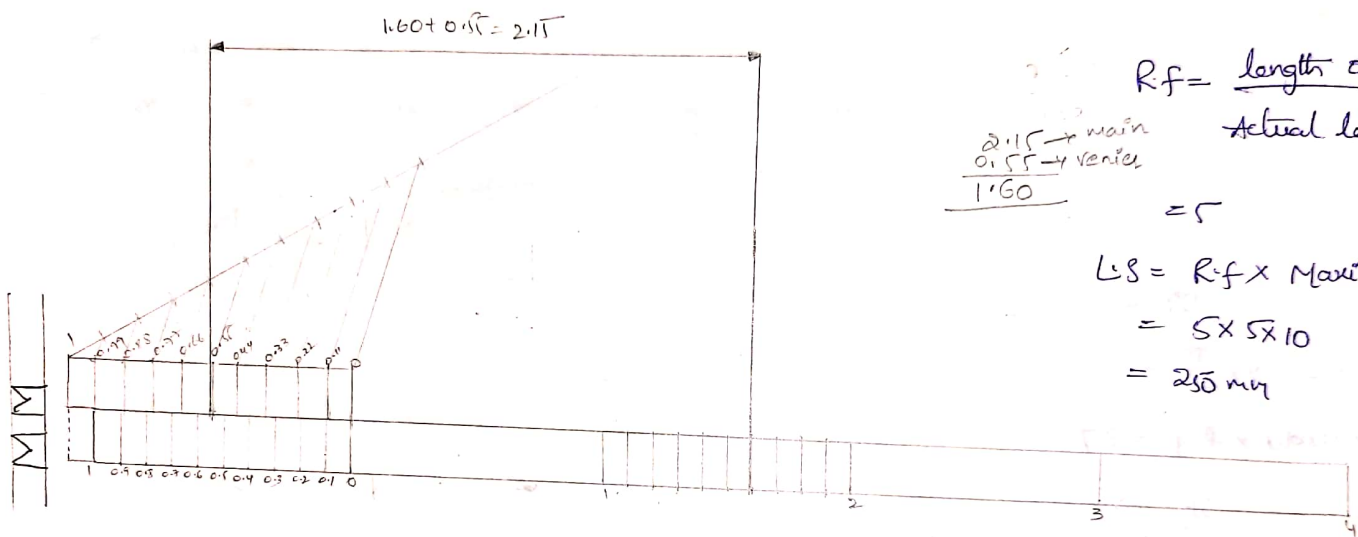
$L.S = R.f \times \text{Maximum length}$   
 $= \frac{1}{75} \times 6 \times 100 \times 10$   
 $= 80$

[Increasing scale to 100 means 2:1]

[Again reduce scale to 100 to remove decimal values]

5) If comparing a vernier scale of R.f = 1/75 to measure upto 6m mark centimetre upto 10mm.

2, A construct of vernier scale of R.f=5 to measure upto 5cm mark on the scale distance 2.15cm.



$$R.f = \frac{\text{length of drawing}}{\text{Actual length of drawing}}$$

$$\frac{2.15 \text{ (main)}}{0.55 \text{ (vernier)}} = \frac{1.60}{5}$$

$$L.S = R.f \times \text{Maximum length}$$

$$= 5 \times 5 \times 10$$

$$= 250 \text{ mm}$$

MM

CM

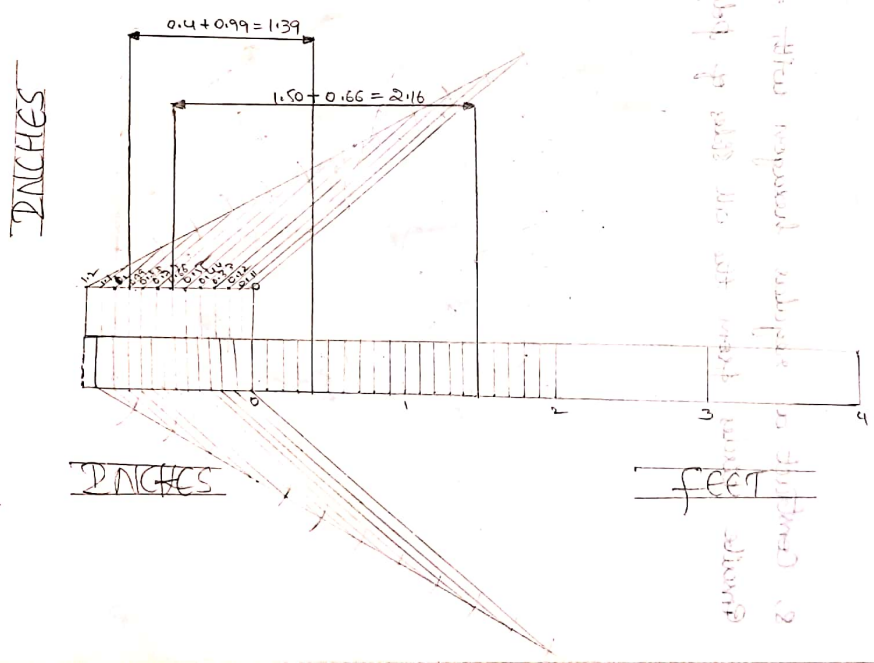
What is the purpose of vernier?

It is used to measure the length of an object with a higher accuracy than a main scale. It is used to measure the length of an object with a higher accuracy than a main scale.



2) Draw of a vernier scale of  $R_f = 5$  to read <sup>1.25 cm</sup> toward and measure upto 5 cm mark on the scale distance ~~the~~ 2.15 cm)

3) Construct a vernier scale of  $1\frac{1}{4}'' = 1$  foot to measure upto 5 feet and showing feet and inches. Indicate the distance of 2.16 feet, 1.39 feet.



$$\frac{0.99}{1.39}$$

$$\frac{2.16}{2.76}$$

$$R_f = \frac{\text{length of drawing}}{\text{Actual length of drawing}}$$

$$= 1\frac{1}{4}''$$

$$= 0.25'$$

$$= 1 + 0.25$$

$$= \frac{1.25}{1 \times 12} = 0.104$$

$$L.S = R_f \times \text{Maximum length}$$

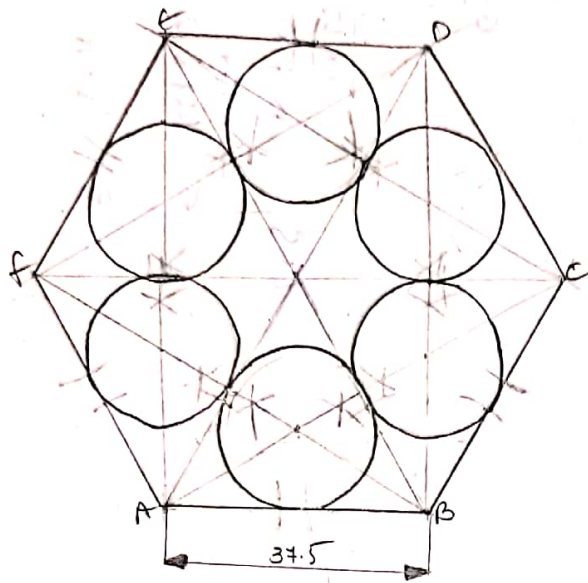
$$= 0.104 \times 12 \times 25.4$$

$$= 158.77 \text{ [Reduced to 150]}$$

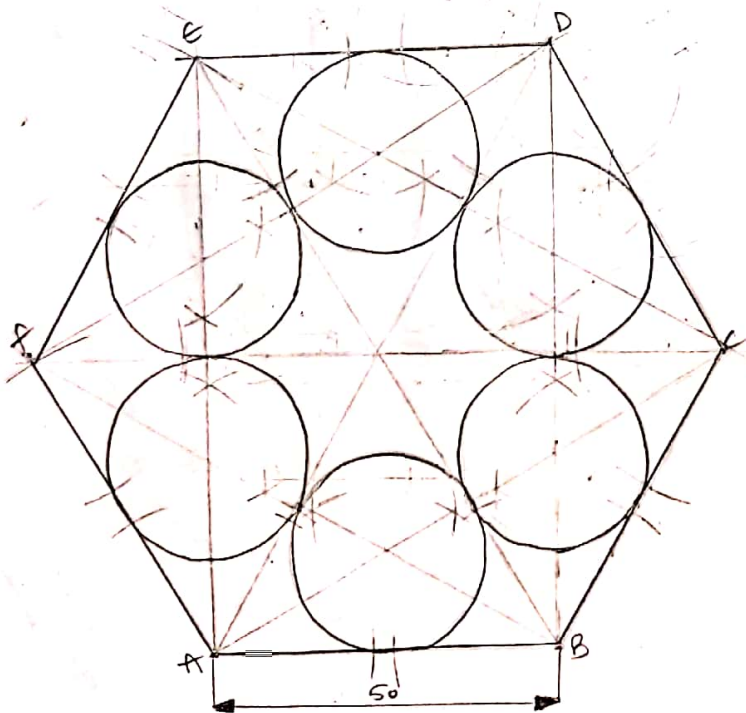
Polygon

7, Construct a regular hexagon with 80mm Sides and Inscribe circles from the all sides of polygon.

10 Ans

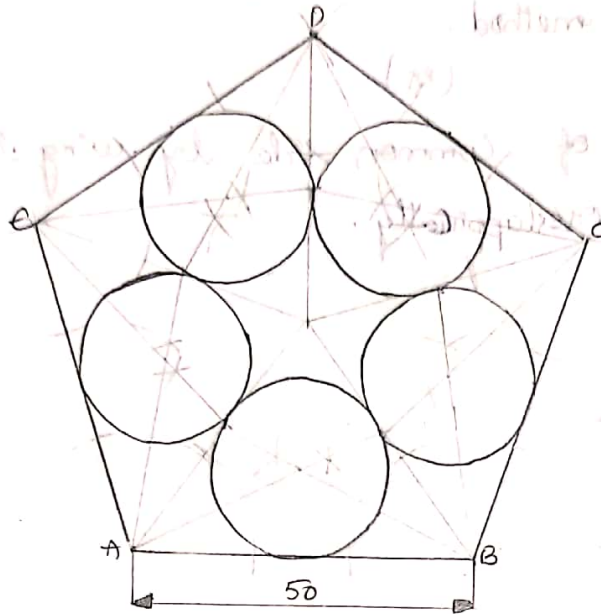


8, Construct a regular hexagon with 50mm Sides and Inscribe circles from the all sides of polygon.



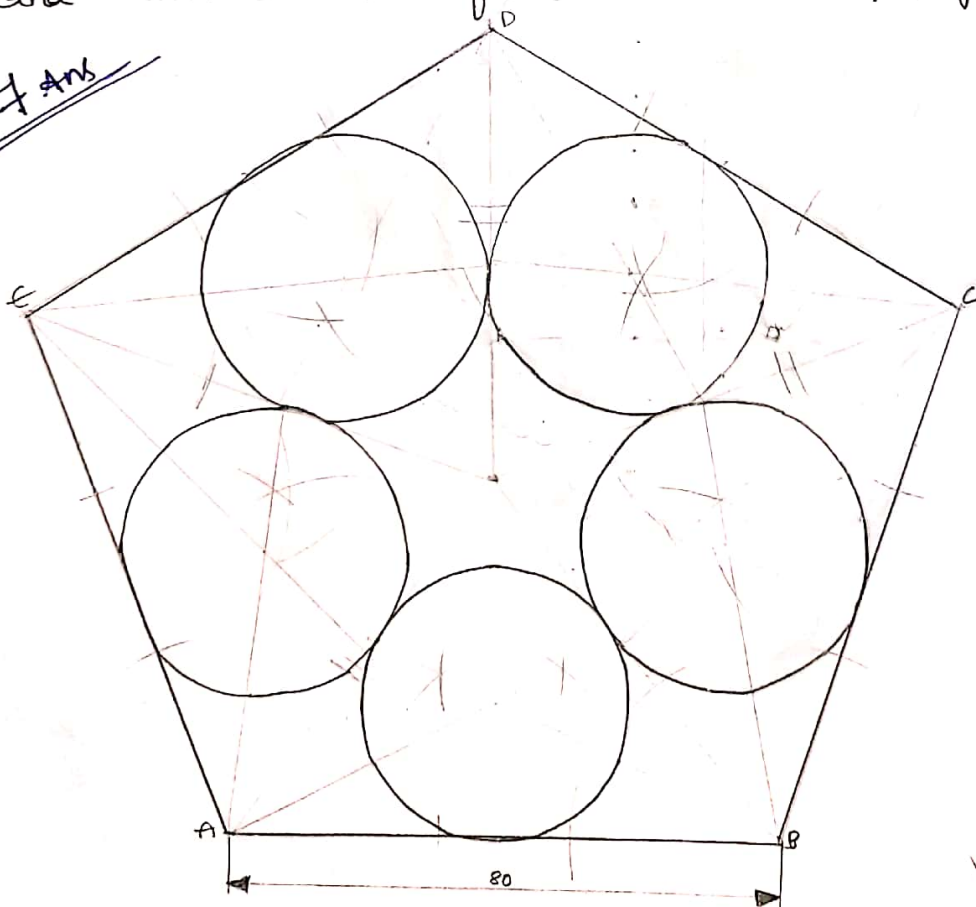
Handwritten notes in red ink on the right margin of the page, including calculations and construction instructions. Some legible parts include:  
 $107.15 = \frac{1}{2} P$   
 $107.15 = 2.89 P$   
 $P = \frac{107.15}{2.89}$   
 $P = 37.08$   
 (Diameter of circle) (37.08)

9, Construct a regular pentagon with 50mm sides and inscribe circles from the all sides of polygon.



10, Construct a regular hexagon with 37.5mm sides and inscribe circles from the all sides of polygon.

7 Ans

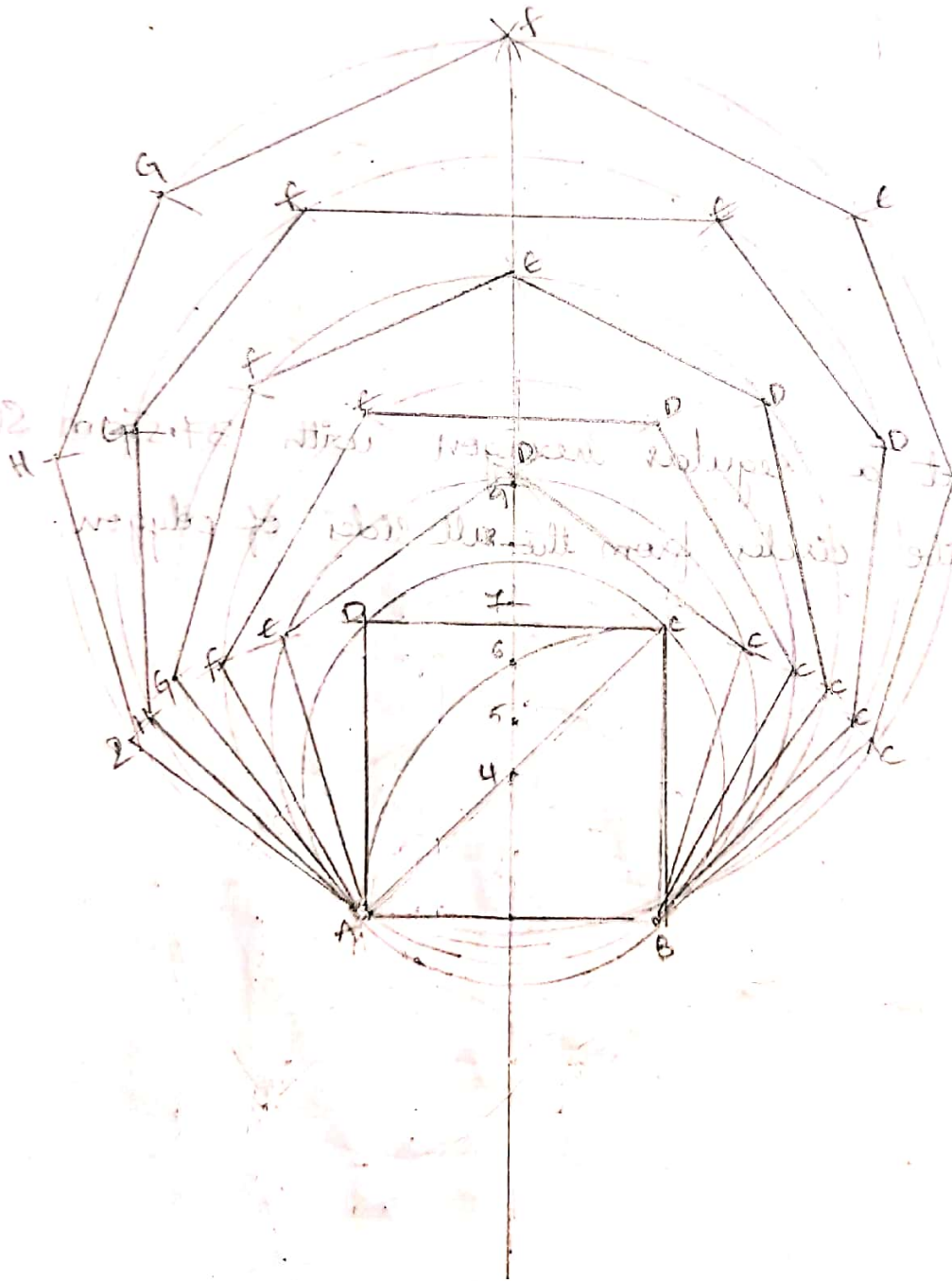


# OVER LAPPING

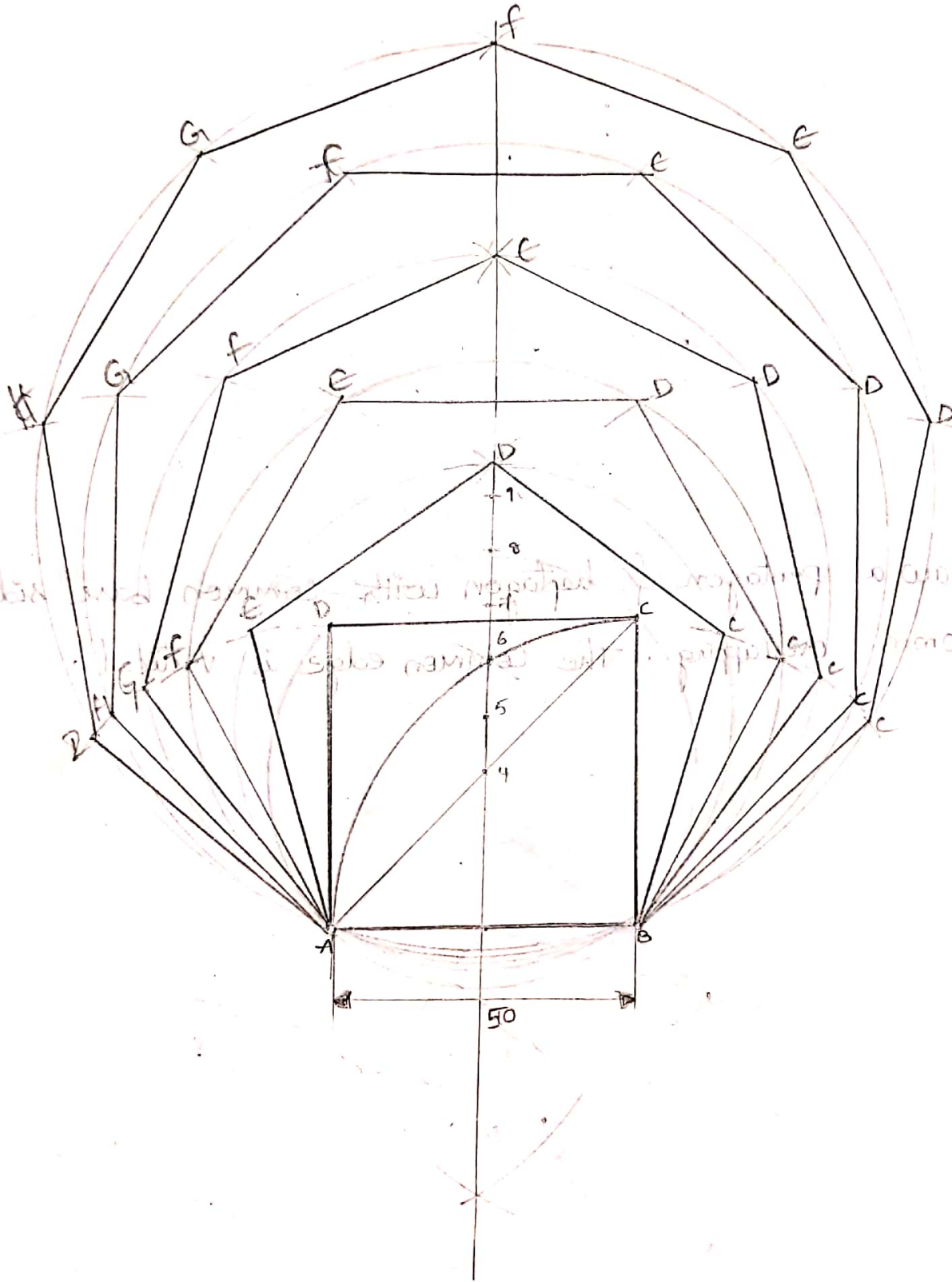
1, Draw a Square, pentagon, hexagon, heptagon, octagon, nonagon with the same common edge of 40mm sides by using of overlapping method.

(or)

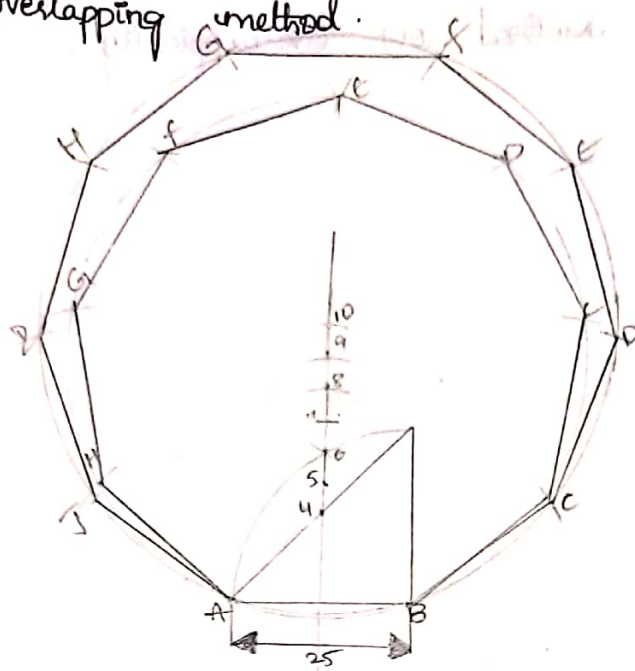
Draw the polygons of common side by using the overlapping method (or) overlappically.



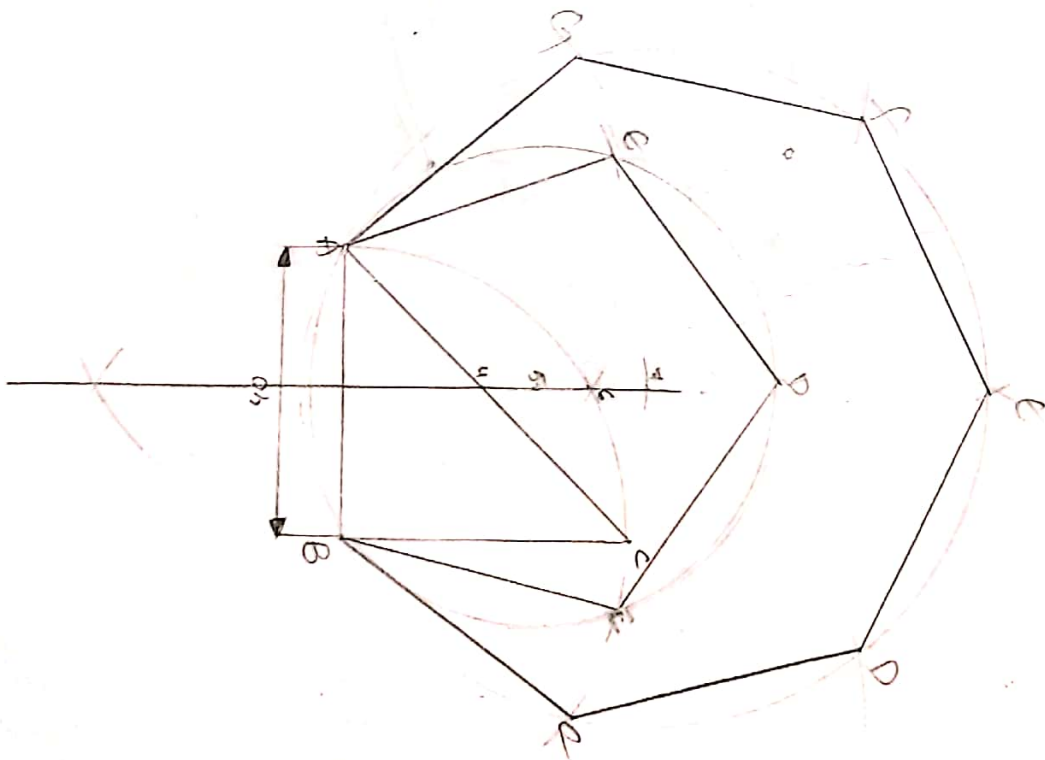
2, Draw the polygons of common side by using the overlapping method (or) overlappically.



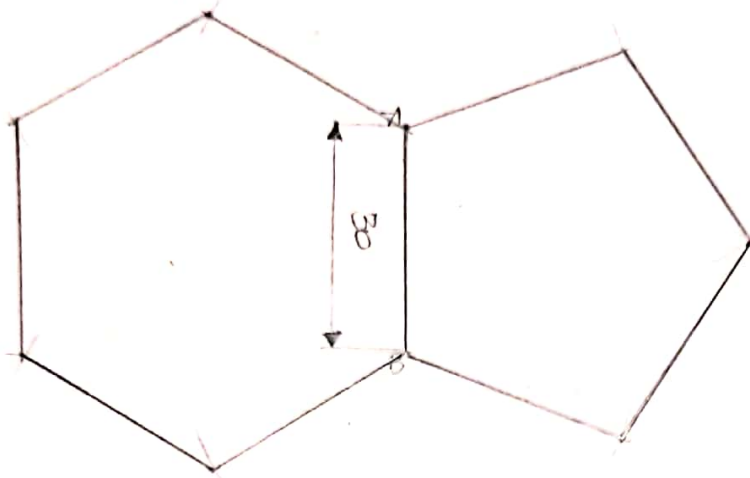
3, Draw a Nonagon & Decagon with side 25mm by using overlapping method.



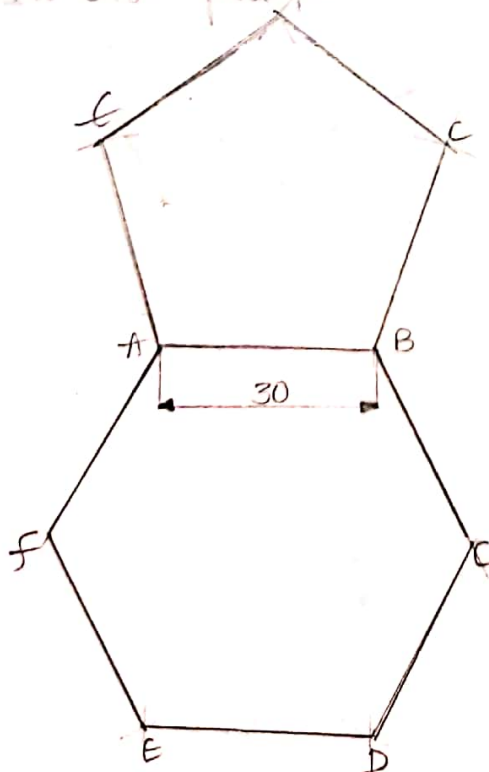
4, Draw a pentagon & heptagon with common base side is 40mm overlapping. The common edge is vertical.



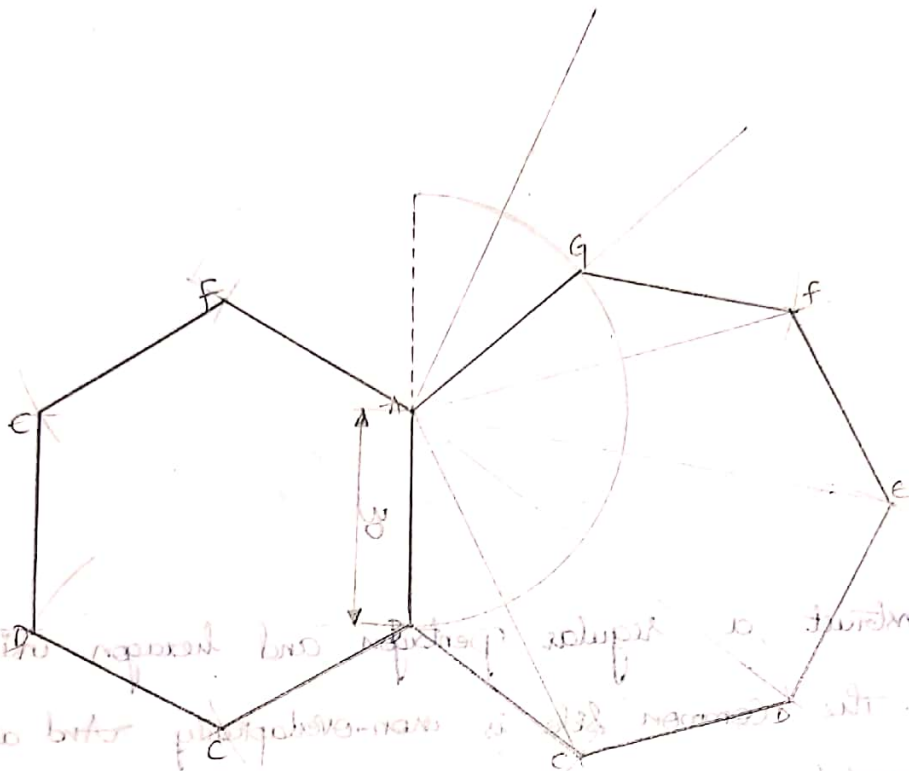
5, Construct a regular Pentagon and hexagon with 30mm side. The common side is non-overlappingly. And also it is vertical.



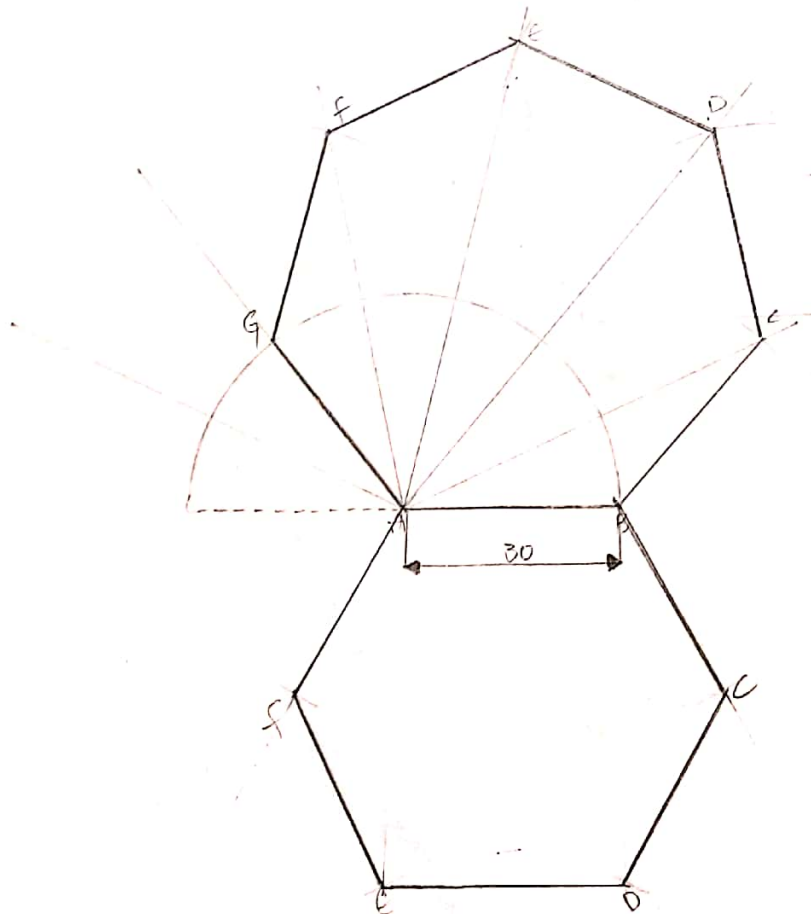
6, Construct a regular Pentagon and hexagon with 30mm side. The common side is non-overlappingly. And also it is horizontal.



7, Construct a regular hexagon and heptagon with 30mm side. The common side is non-overlappingly. And also it is vertical.

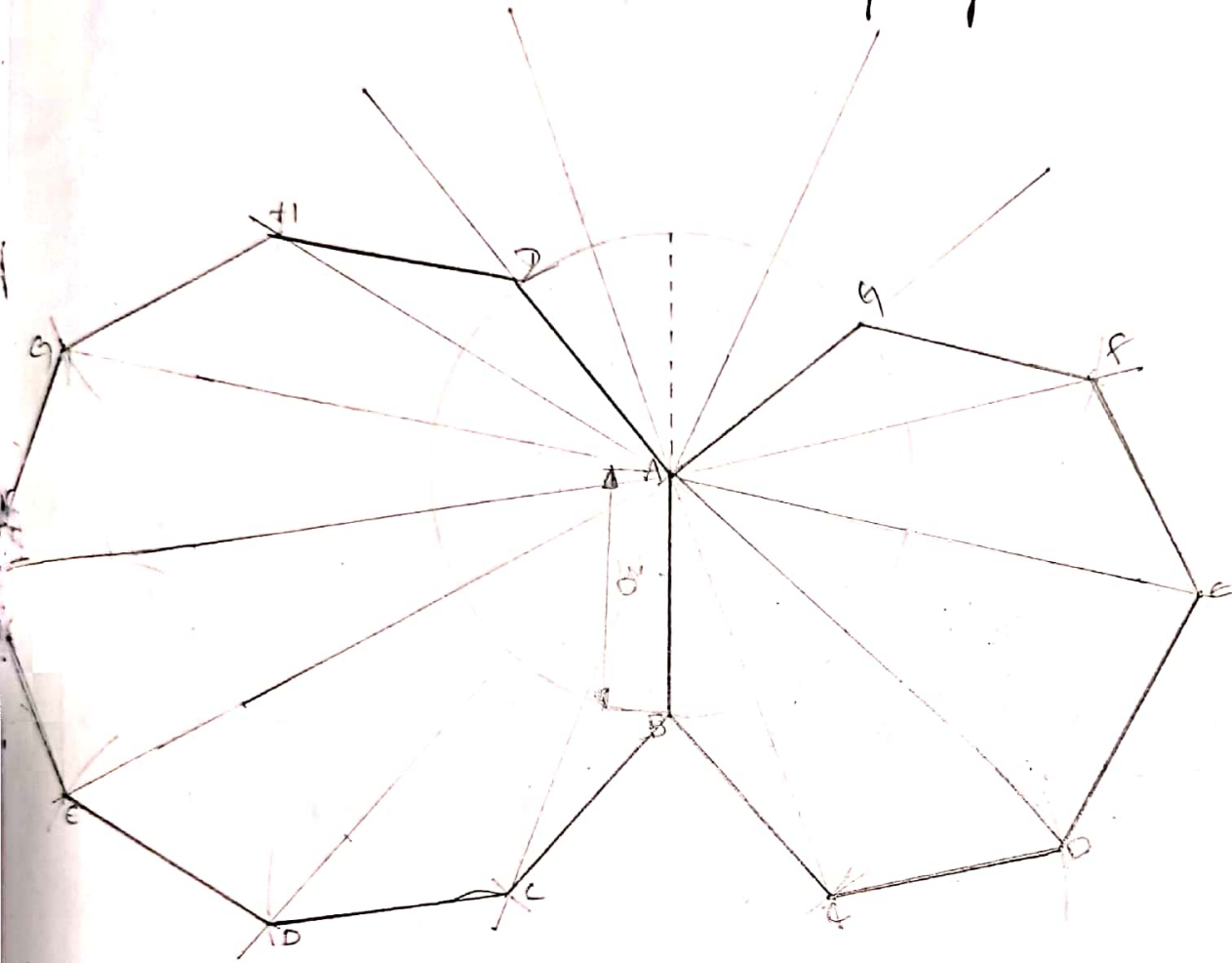


8, Construct a regular hexagon and heptagon with 30mm side. The common side is non-overlappingly. And also it is horizontal.



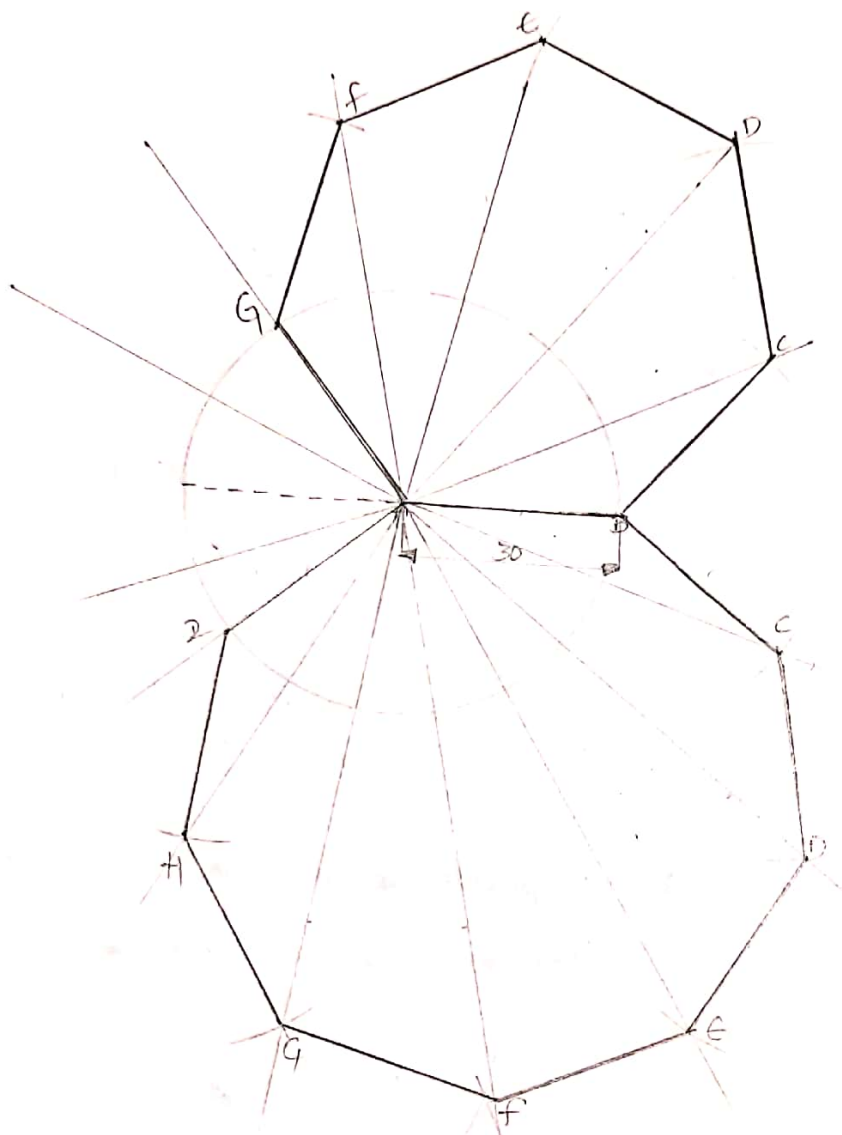


Q, Construct a regular heptagon and nonagon with 30mm side.  
 The common side is non-overlappingly. And also it is vertical.

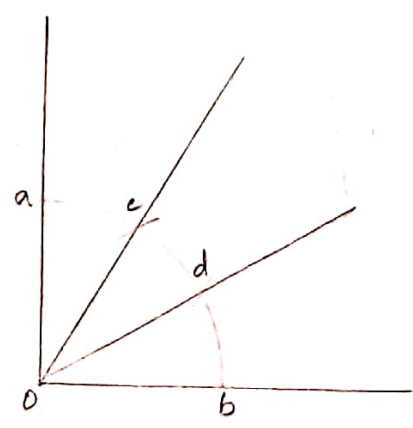


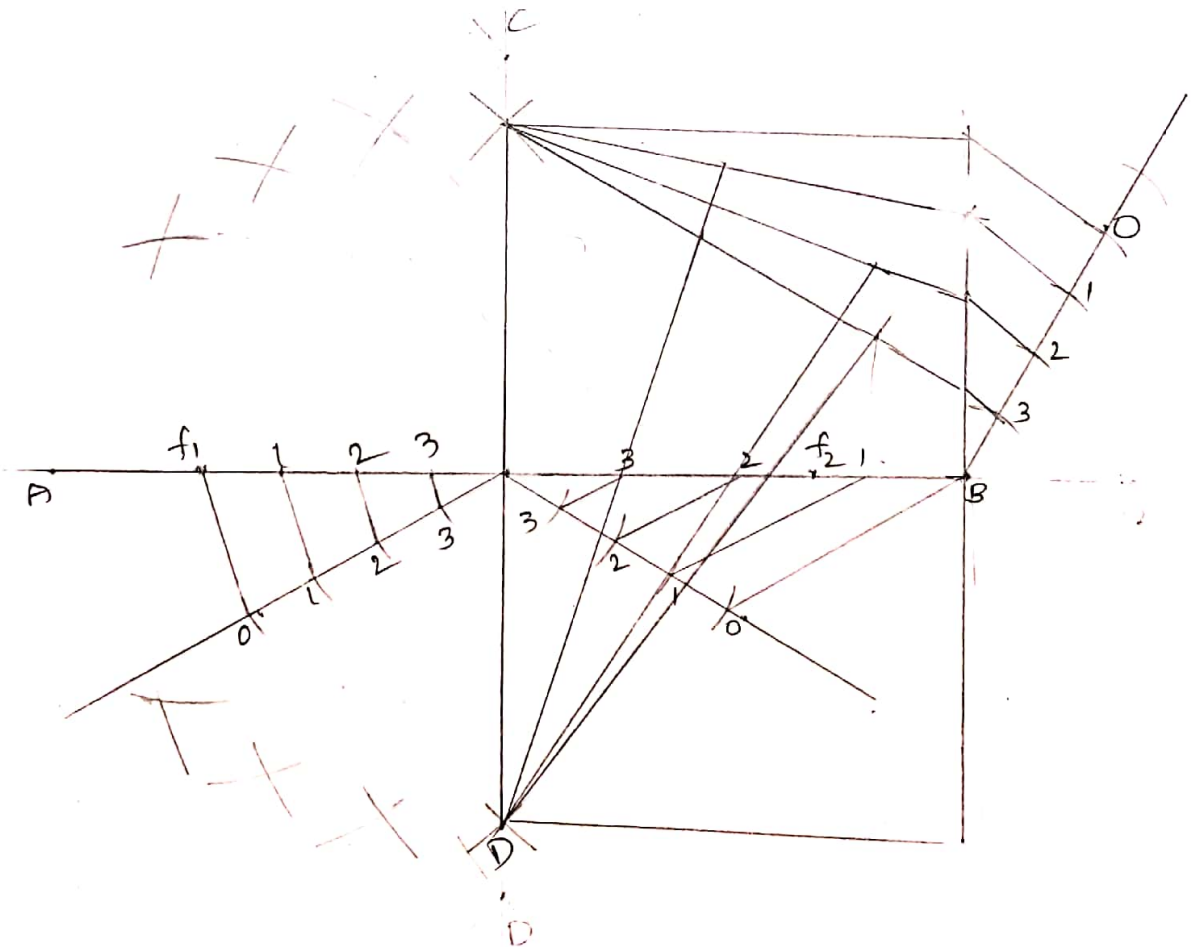
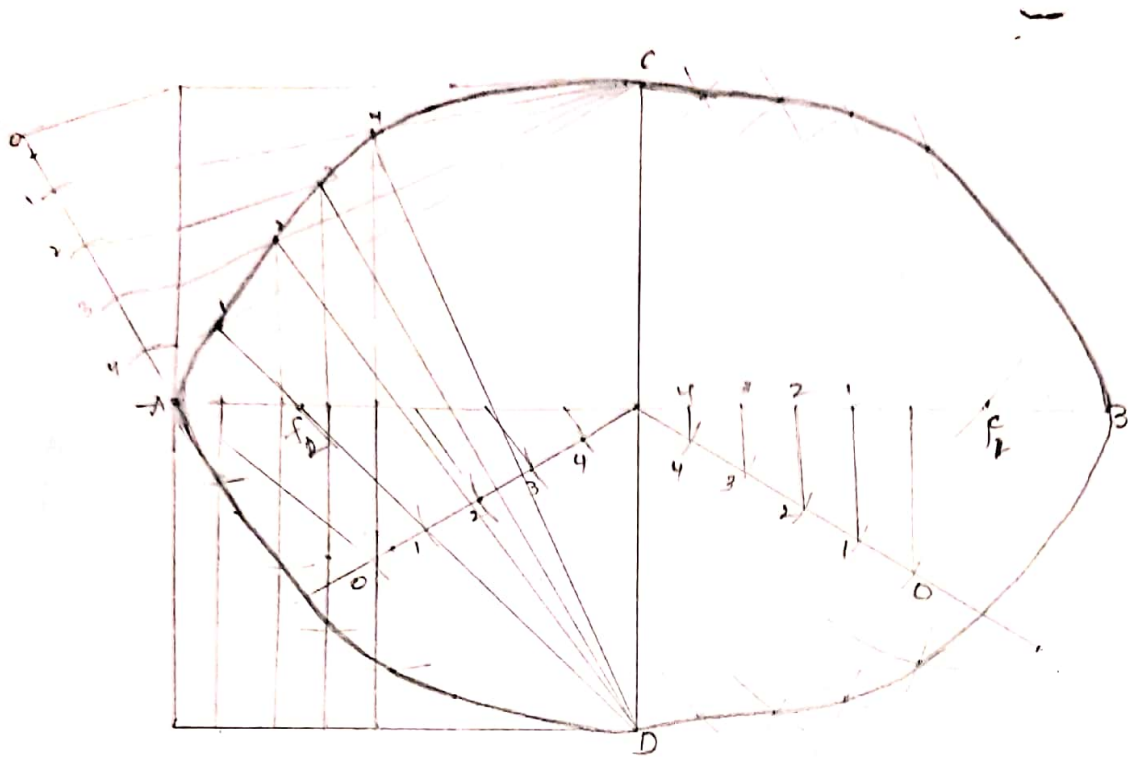
Construct a regular heptagon and nonagon with 30mm side. The common side is non-overlappingly. And also it is vertical.

10, Construct a regular heptagon, nonagon, with 30mm sides. the common side is non-overlapping and also it is horizontal

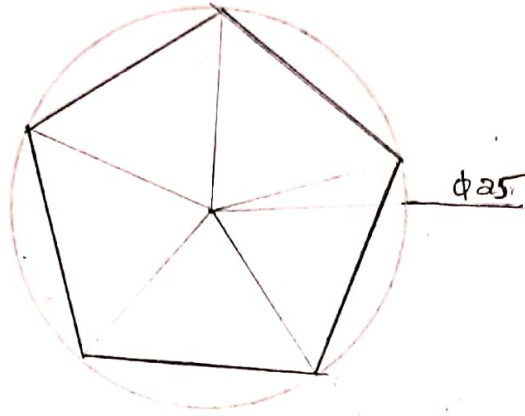


11. Construct a  $90^\circ$  right angle with 50mm sides and trisect the right angle. half of the radius

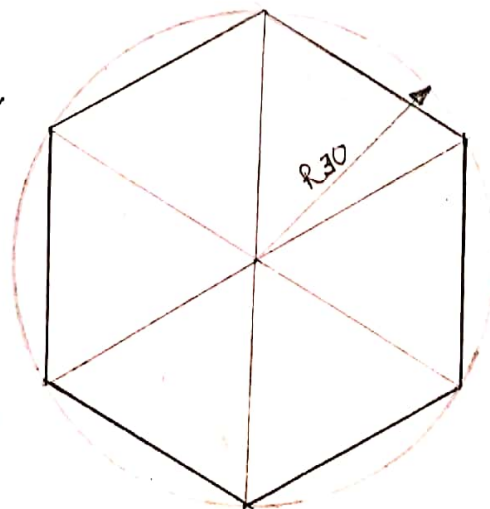




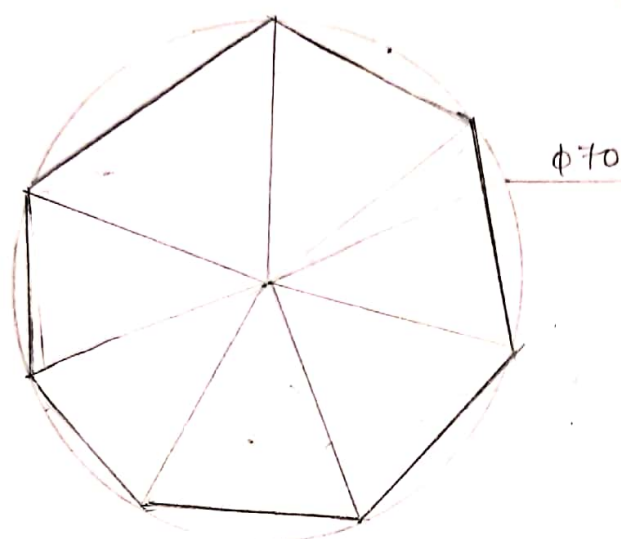
1, Draw a 50mm dia circle and inscribe a pentagonal polygon in it.



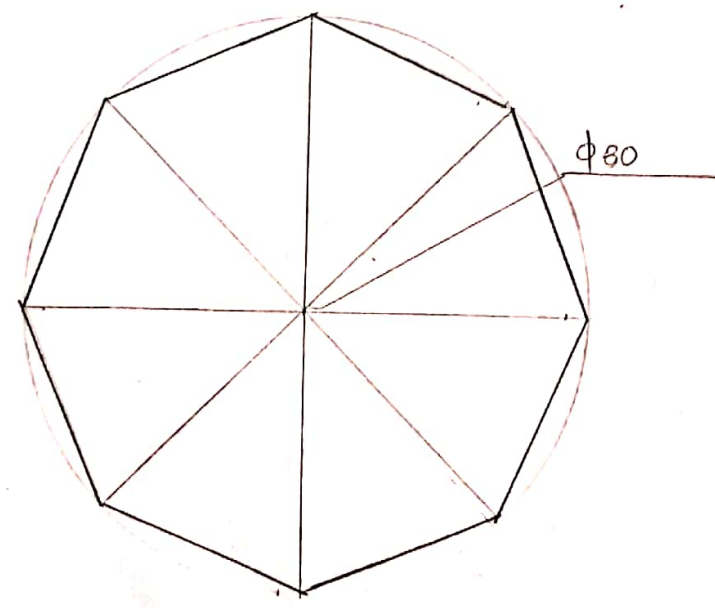
2, Construct a hexagon is inscribe in a 30mm radius circle.



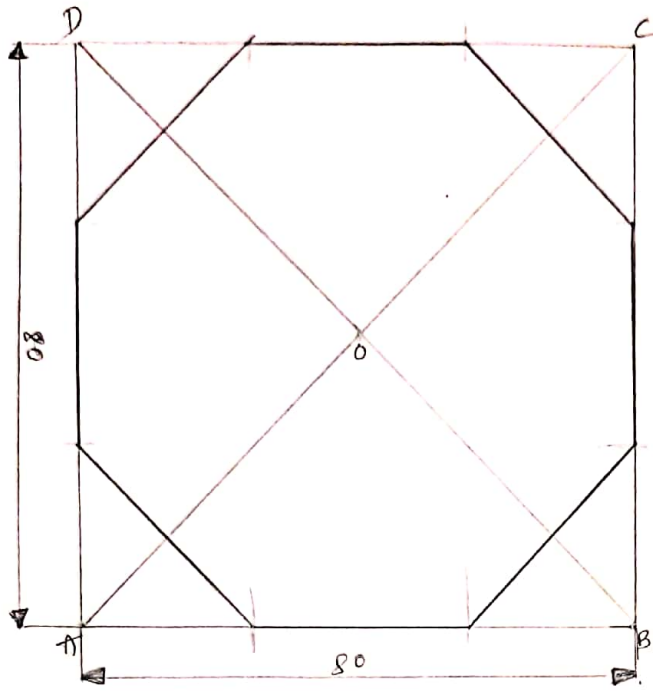
3, Draw a Heptagon is <sup>inscribed</sup> inscribing in a 70mm dia of circle.



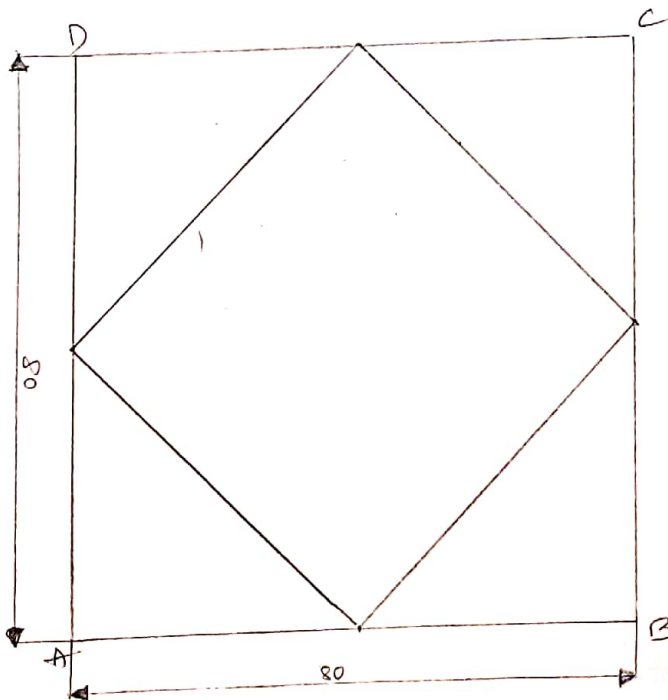
4, Inscribe a octagon in a 80mm dia of circle.



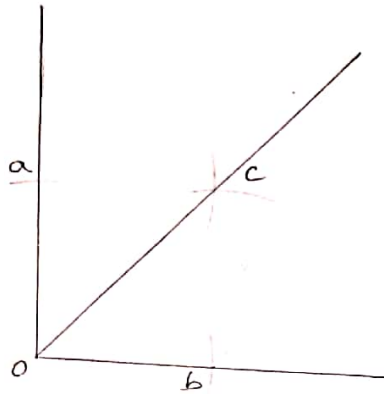
5, Construct a  $80 \times 80$  mm square and inscribe a ~~hexagon~~ octagon in it.



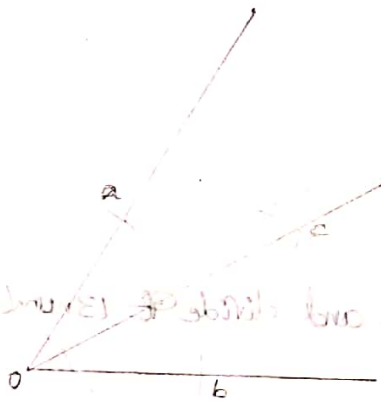
6, Construct a  $80 \times 80$  mm square and draw another square in it from the vertices of sides.



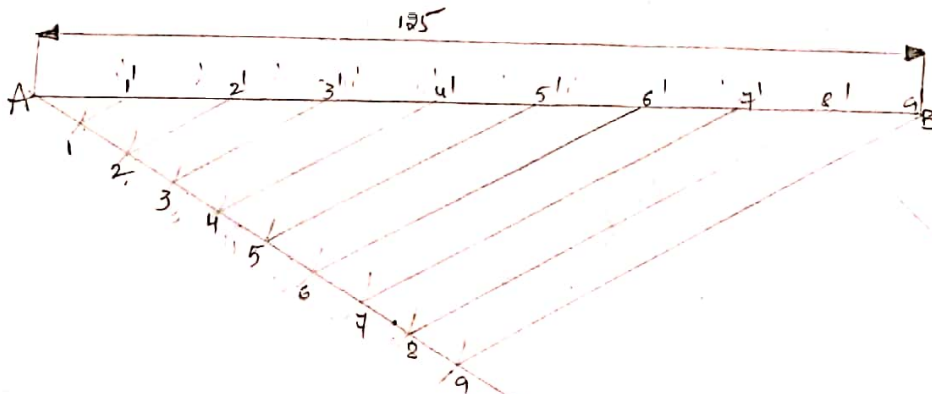
12, Construct a  $90^\circ$  right angle with 50mm sides and bisect the right angle.



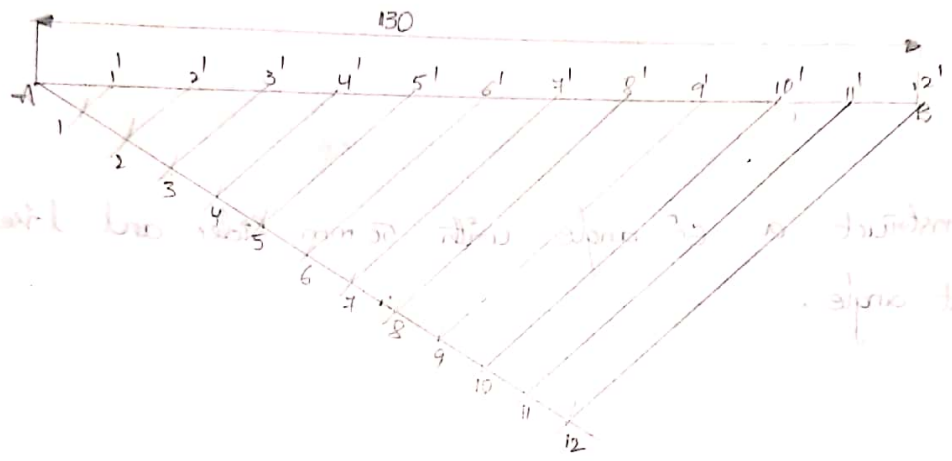
13, Construct a  $60^\circ$  angle with 50mm sides and bisect the right angle.



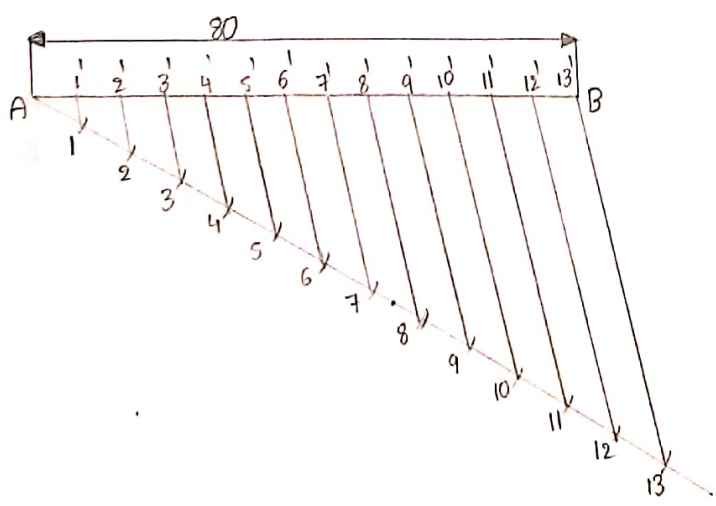
14, Draw a 125mm long line and dividing it 9 number of equal parts



15, Construct a horizontal straight line with your convenient distance and make it 12 number of equal parts.



16, Draw a 80mm long line and divide it 13 number of equal parts.

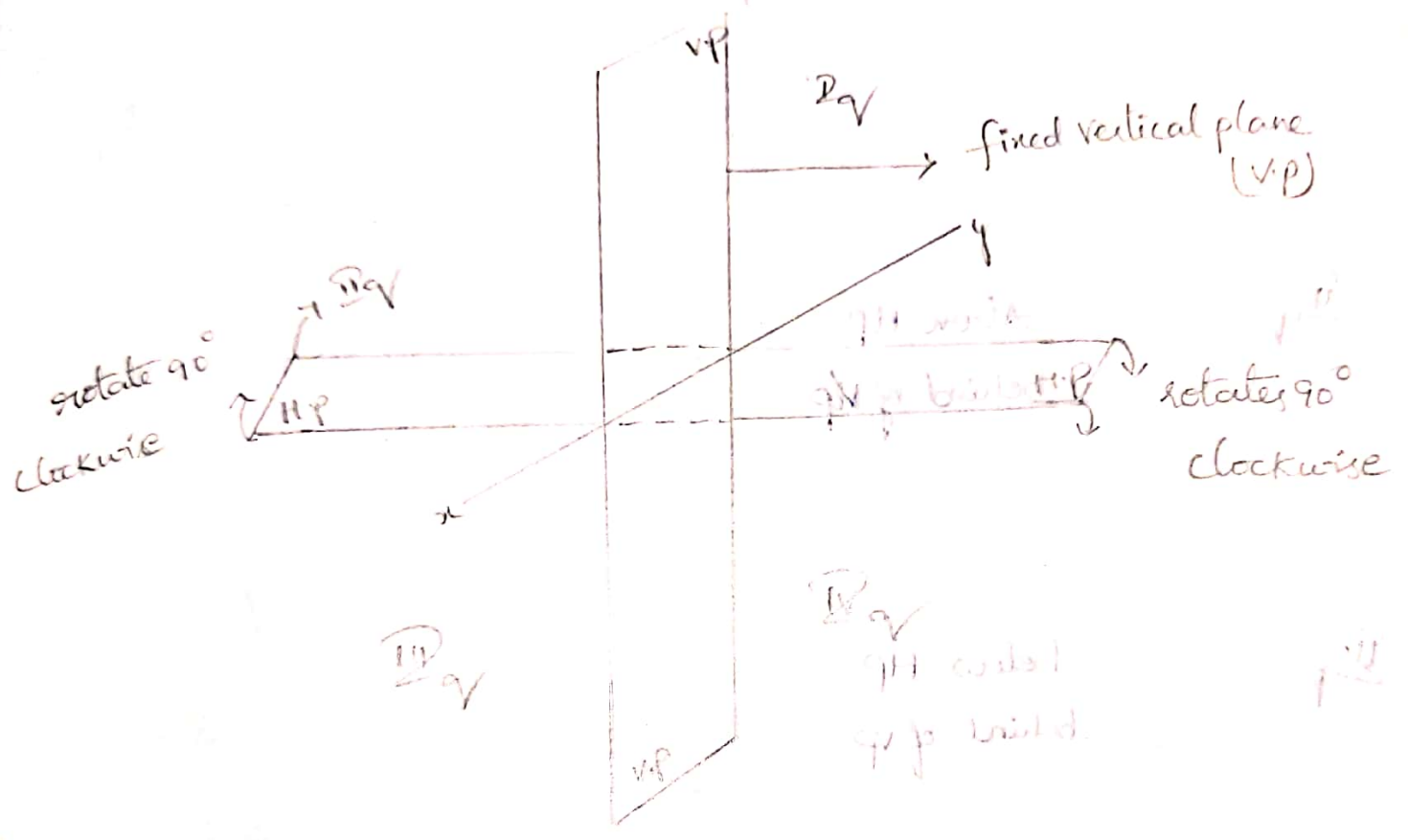




12-10-19

UNIT-2

PROJECTION OF POINTS



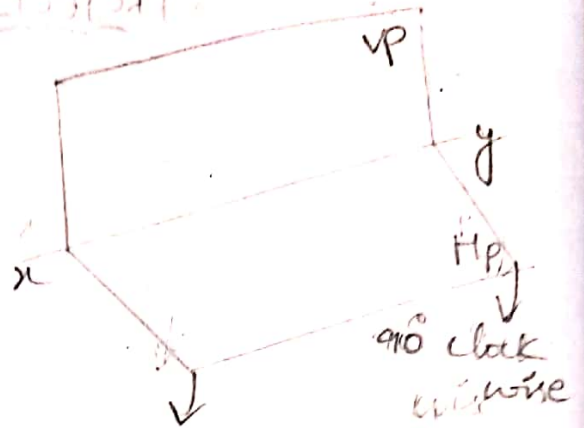
Quadrant

Condition

Pictorial Position

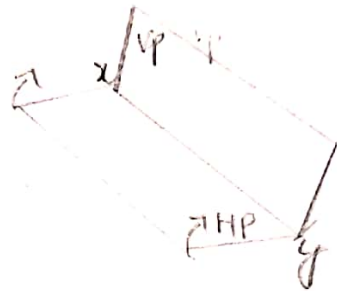
I<sub>q</sub>

Above HP  
Front of VP



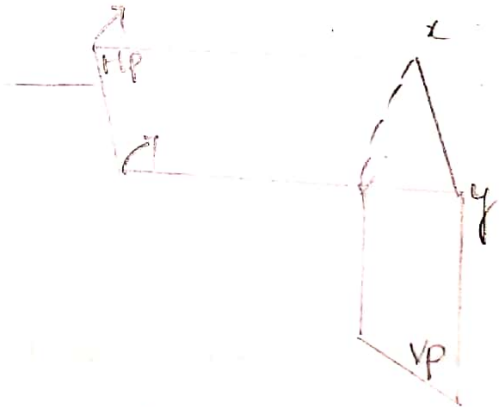
II<sub>q</sub>

Above HP  
behind of VP



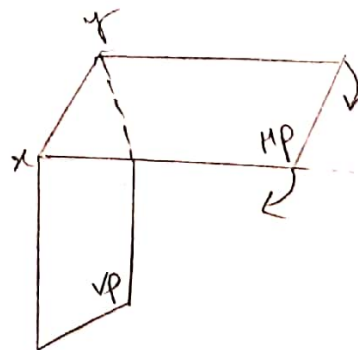
III<sub>q</sub>

below HP  
behind of VP



IV<sub>q</sub>

below HP  
Front of VP

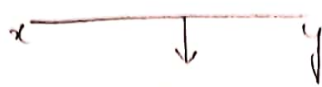


Position

Above HP



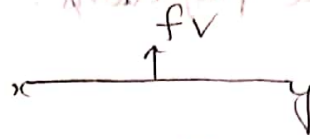
in front of VP



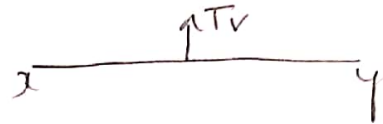
Above HP ----- a', b', c' ----- z' ; [f.v]

in front of VP ----- a, b, c ----- z ; [T.v]

Above HP [fv]

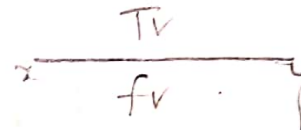
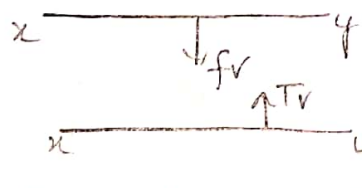


Behind of VP [T.v]



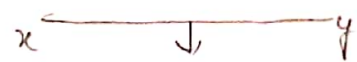
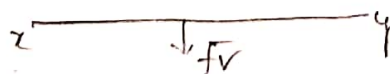
Below HP

behind of VP



Below HP

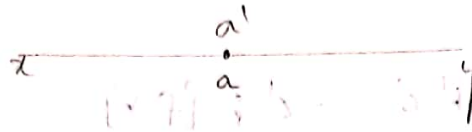
in front of VP



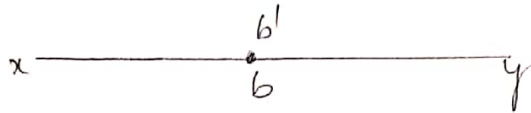
Below HP  
in front of VP

# Q. 1

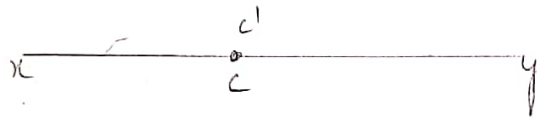
1, A point 'A' is lies in between the horizontal plane and vertical plane it is 1<sup>st</sup> Q<sub>v</sub>. Draw the projections.



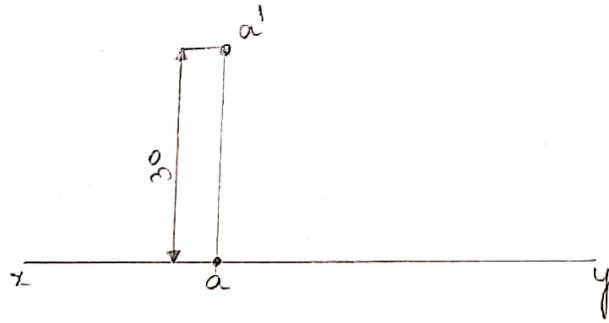
2, A point 'B' is touches to both horizontal and vertical plane. Draw the projections.



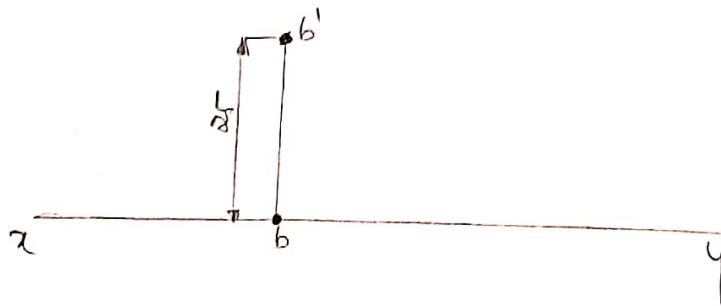
3, A point 'c' is on the reference line. Draw &g



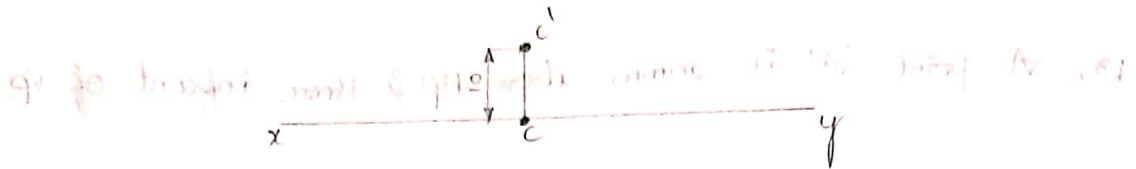
4, A point 'A' is 30mm above HP



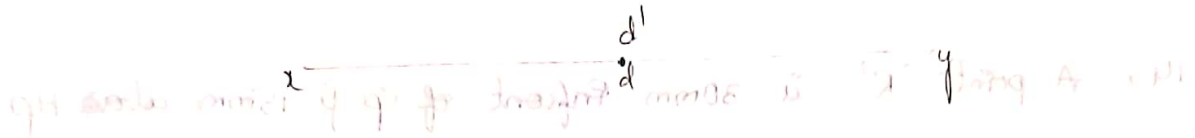
5, A point 'B' is 25mm above HP



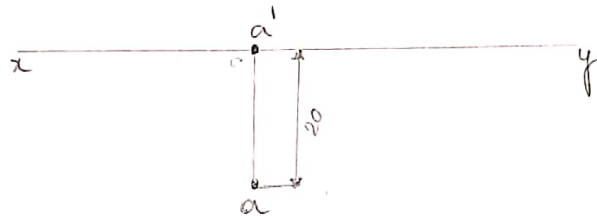
6, A point 'C' is 10mm above HP



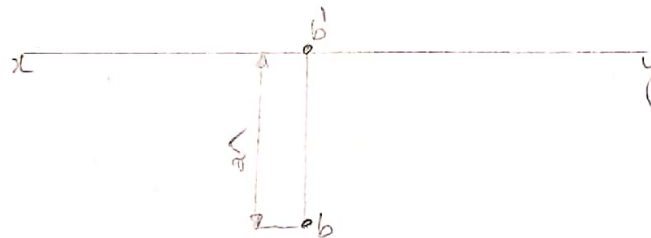
7, A point 'D' touches to both planes.



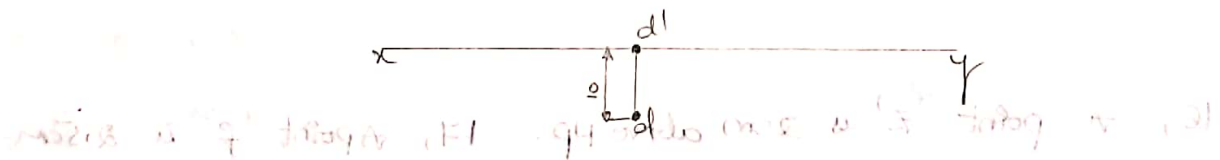
8, A point 'A' is 20mm in front of VP



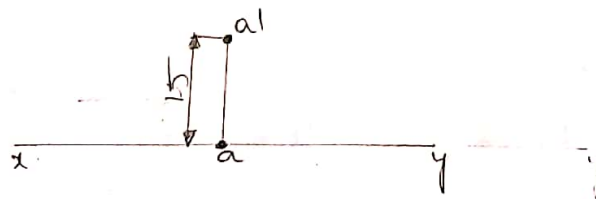
9, A point 'B' is 25mm in front of VP and lies in HP



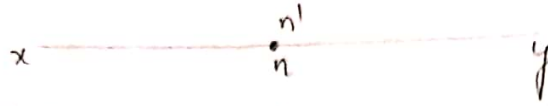
10, A point 'D' is 10mm in front of VP



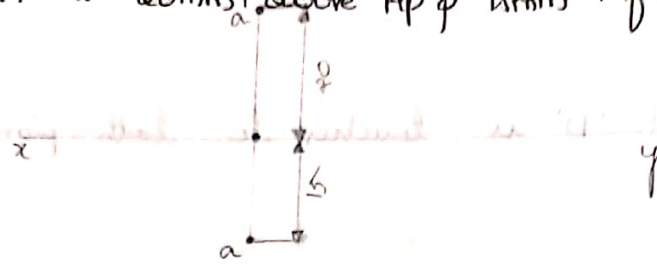
11, A point 'A' is 15mm above HP.



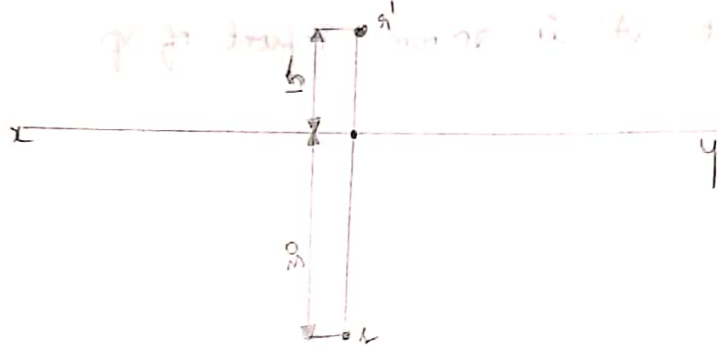
12, A point 'N' is touches to both Hp and Vp



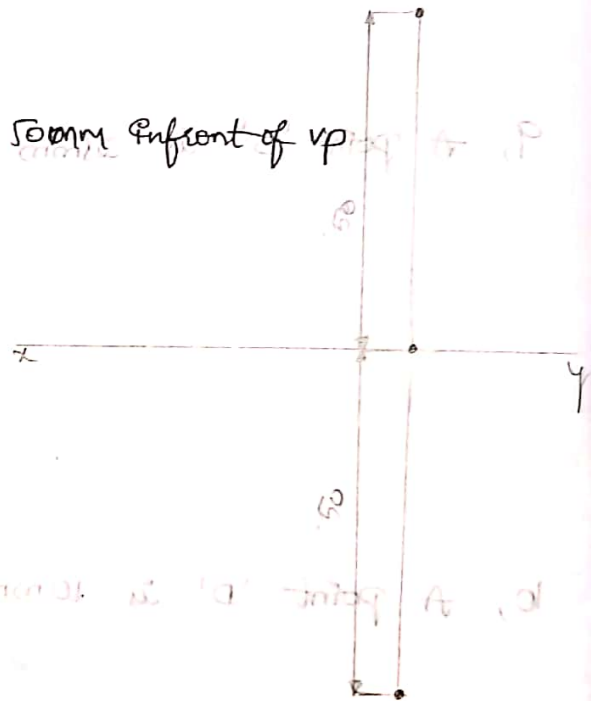
13, A point 'A' is 20mm above Hp & 15mm in front of Vp



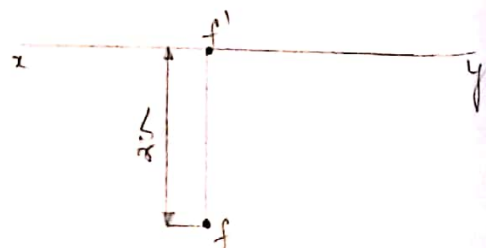
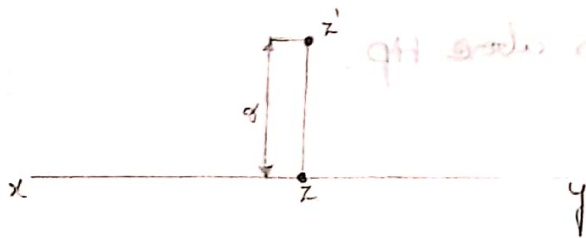
14, A point 'R' is 30mm in front of Vp & 15mm above Hp



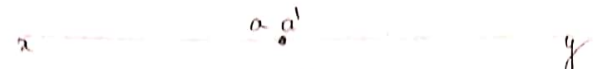
15, A point 'N' is 50mm Hp & 50mm in front of Vp



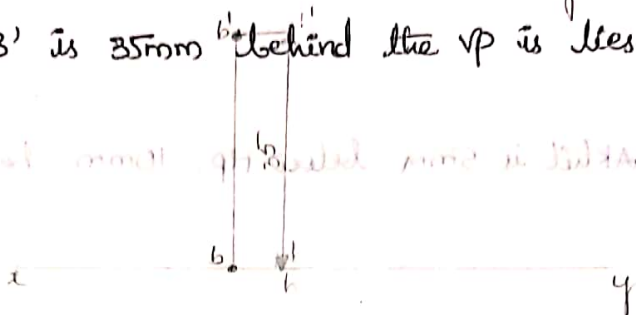
16, A point 'Z' is 2cm above Hp. 17, A point 'f' is 2.5cm in front of Vp.



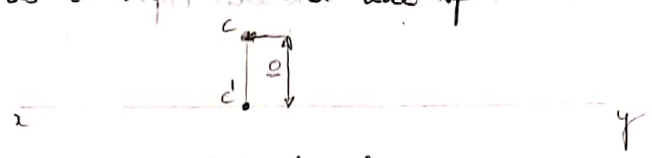
Q.18 A point 'A' touches to both planes. Draw the projections in Eq.



19, A point 'B' is 35mm behind the VP is lies on HP



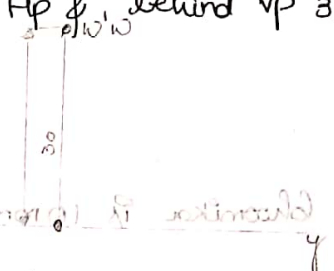
20, A point 'C' is 10mm behind the VP



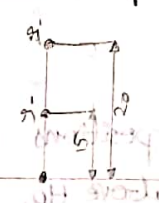
21, A point 'R' is 15mm behind the VP



22, A point 'W' is 30mm above HP & behind VP 30mm

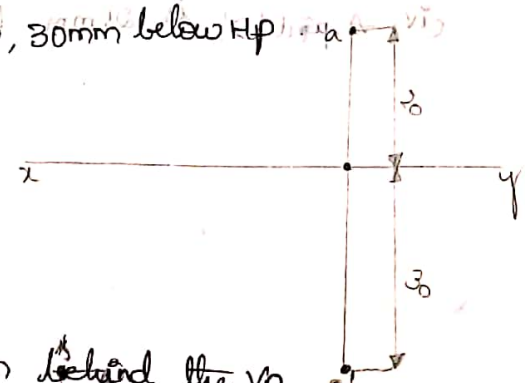


23, A point 'R' is 30mm behind VP & 25mm above HP

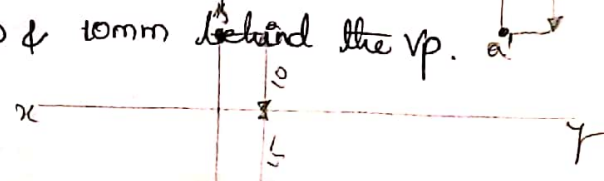


Q.19

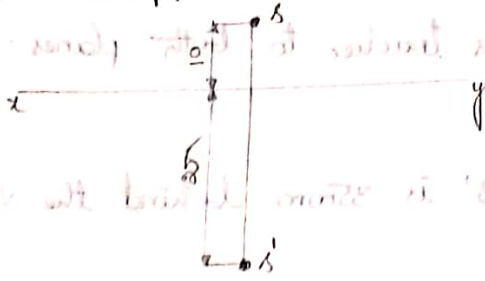
24, A point 'A' is 20mm behind the VP, 30mm below HP



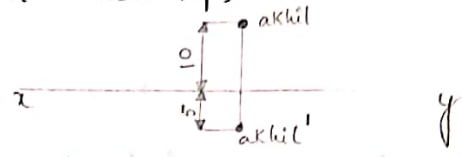
25, A point 'S' is 15mm below HP & 10mm behind the VP.



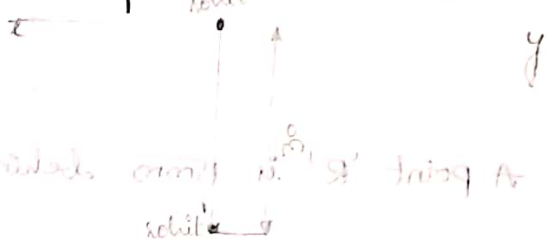
26, A point 'S' is 25mm below Hp, 10mm behind vp.



27, A point Akhil is 5mm below Hp, 10mm behind vp.

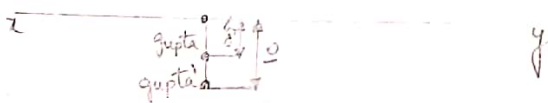


28, A point Rohit is 30mm below Hp

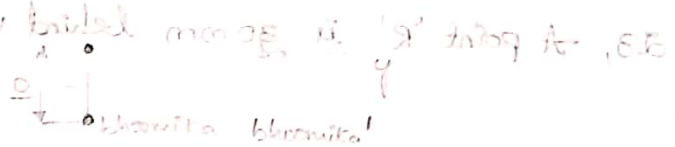


Q.9

29, A point Gupta is 10mm below Hp, 0.5cm in front of vp.



30, A point Bhoomika is 10mm in front of vp, 10mm below Hp.



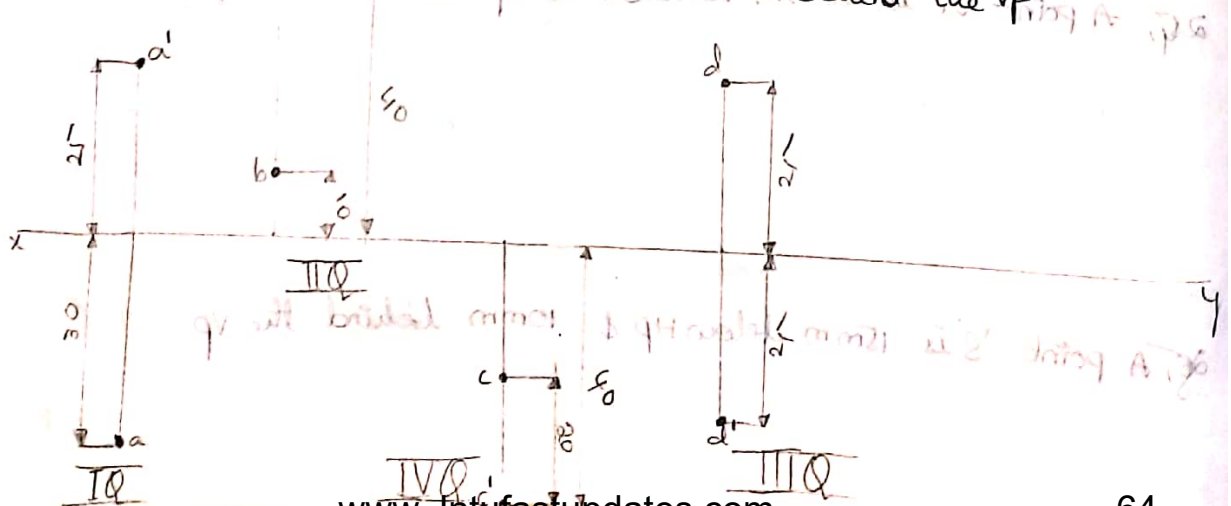
31, Draw the following positions with 20mm apart.

i, A point 'A' is 25mm above Hp, 30mm in front of vp.

ii, A point 'B' is 40mm above Hp, 10mm behind the vp

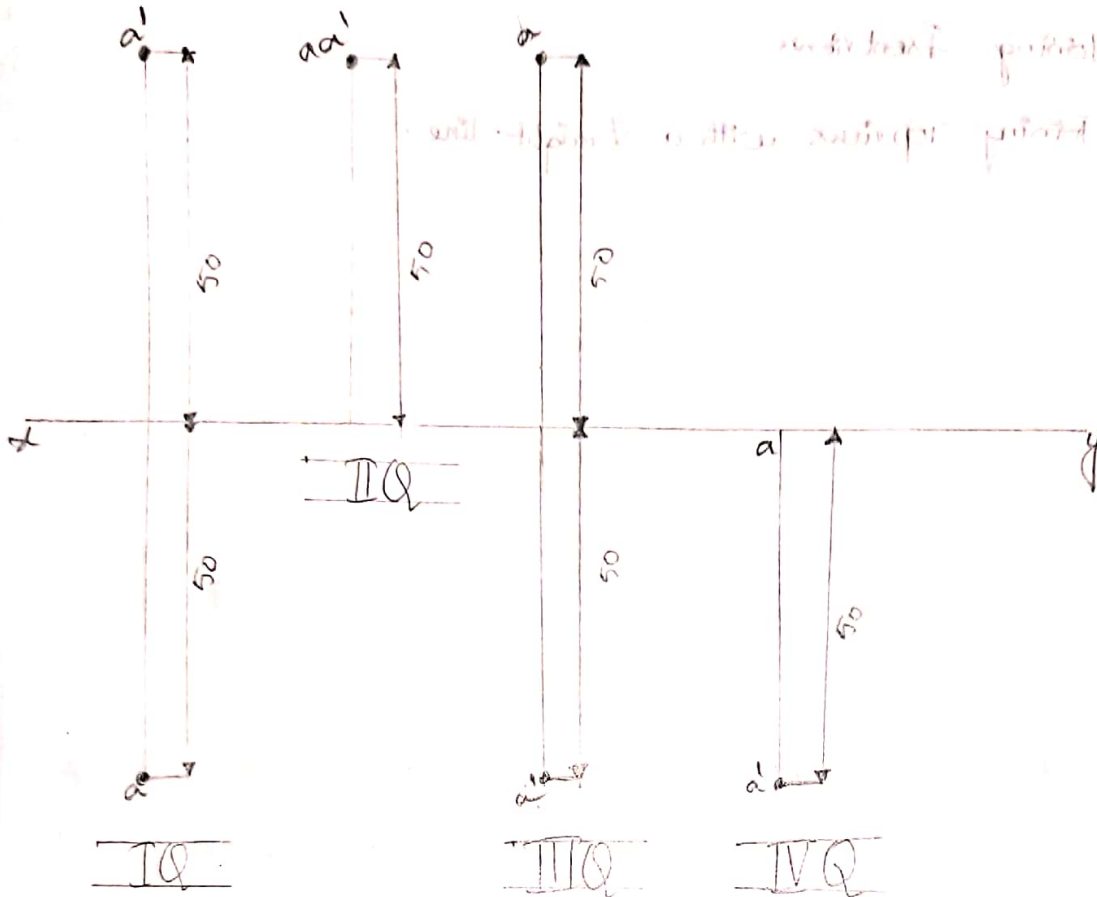
iii, A point 'C' is 40mm below Hp, 20mm in front of vp

iv, A point 'D' is 25mm below Hp, 25mm behind the vp.

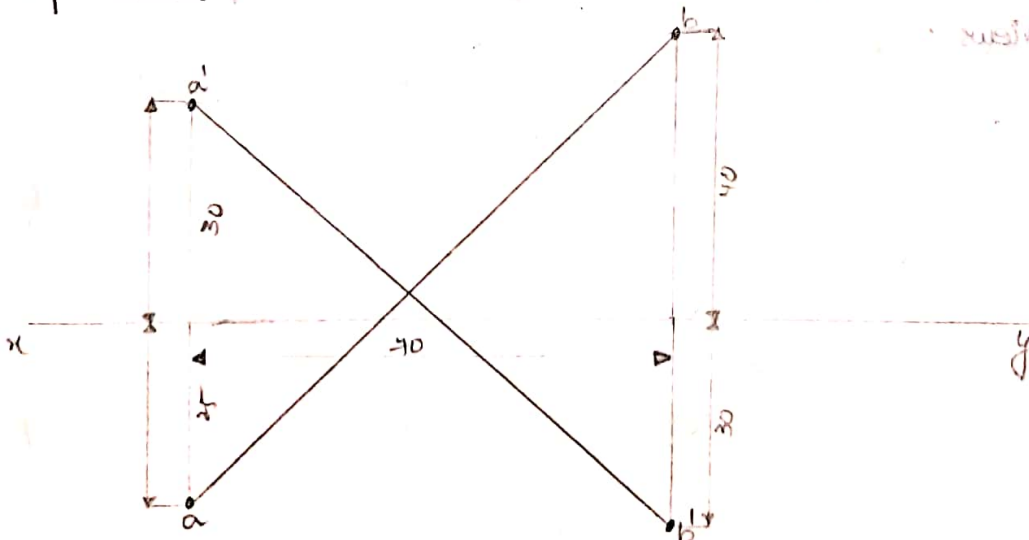




32) A point P is 50mm from the both reference planes. Draw the position of views in all possible quadrants.



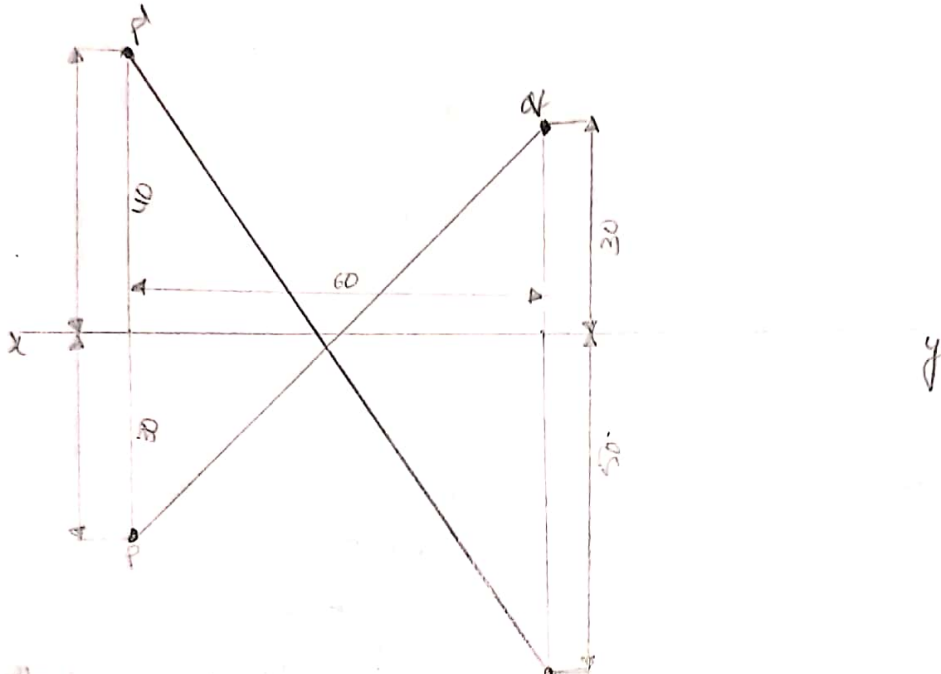
33, A point A is 30mm above HP 25mm in front of VP. Another point B is 30mm below HP, 40mm behind the VP. The distance between 2 projectors are 70mm apart. Joining their front and top views.



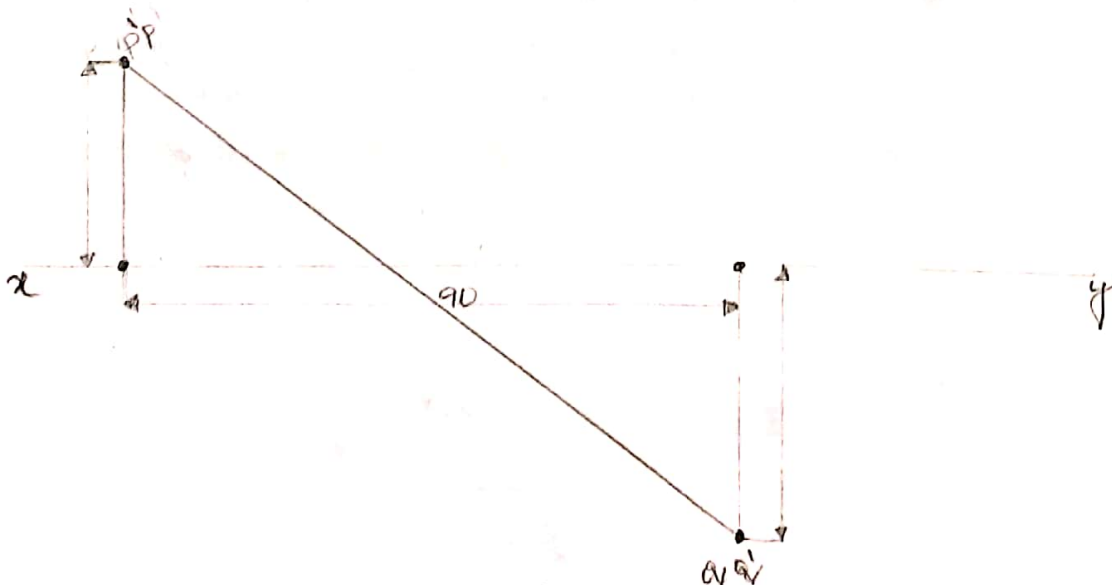
34. A point 'P' is 40mm above HP and 30mm in front of VP. Another point Q is 50mm below HP and 30mm behind VP. And the distance between 2 projectors are 60mm apart.

1, Joining Front views

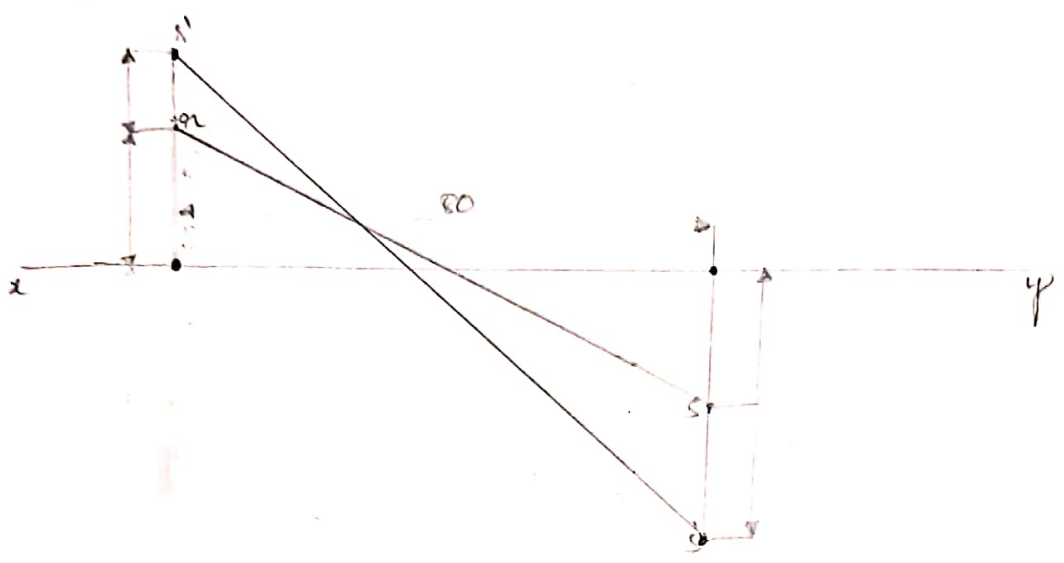
2, Joining Top views with a straight line.



35. A point 'P' is 30mm above HP and also behind VP. Another point Q is 40mm below HP and also in front of VP. And the distance between 2 projectors are 90mm apart. Joining front and top views.



26) A point 'R' is 30mm above HP, 20mm behind VP. Another point 'S' is 40mm below HP, 20mm in front of VP. The distance b/w two projectors are 80mm apart. Joining their front and top views.



37) Draw the projections of given below 10mm apart.

i) Point A is 30mm above HP 25mm behind the VP.

ii) Point B is 45mm below HP 10mm behind the VP

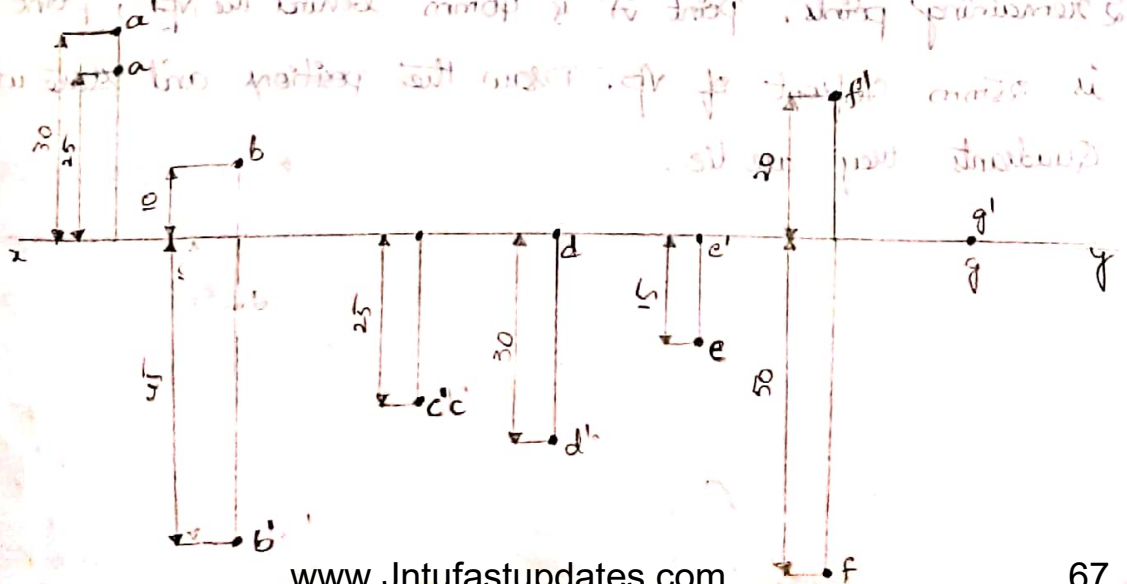
iii) Point C is 25mm below HP and also in front of VP

iv) Point D is 30mm below HP

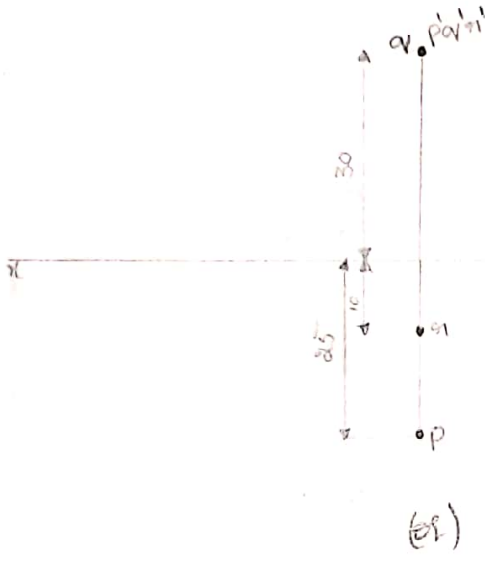
v) Point E is 15mm in front of VP

vi) Point F is 20mm above HP, 50mm in front of VP

vii) Point G is lies in 1<sup>st</sup> quadrant it touches to both reference plane.



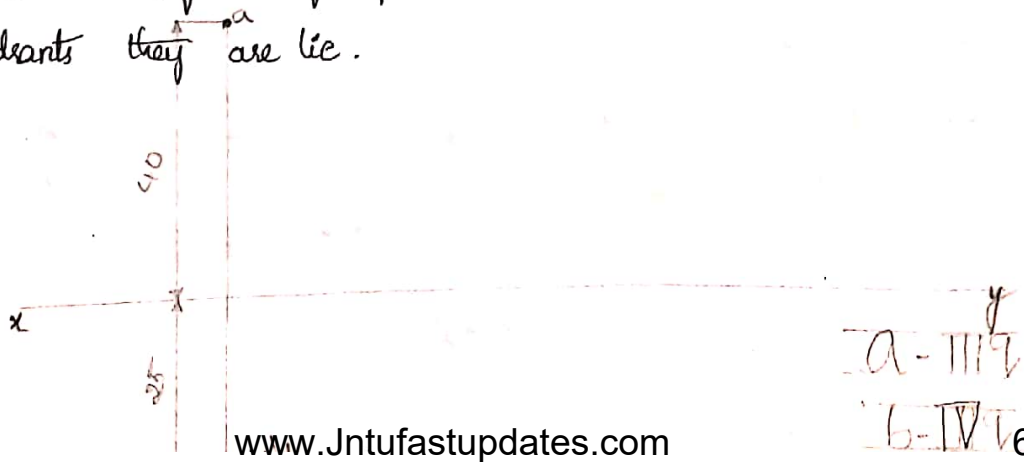
938, A point is 30mm above the xy line. It is front view for remaining 3 points. Point 'P' is 25mm in front of VP, point 'Q' is 30mm behind the VP. and point 'R' is 10mm in front of VP. Draw the positions and state which quadrants they are lie.



$\begin{matrix} P-IQ \\ Q-IIQ \\ R-IQ \end{matrix}$

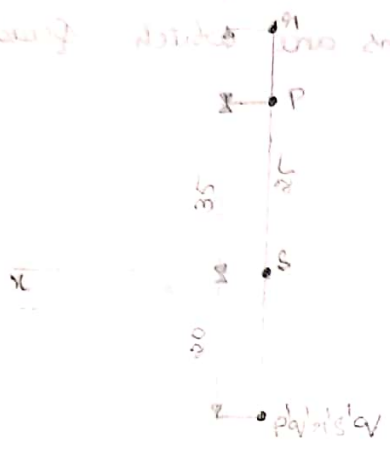
Draw the projections of a point which is 30mm above the xy line and 25mm in front of the VP. Point 'P' is 25mm in front of VP, point 'Q' is 30mm behind the VP and point 'R' is 10mm in front of VP.

939, A point is 25mm below the xy line. It is front view for 2 remaining points. Point 'A' is 40mm behind the VP, point 'B' is 25mm in front of VP. Draw the positions and state which quadrants they are lie.

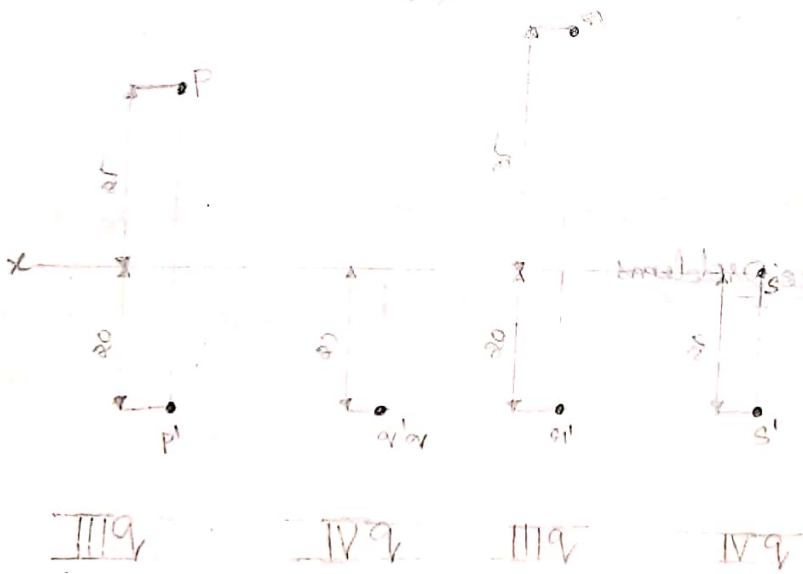


$\begin{matrix} A-IIIQ \\ B-IVQ \end{matrix}$

40, A point Q is 20mm below the xy line. It is front view for remaining 4 points. Point P is 25mm behind the VP, point Q' is 20mm in front of VP, point R is 35mm behind the VP. Point S is on the reference line. State which quadrant they are lie of their positions.



- P - III Q
- Q' - IV Q
- R - III Q
- S - IV Q

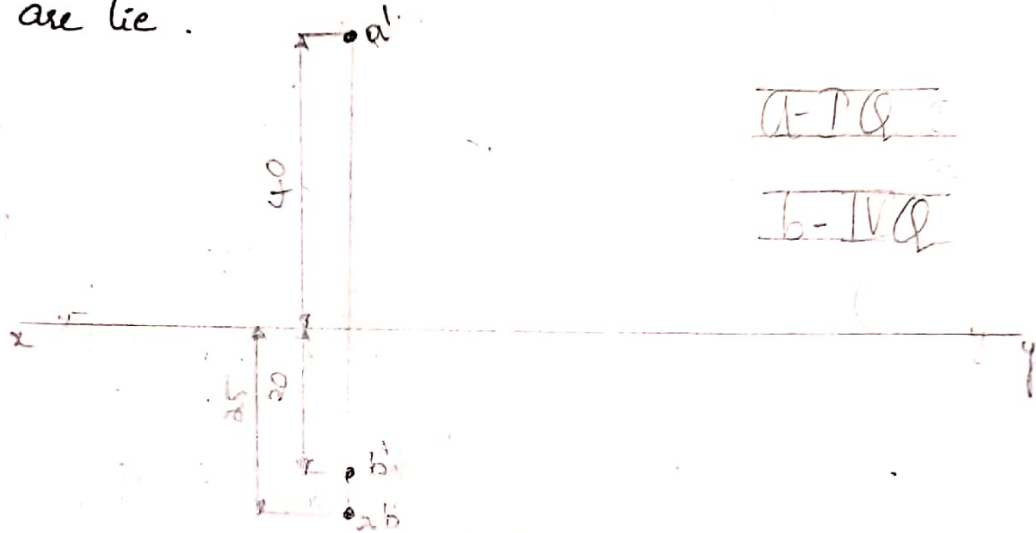


41, A point is 30mm above the xy line. It is top view for remaining 2 points. Point P is 30mm below HP, point Q is 30mm above HP. draw the positions and state which quadrant they are lie.

P-IIIQ

V-IIIQ

A point is 25mm below the xyline. It is top view for 2  
 remaining points. Point 'A' is 40mm above Hp, point 'B' is  
 20mm below Hp. State the positions and which quadrant  
 they are lie.



a-IIIQ

b-IVQ

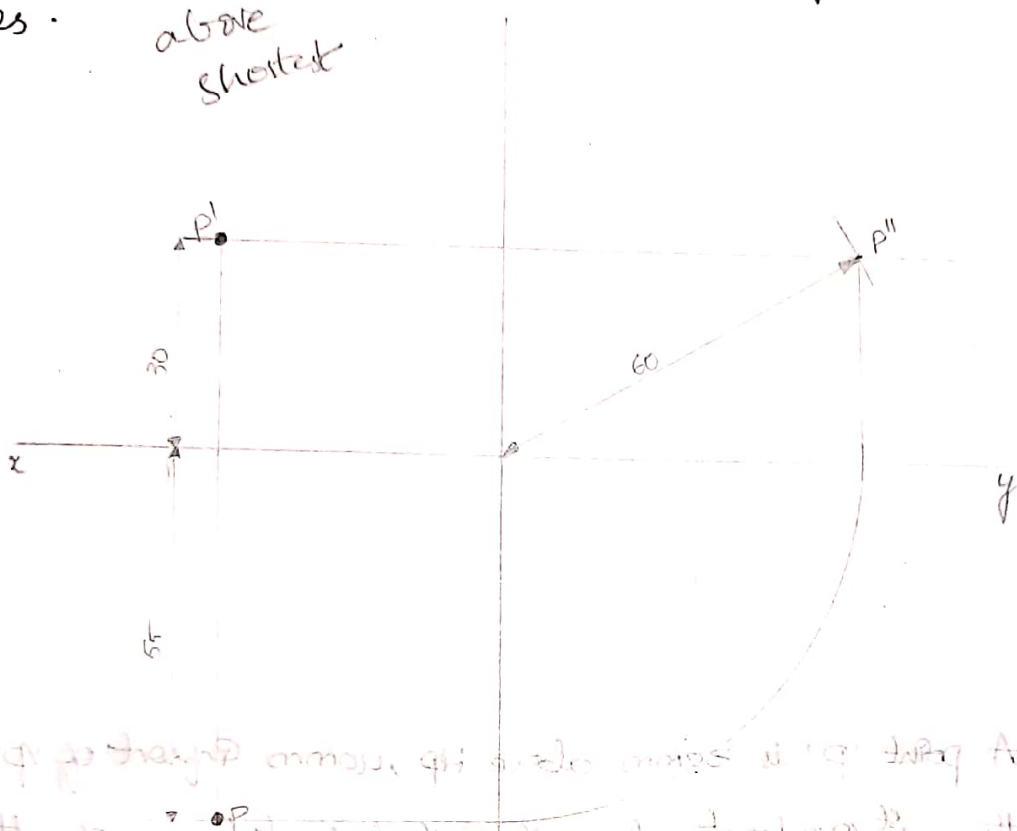
### Shortest distance problems

A

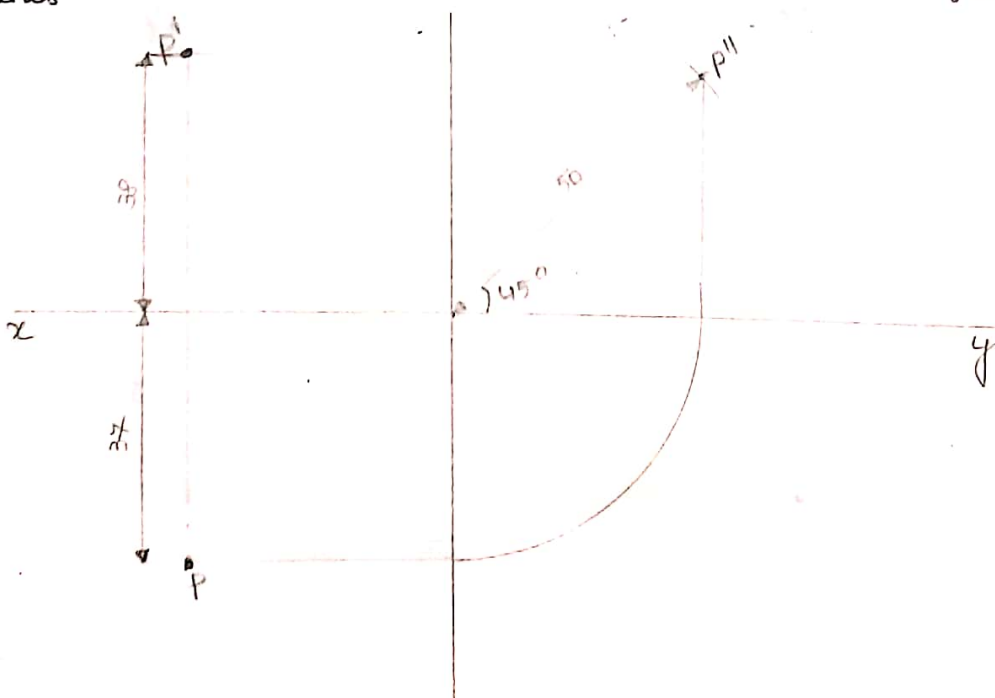
A point is 25mm below the xyline. It is top view for 2  
 remaining points. Point 'A' is 40mm above Hp, point 'B' is  
 20mm below Hp. State the positions and which quadrant  
 they are lie.

# Shortest distance problems

1. A point P is 30mm above HP is in the 1<sup>st</sup> quadrant. Draw the shortest distance is 50mm from the origin of principle planes.

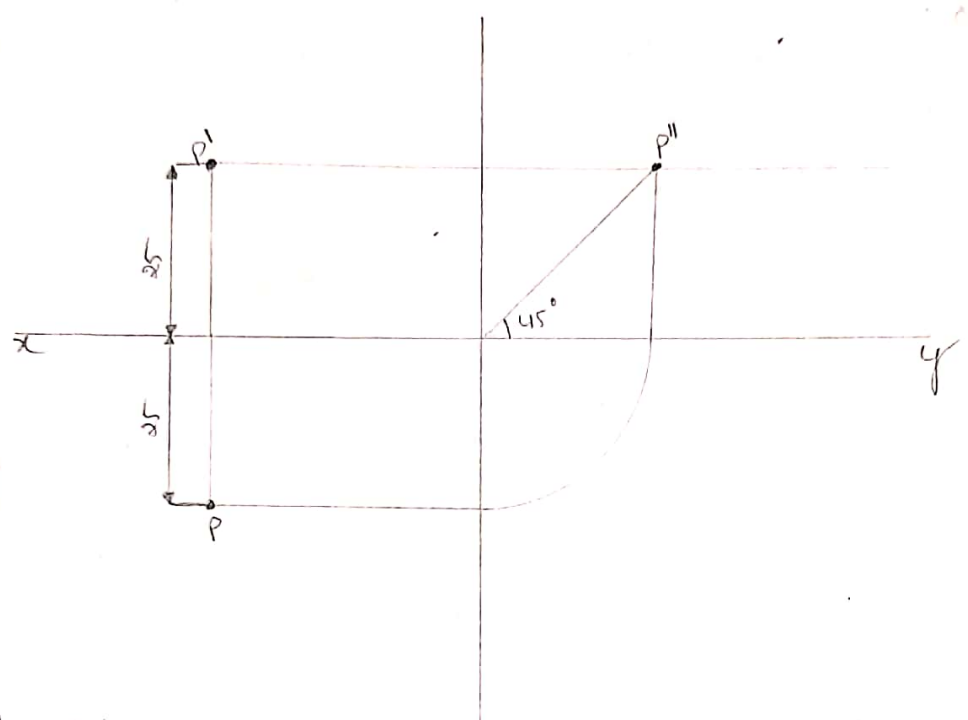


2. A point A is in the 1<sup>st</sup> quadrant. The shortest distance of 'A' is 50mm. Draw the projection of from the origin of principle planes.



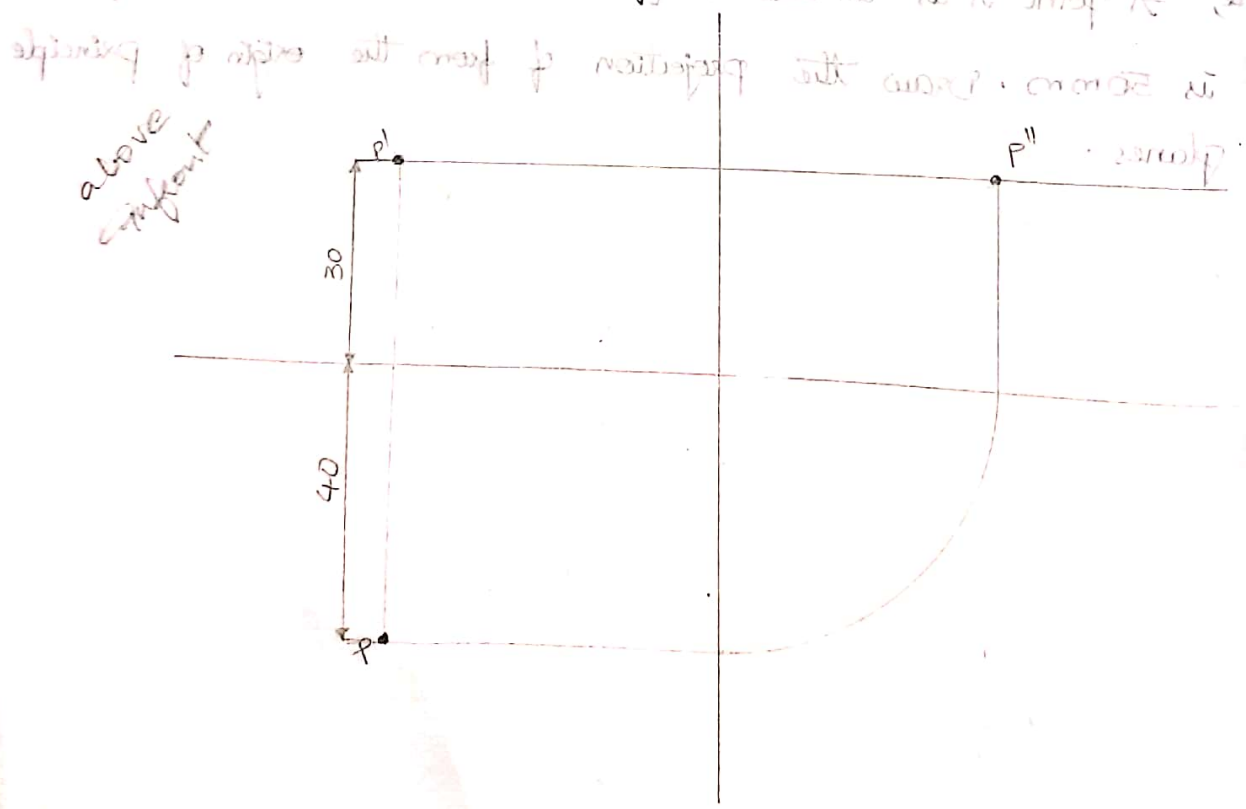
3) A point A is 25mm above HP is in the 1<sup>st</sup> quadrant.

Draw the shortest distance of their projections from the principle planes.



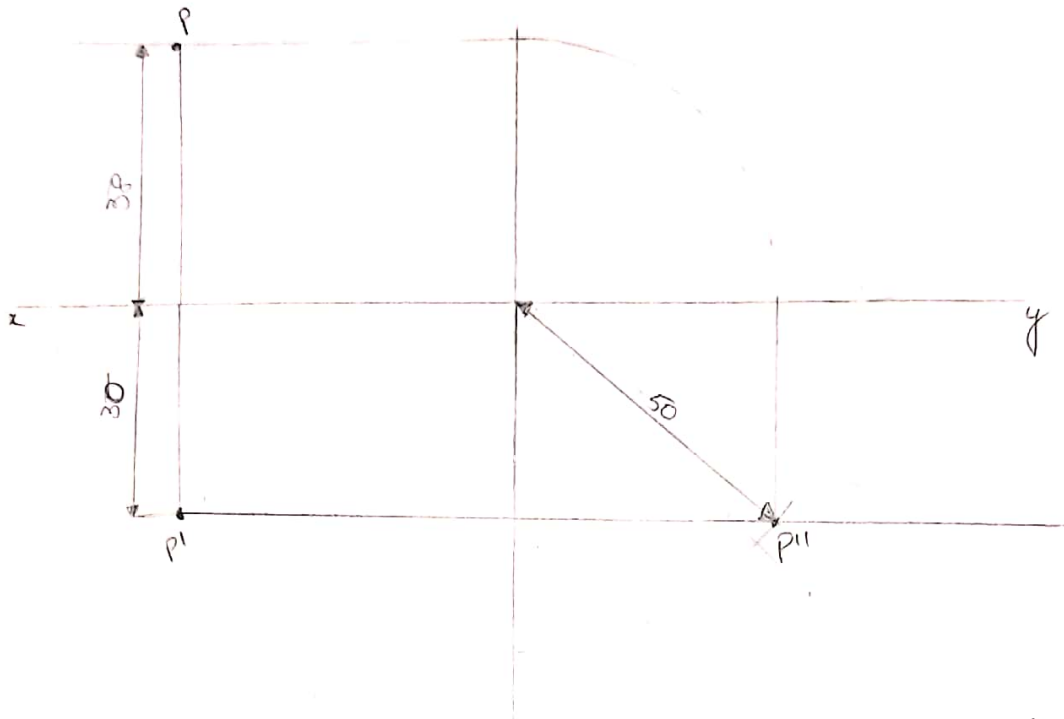
4) A point 'P' is 30mm above HP, 40mm in front of VP is in the 1<sup>st</sup> quadrant draw the shortest distance of their

Principle views from the origin of two planes.

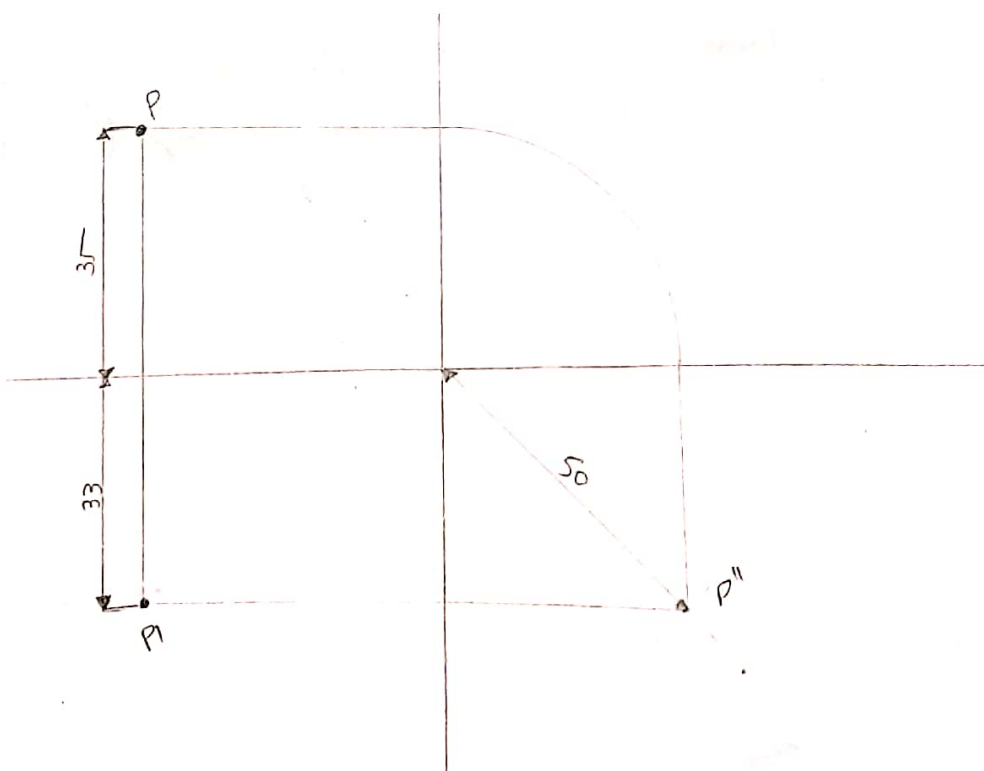




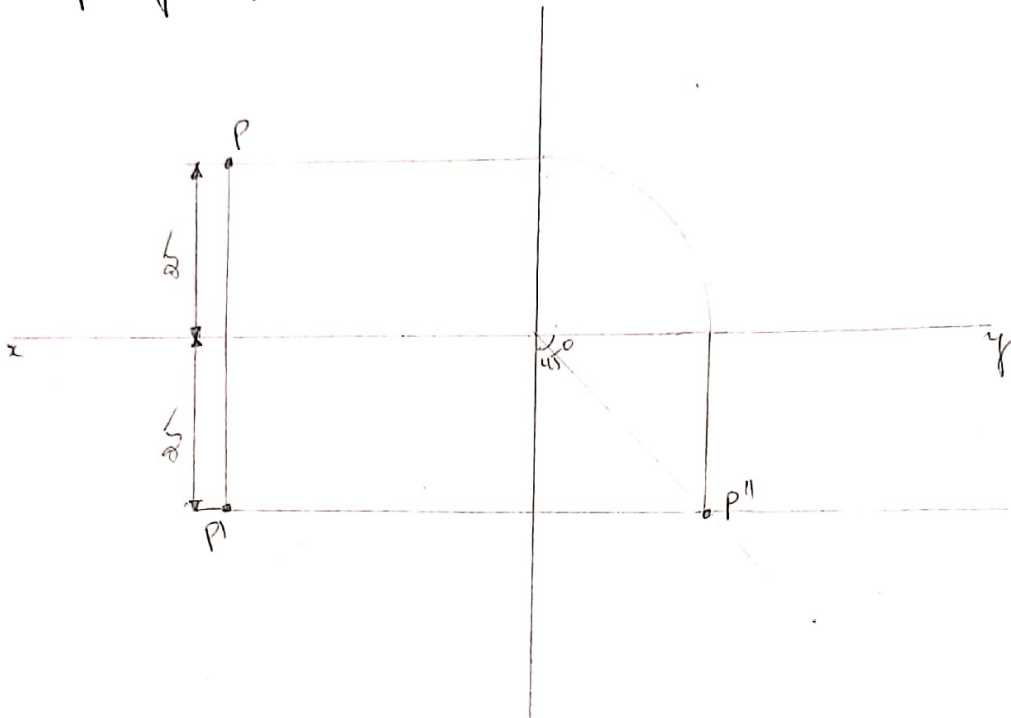
5, A point P is 30mm below HP is in the  $IV^{th}$  quadrant. Draw the shortest distance is 50mm from the origin of Principle planes.



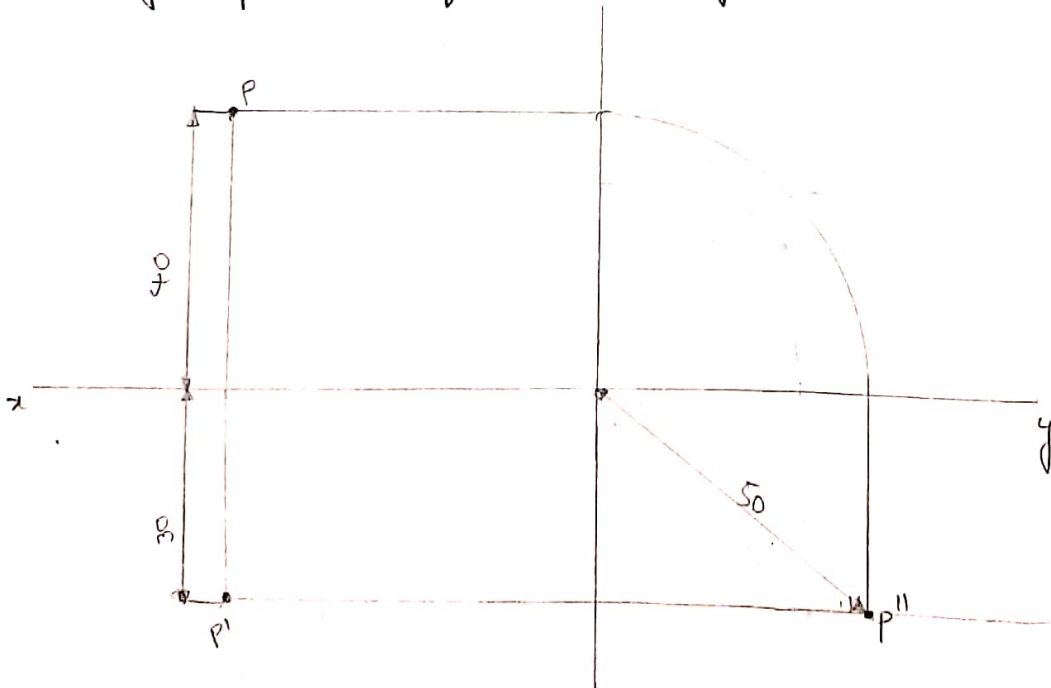
6, A point 'A' is in the  $III^{rd}$  quadrant. The shortest distance of 'A' is 50mm. Draw the projection of from the origin of principle planes.



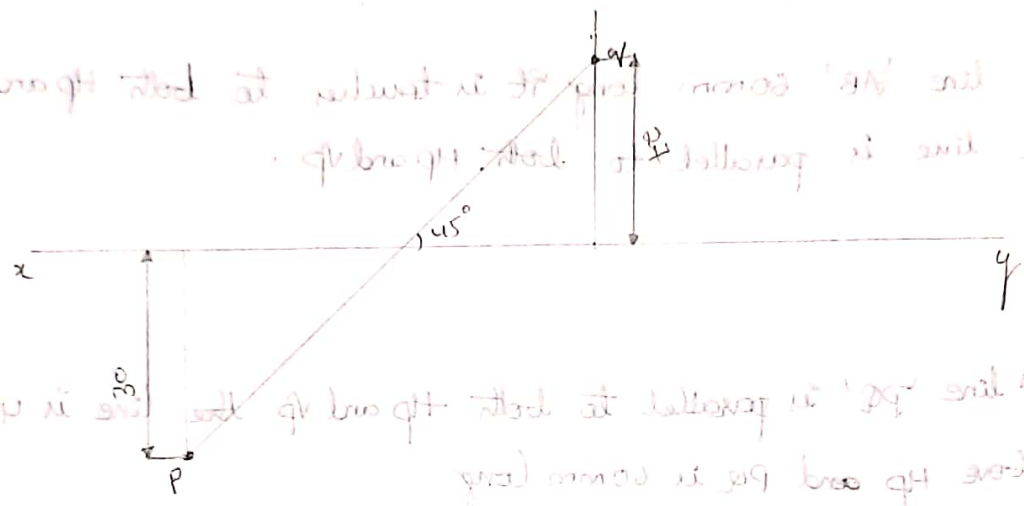
7) A point 'A' is 25mm below HP is in the  $IV^{th}$  Q. Draw the shortest distance of their projections from the Principle planes.



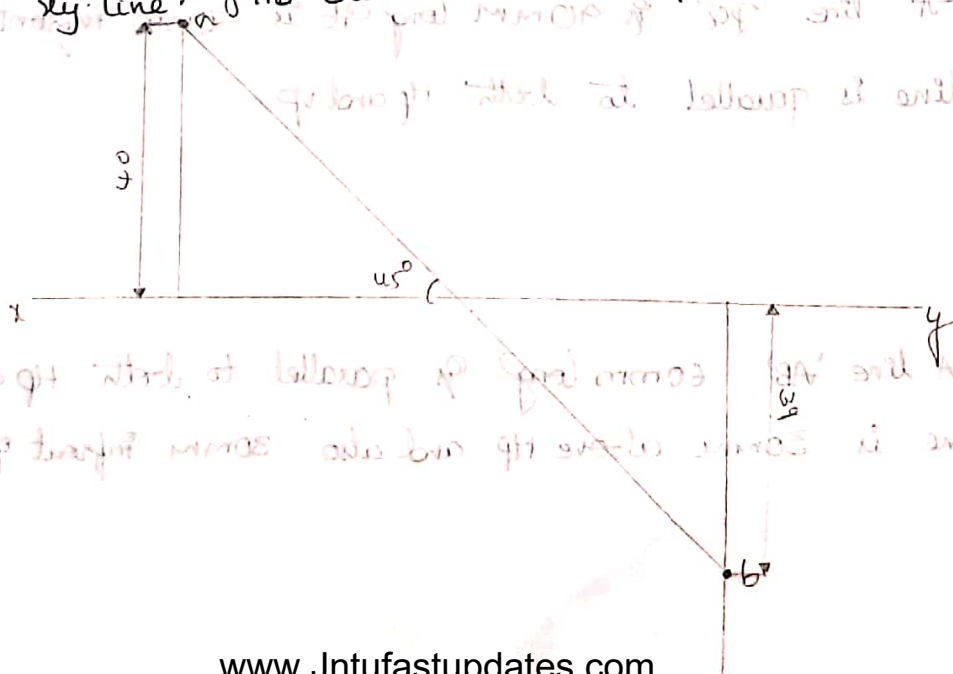
8, A point 'P' is 30mm below HP, 40mm behind of VP is in the  $IV^{th}$  quadrant. Draw the shortest distance of their principle views from the origin of two planes.



9, A point P is 30mm in front of VP another point Q is behind the VP. The distance between two projectors are 60mm. Find out the point Q. Joining a line with  $45^\circ$  inclination from P projection to Q.



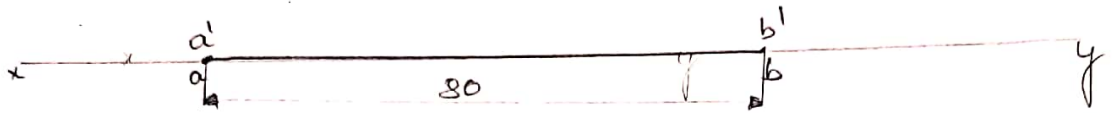
10, A point A is 40mm behind the VP another point B is in front of VP. The distance between two projectors are 80mm apart and join the A and B with  $45^\circ$  inclination straight line to the xy line. Find out the another point distance.



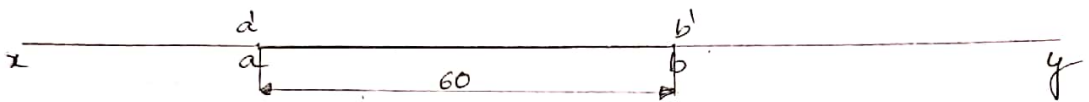
## Straight Lines - 1

Line parallel to both Hp and Vp :-

- 1) A line 'AB' 80mm long It is parallel to both Hp and Vp and the line is lying in between of both planes.



- 2, A line 'AB' 60mm long It touches both Hp and Vp, the line is parallel to both Hp and Vp.



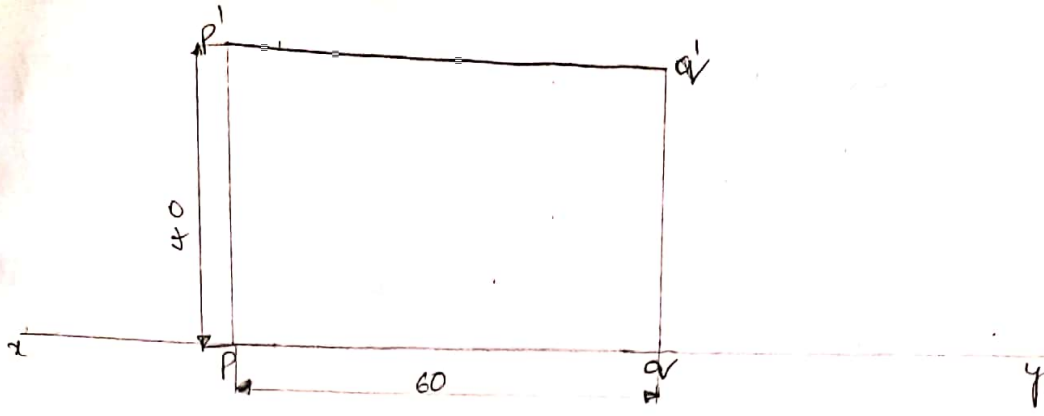
3. A line 'PQ' is parallel to both Hp and Vp the line is 40mm above Hp and PQ is 60mm long.

- 4, A line 'CD' is 50mm long is 20mm in front of Vp. The line is parallel to both Hp and Vp.

- 5, A line 'PQ' is 90mm long It is 50mm in front of Vp. The line is parallel to both Hp and Vp.

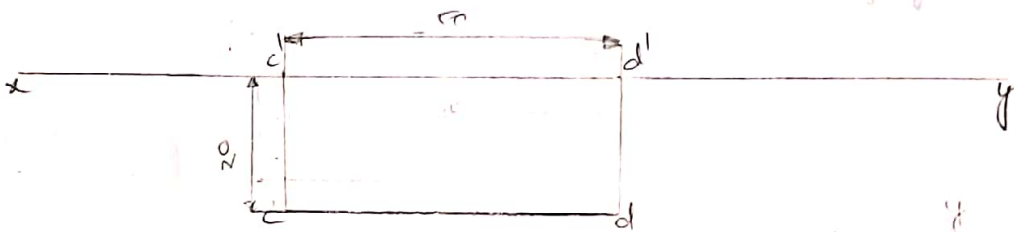
- 6, A line 'AB' 60mm long is parallel to both Hp and Vp. The line is 30mm above Hp and also 30mm in front of Vp.

3A)



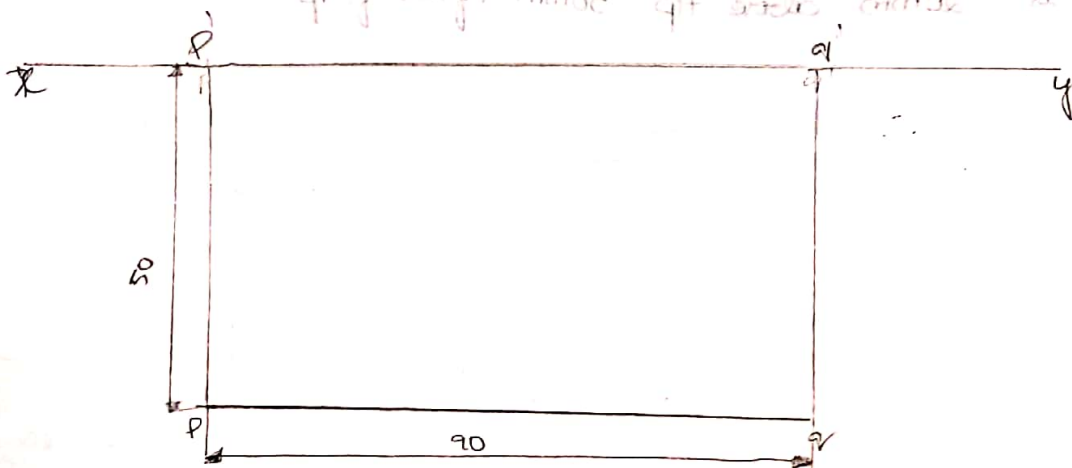
4A,

the moment of the area about the x-axis is 12000 cm<sup>4</sup>. Find the width of the rectangle.

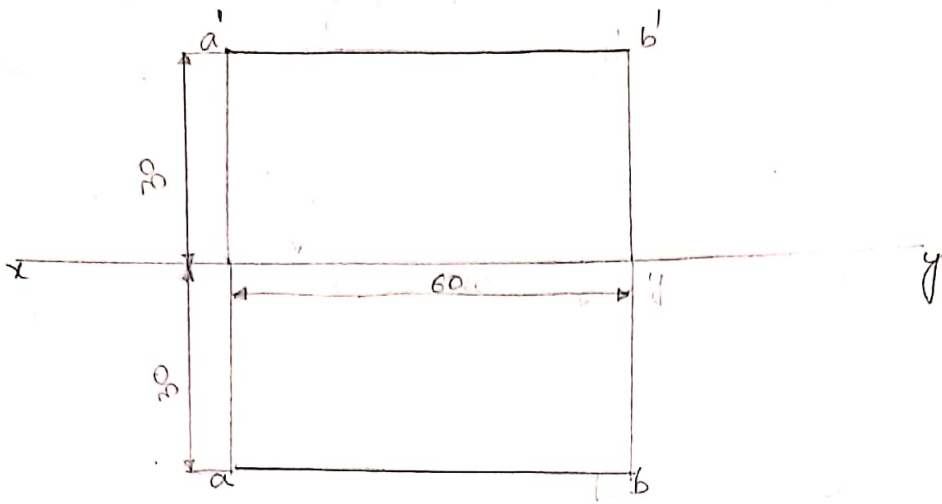


5A,

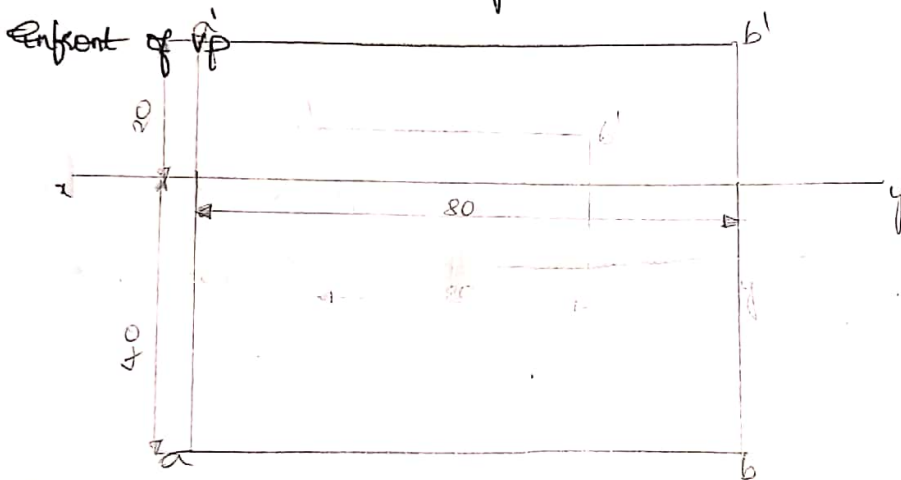
the moment of the area about the y-axis is 12000 cm<sup>4</sup>. Find the height of the rectangle.



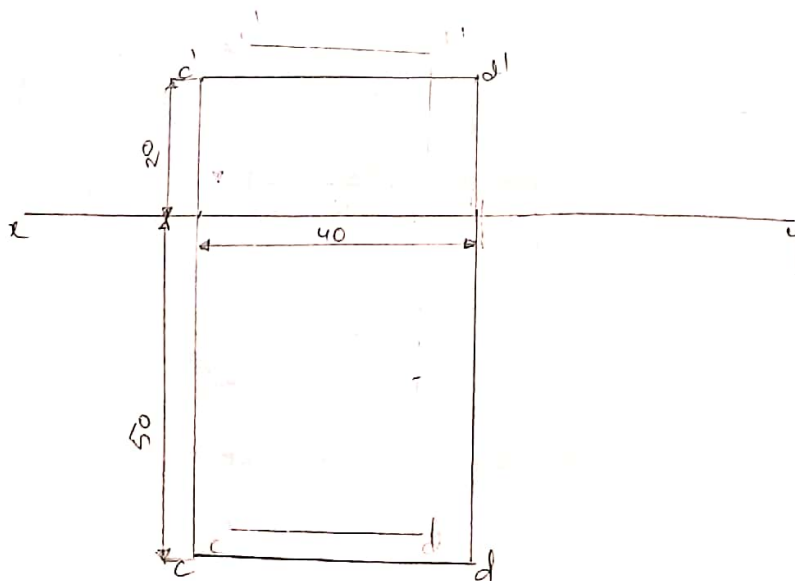
6A,



7, A line AB 80mm long it is 20mm above HP, 40mm ~~above~~

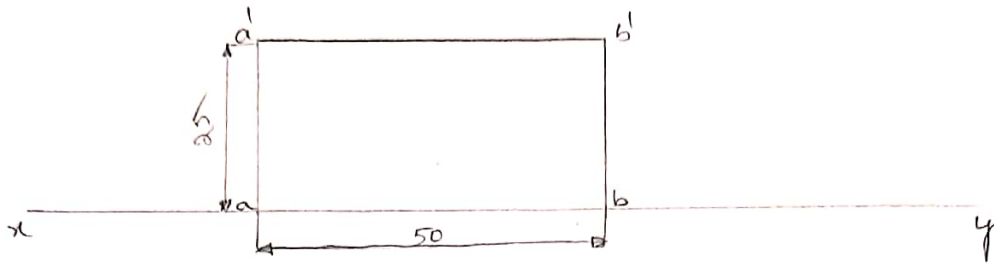


8, A line CD 40mm long is parallel to both HP and VP and the line is 20mm above HP 50mm in front of VP

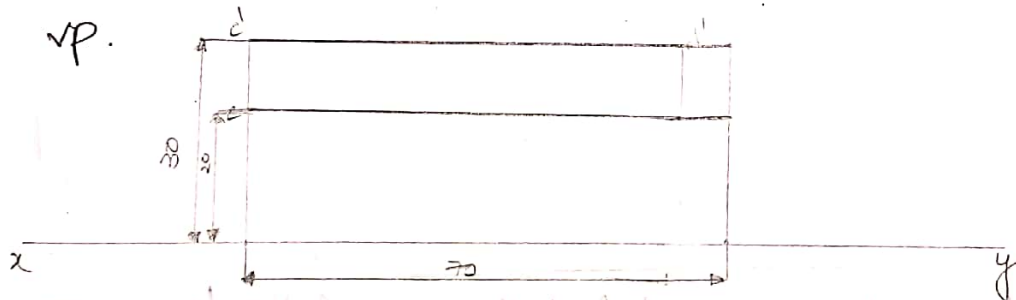


Line parallel to both Hp and Vp - Dg

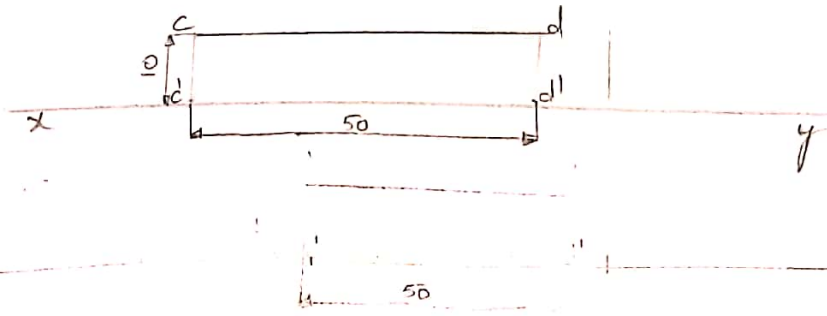
1, A line 'AB' 50mm long is parallel to both Hp and Vp and the line is 25mm above Hp and also behind the Vp



2, A line CD is 70mm long and the line is 30mm above Hp, 20mm behind the Vp. Line is parallel to both Hp and Vp.

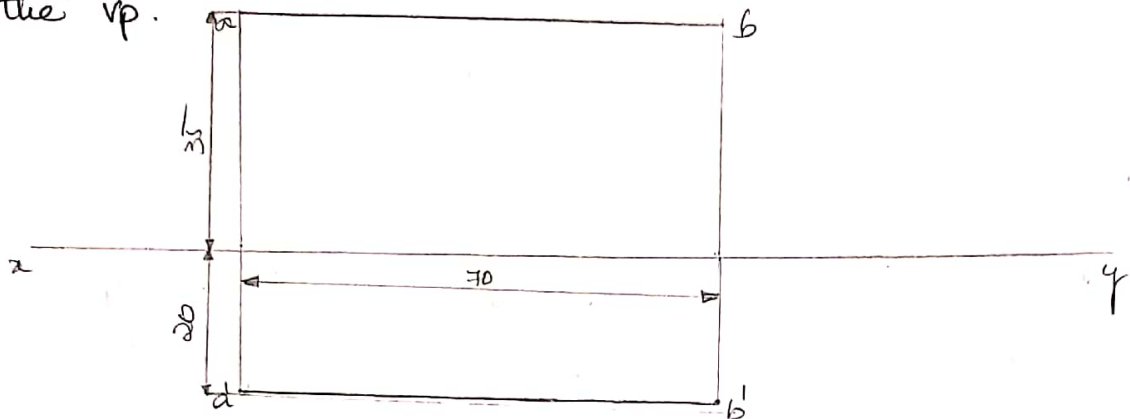


3, A line CD is 50mm long line parallel to both HP and Vp and also 10mm behind Vp.

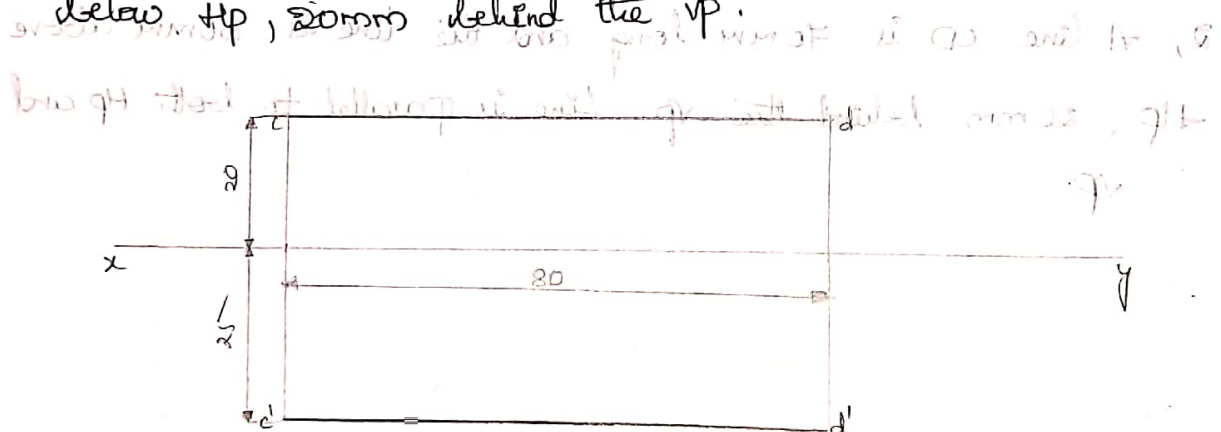


Line parallel to both Hp and Vp - P9

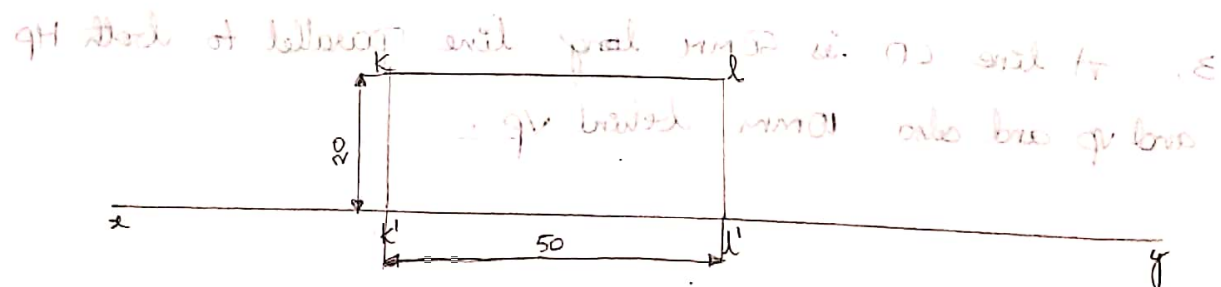
1. A line 'AB' 70mm long, it is parallel to both Hp and Vp and the line is 20mm below Hp, 35mm behind the Vp.



2. A line 'CD' 80mm long it is parallel to both 25mm below Hp, 20mm behind the Vp.



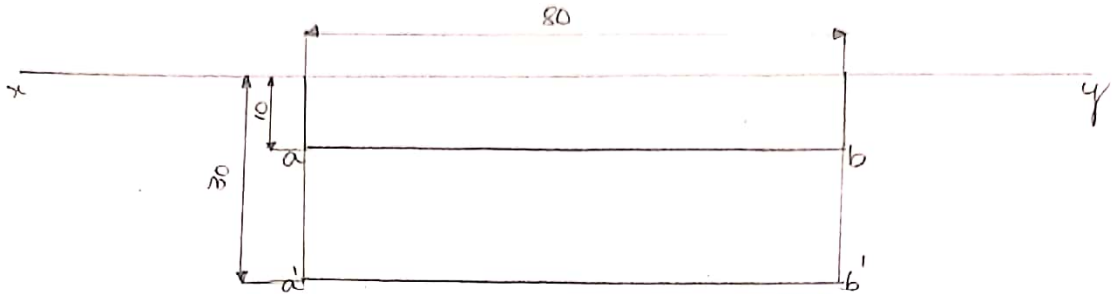
3. A line 'KL' is 20mm behind the Vp and the line is parallel to both and 50mm long.



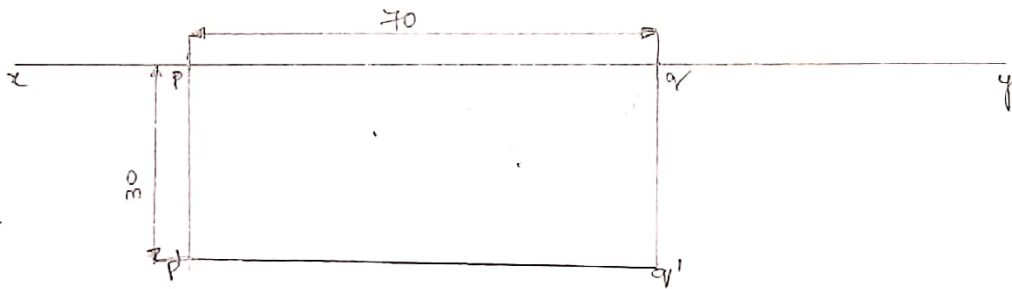


Line parallel to both Hp and Vp - 2Q

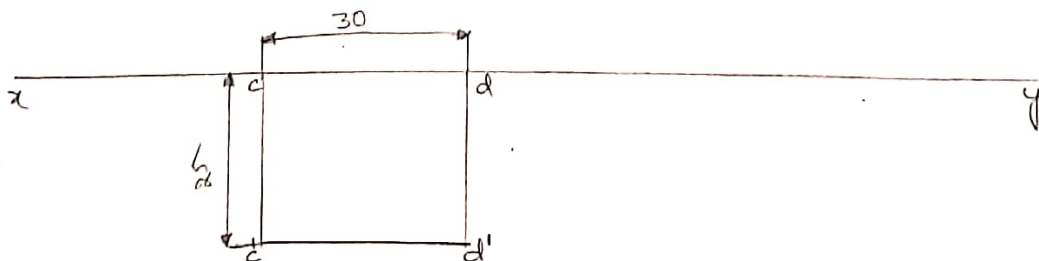
1, A line 'AB' 80mm long is 10mm in front of VP, 30mm below HP




2, A line 'pq' is 70mm long is parallel to both and 30mm below HP and also in front of VP

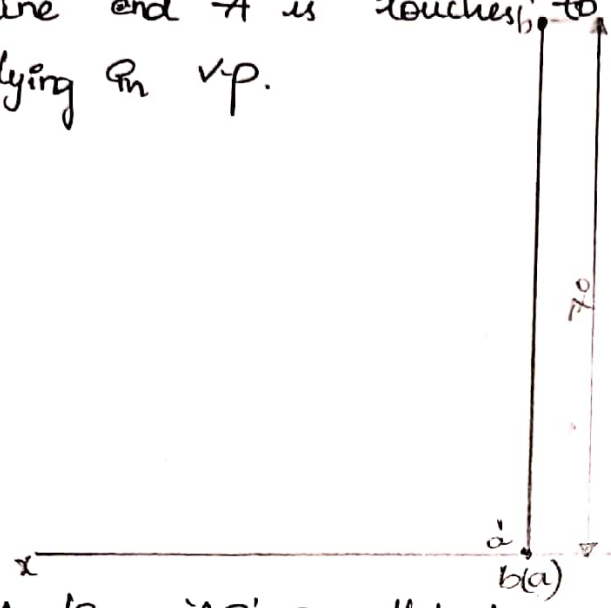


3, A line 'cd' 30mm long is 25mm below HP.

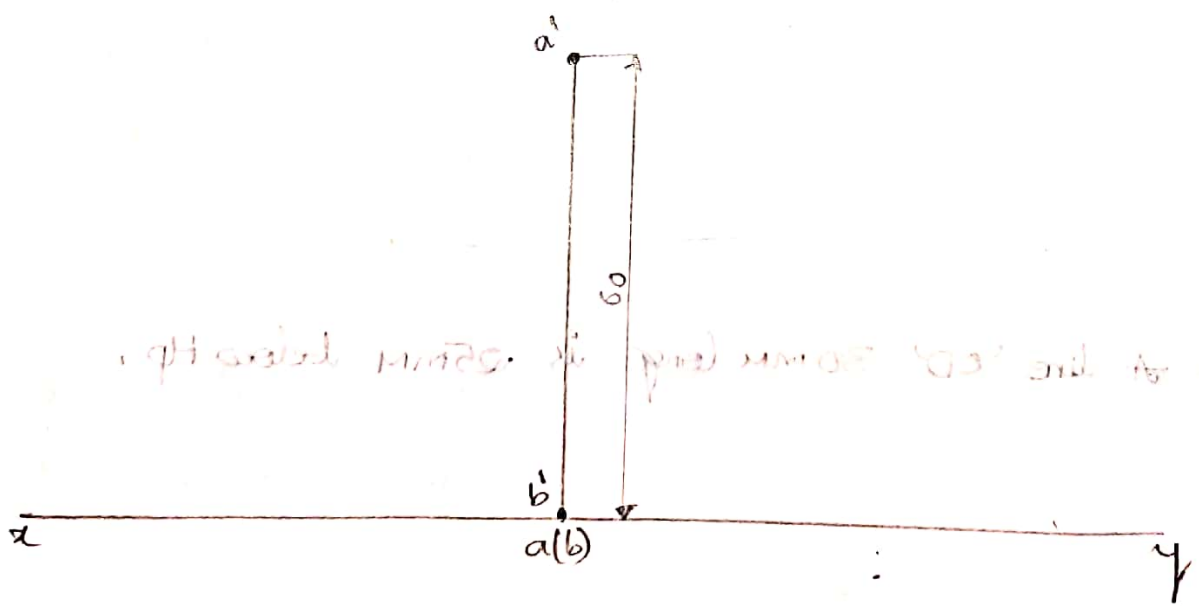


Line perpendicular to H.P. and parallel to V.P. :- 

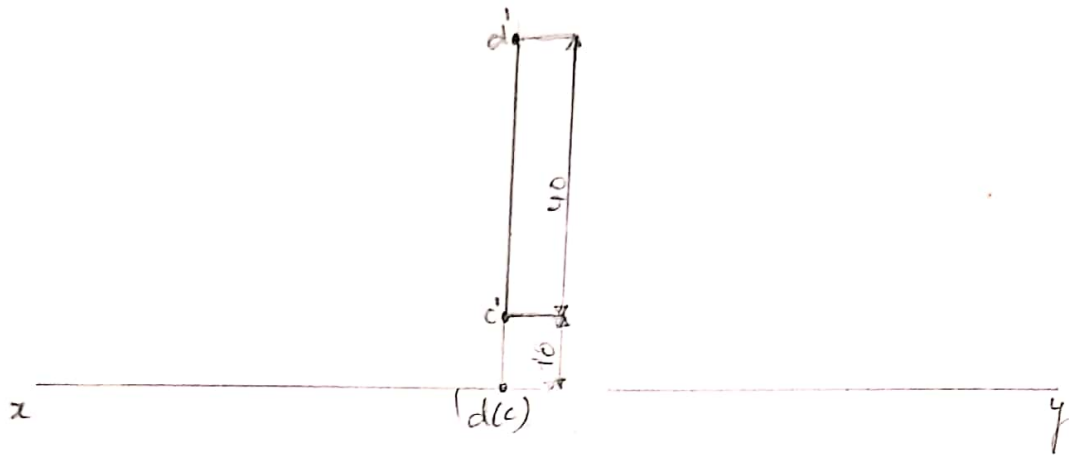
1, A line 'AB' is 70mm long & it is  $\perp$  to H.P. and  $\parallel$  to V.P. the line end A is touches to H.P. and the line is lying in V.P.



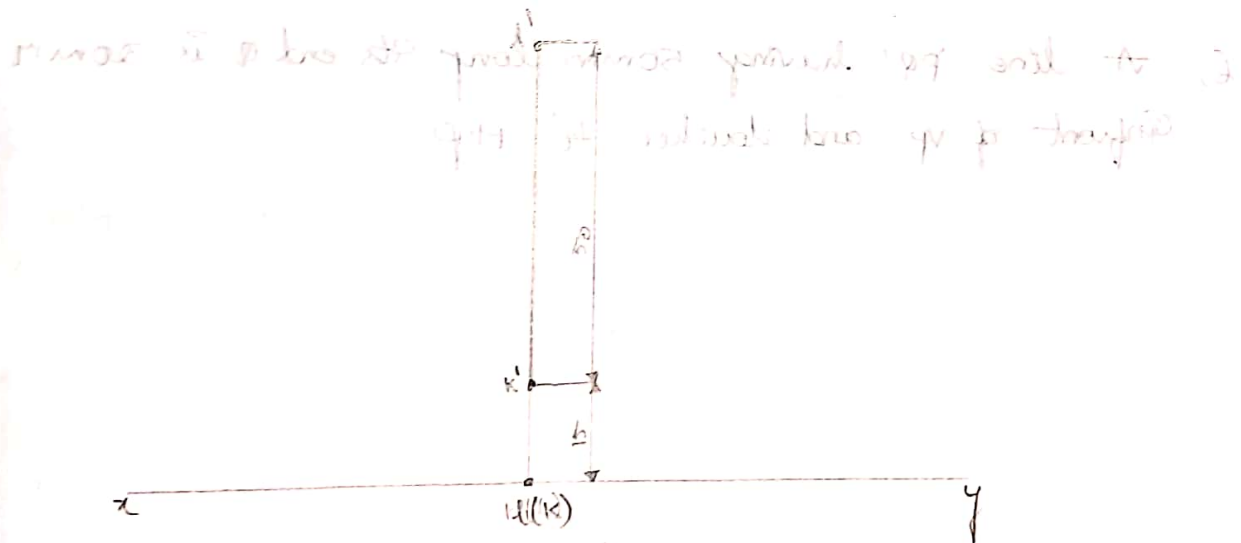
2, A line 'AB' parallel to V.P,  $\perp$  to H.P. - Its one of the end B is touches to ground. Draw the projection. The line is 60mm long.



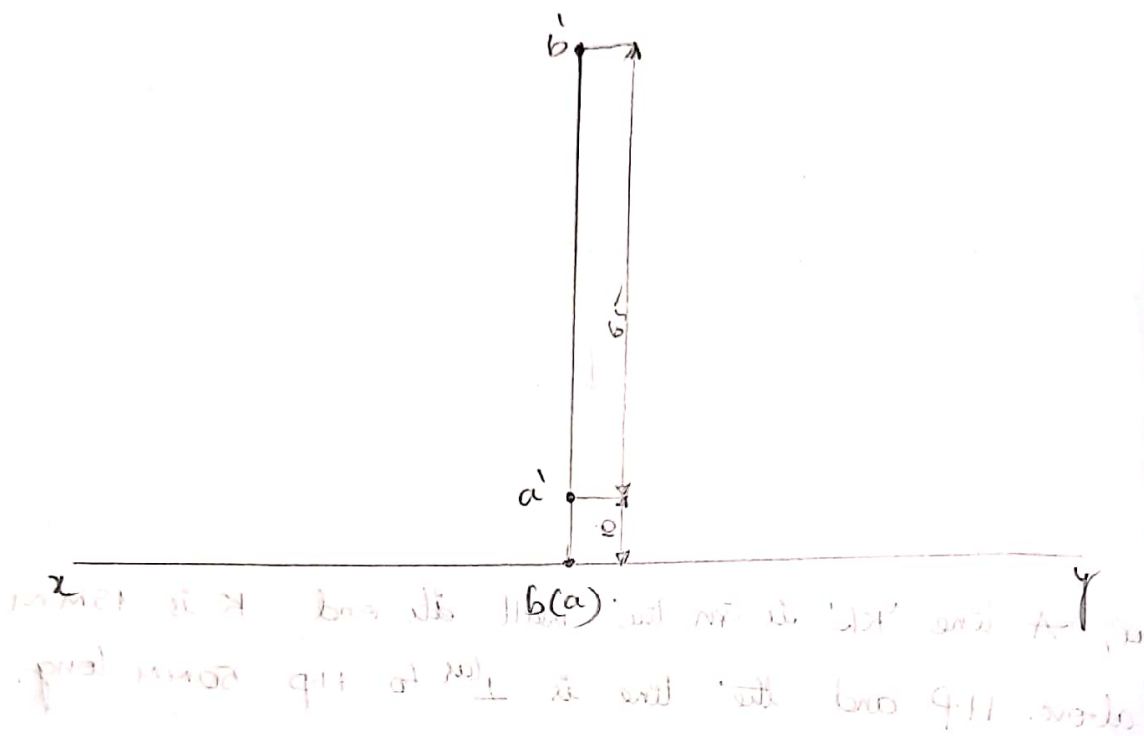
3. A line CD 40 mm long its end c' is 10 mm above HP and the line is lying on VP  $\perp^{lar}$  to the HP



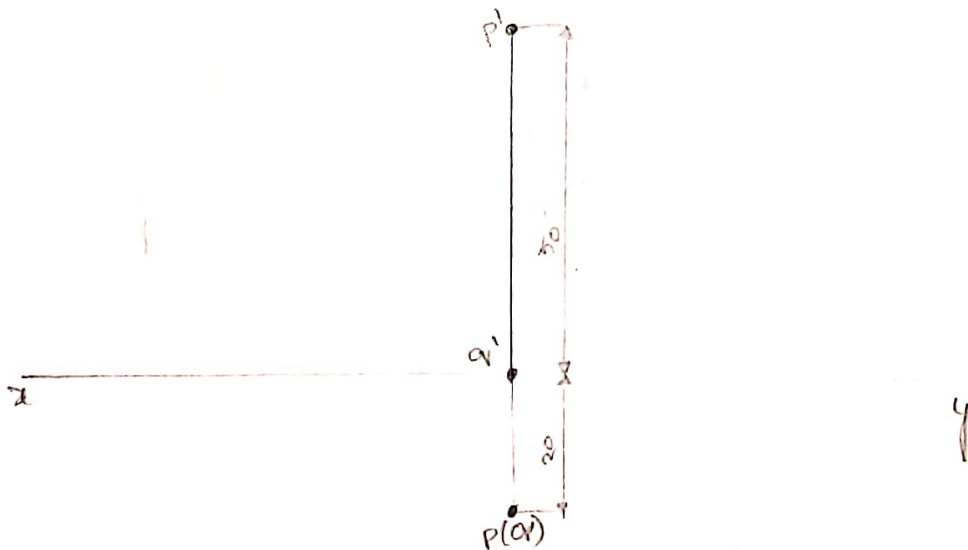
4. A line 'kh' is on the wall its end k is 15 mm above HP and the line is  $\perp^{lar}$  to HP 50 mm long



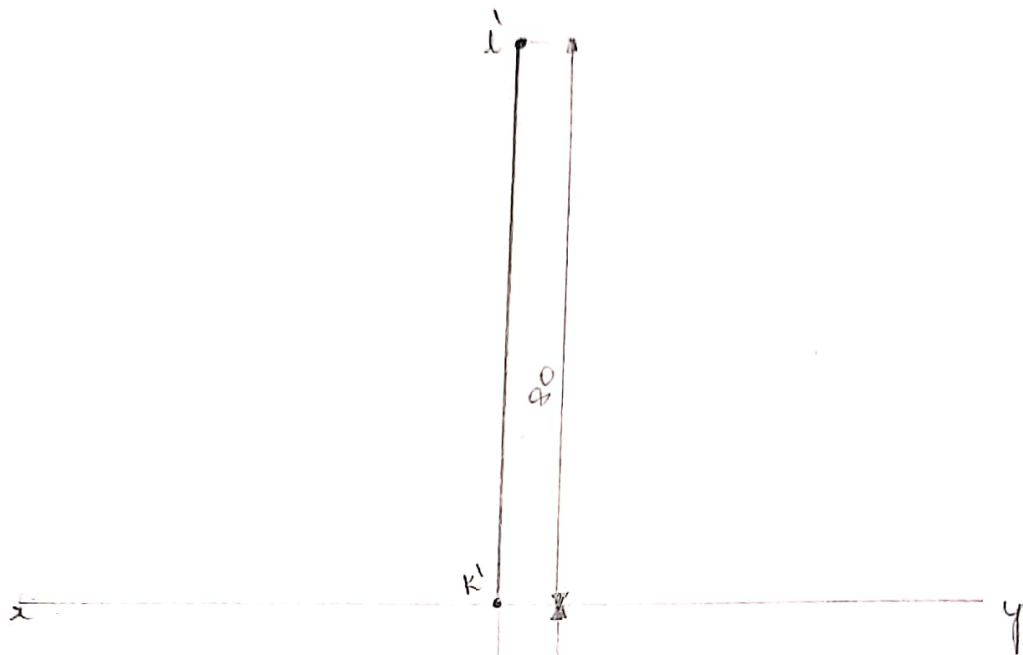
5) A line 'AB' 65mm long  $\perp$  to H.P,  $\parallel$  to V.P.  
 one of the end 'A' is 10mm above H.P.



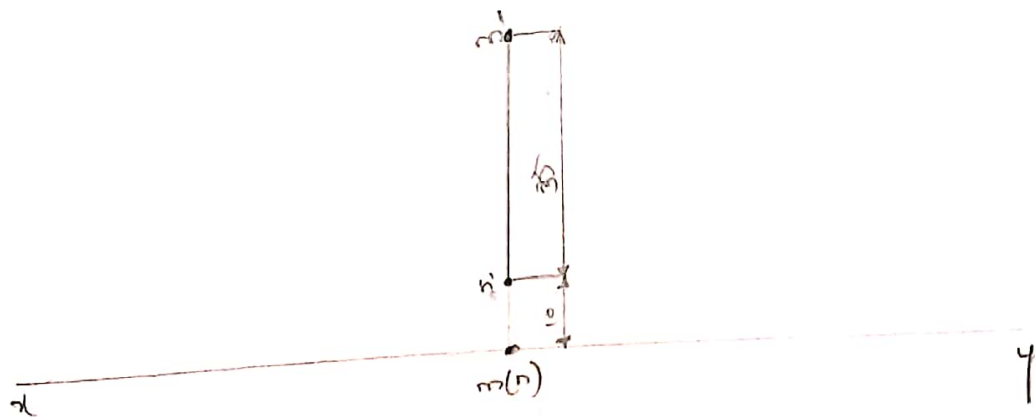
6) A line 'PQ' having 50mm long its end Q is 20mm  
 in front of V.P and touches to H.P



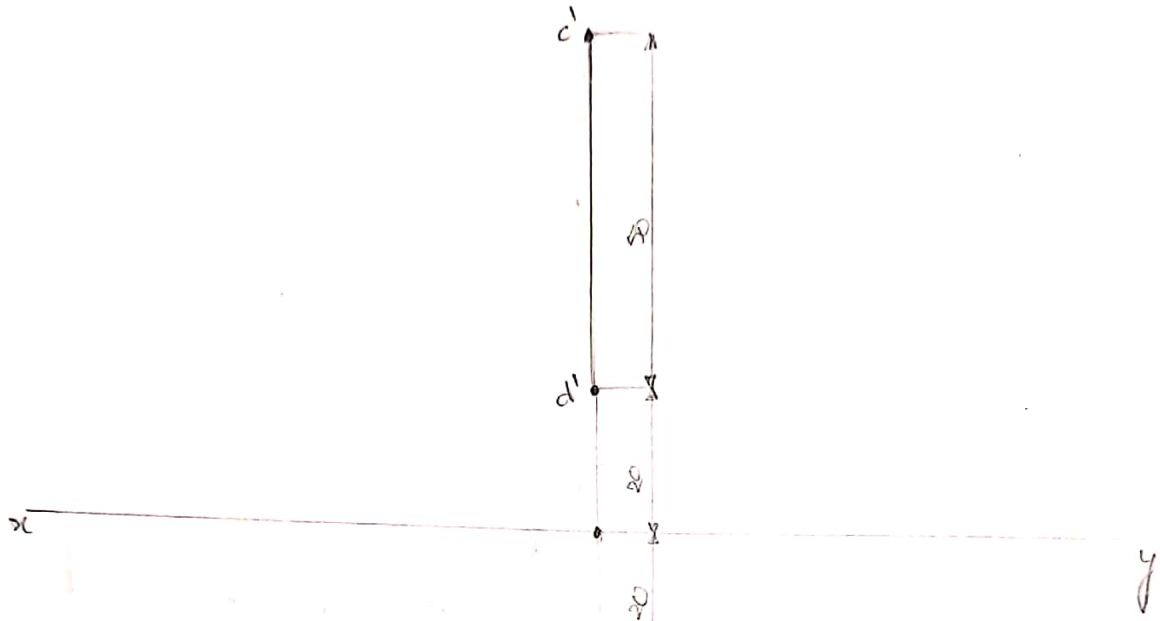
7, A line 80mm long & its end K is 35mm in front of VP and the line is  $\perp^{loc}$  to HP.



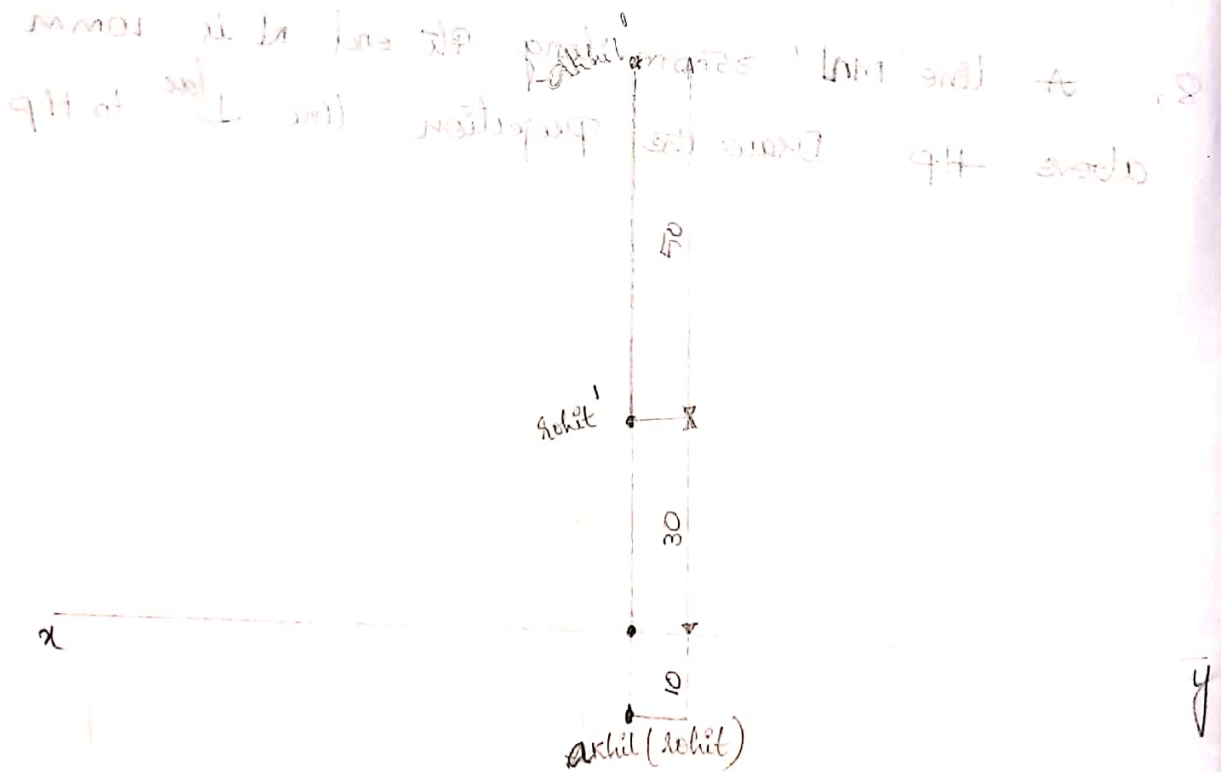
8, A line 'MN' 35mm long & its end N is 10mm above HP. Draw the projection line  $\perp^{loc}$  to HP.



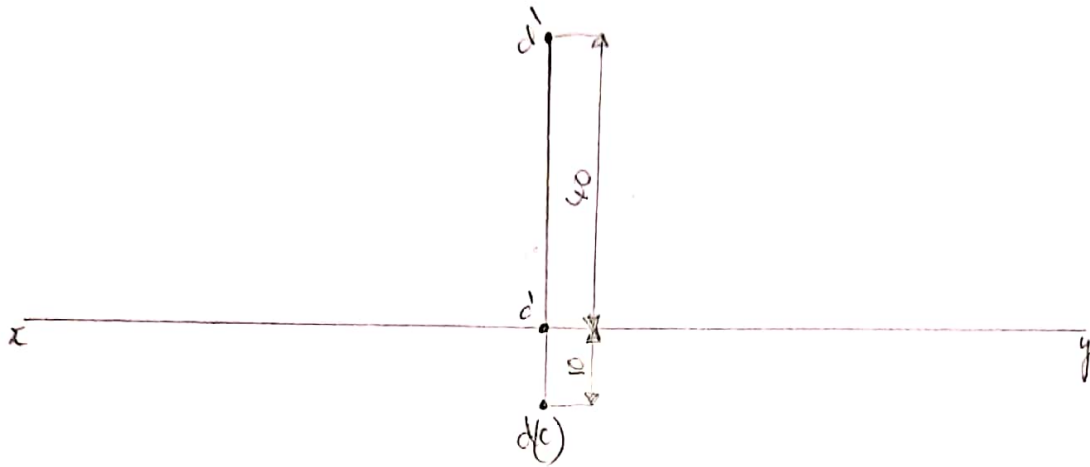
9. A line CD  $\perp$  to HP 50 mm long its end D is 20 mm above HP 20 mm in front of VP.



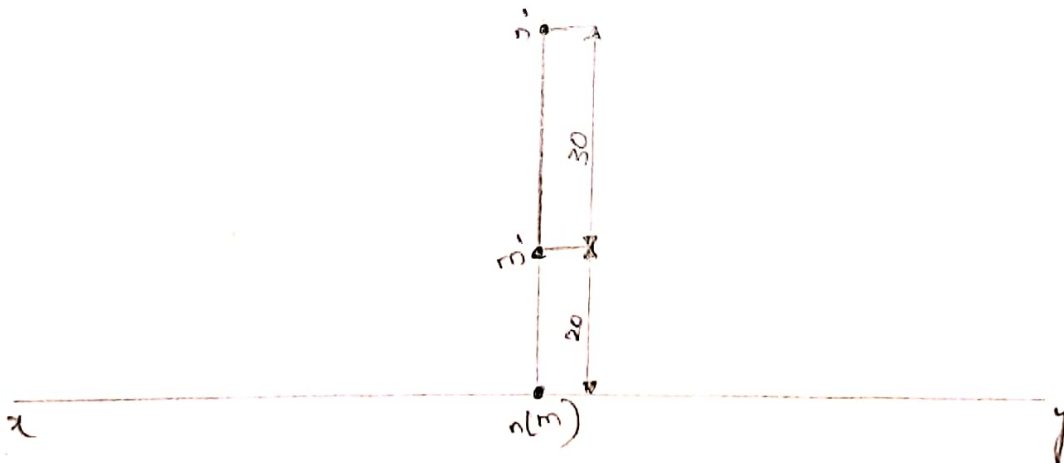
10. A line  $\perp$  to HP 50 mm long its end  $\text{achil}$  is 80 mm above HP, 10 mm in front of VP. The line is  $\perp$  to HP.



11, A line CD 40mm long its end 'c' is touches to HP  
 10mm in front of VP. The line is  $\perp$  to H.P,  $\parallel$  to VP.



12, A line MP 30mm long its end M is 20mm above  
 HP and the line  $\perp$  to HP,  $\parallel$  to VP. Draw the  
 projections.



130/10/19

UNBT-3

PROJECTION OF PLANES

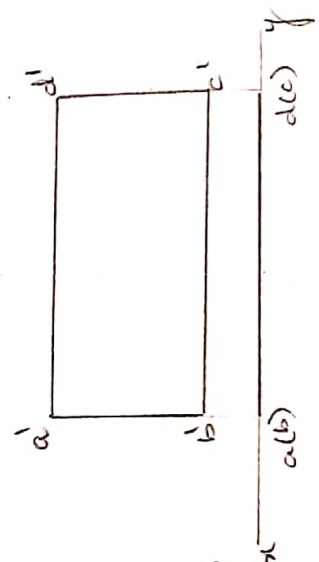
Rectangle

□ plane is resting on VP with shortest edge / side

□ plane is resting on HP with shortest edge / side

□ plane longest side / edge is resting on VP

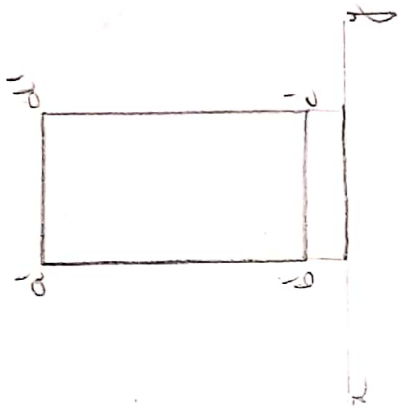
□ plane longest side / edge is resting on HP



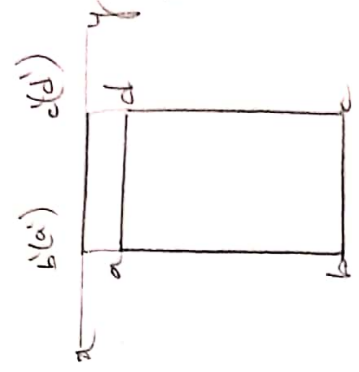
Shortest edge / side is parallel to VP, Perpendicular to HP.



Shortest edge / side is  $\perp$  to HP and  $\parallel$  to VP



Longest edge / side is  $\parallel$  to HP and  $\perp$  to VP

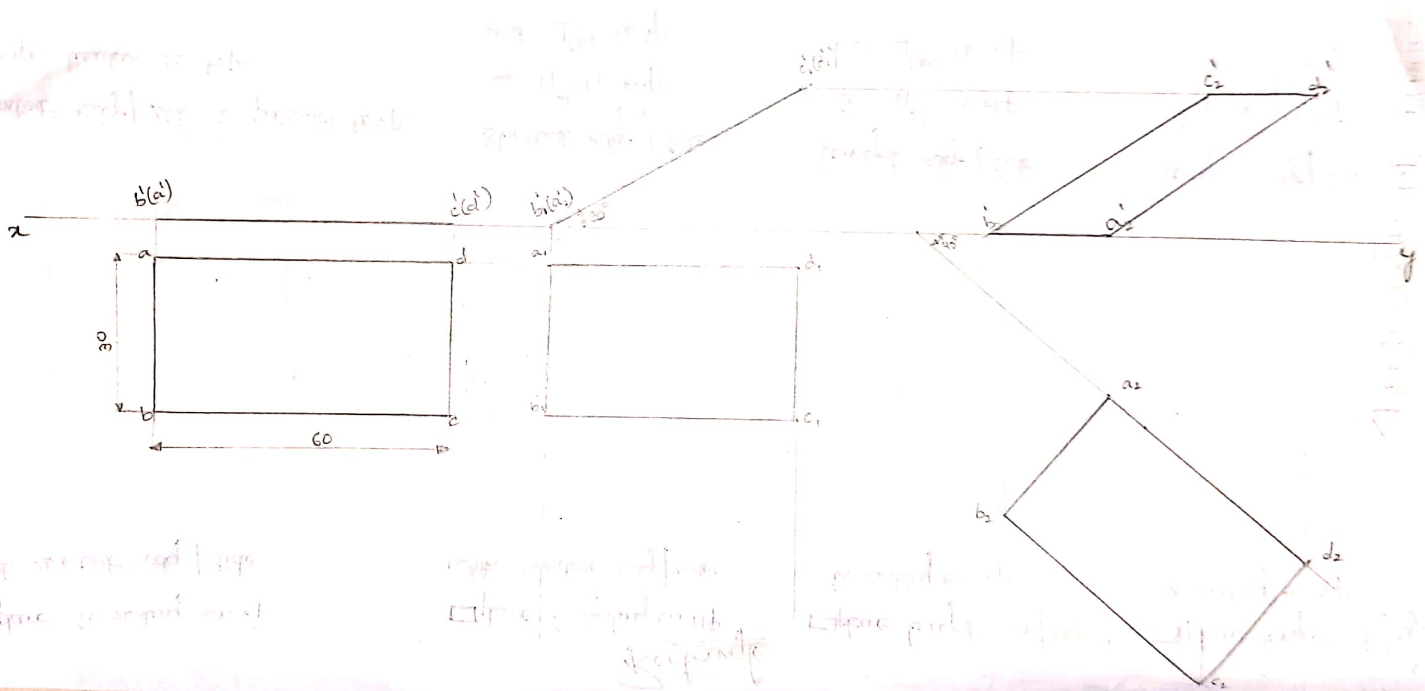


Longest edge / side is  $\parallel$  to VP and  $\perp$  to HP

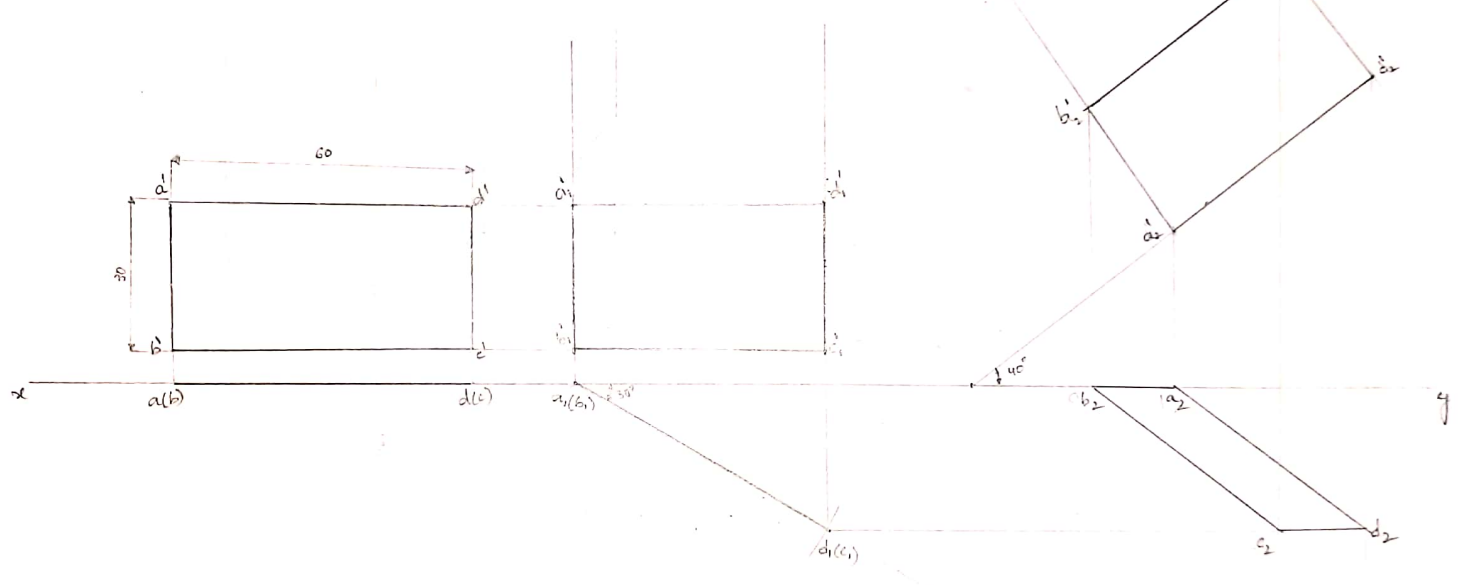
*Handwritten notes on the right side of the page, partially obscured and difficult to read.*



b) A rectangular plate 60x30 sides it is lying on the HP with shortest edges. The surface makes an angle  $30^\circ$  to the HP and also the longest edge makes an angle  $40^\circ$  to the VP.

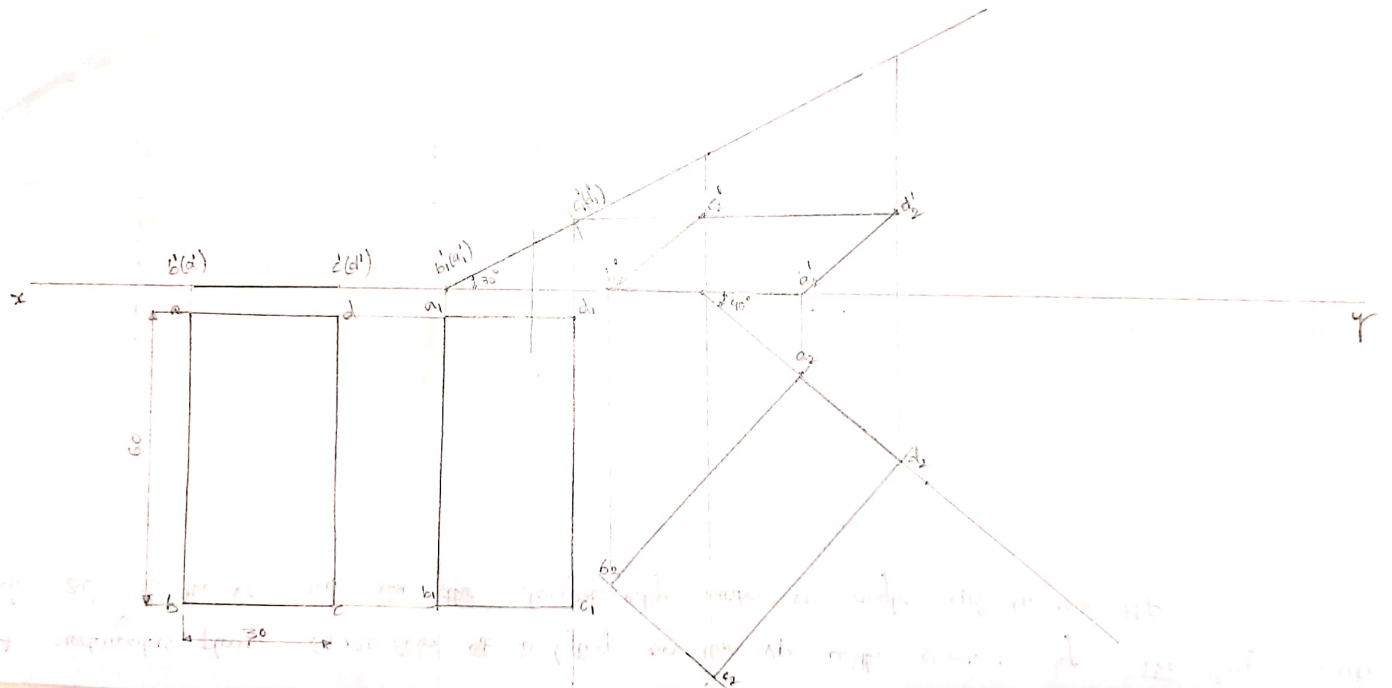


2, A rectangular plane 60x30 sides it is lying on the VP with shortest edges. The surface makes an angle  $30^\circ$  to the VP and also the longest edge makes an angle  $40^\circ$  to the HP

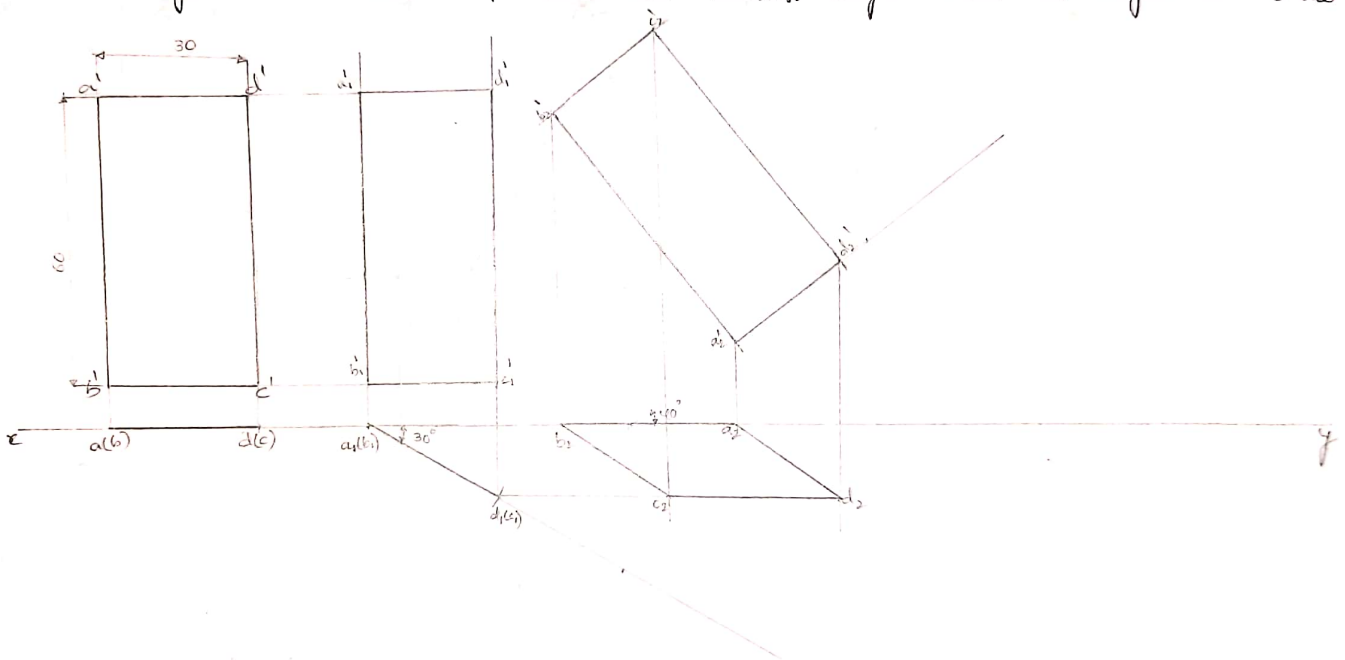


*Faint handwritten notes at the bottom of the page, likely describing the construction steps or providing additional context for the drawing.*

3, A <sup>vertical mirror</sup> rectangular shape plane 60x30 sides it is lying on the HP with longest edges. The surface makes an angle  $30^\circ$  to the HP and also the shortest edge makes an angle  $40^\circ$  to the VP.



4, A rectangular plane  $60 \times 30$  sides it is lying on the V.P with longest sides. The surface makes an angle  $30^\circ$  to the H.P and also shortest edge makes an angle  $40^\circ$  to the H.P.

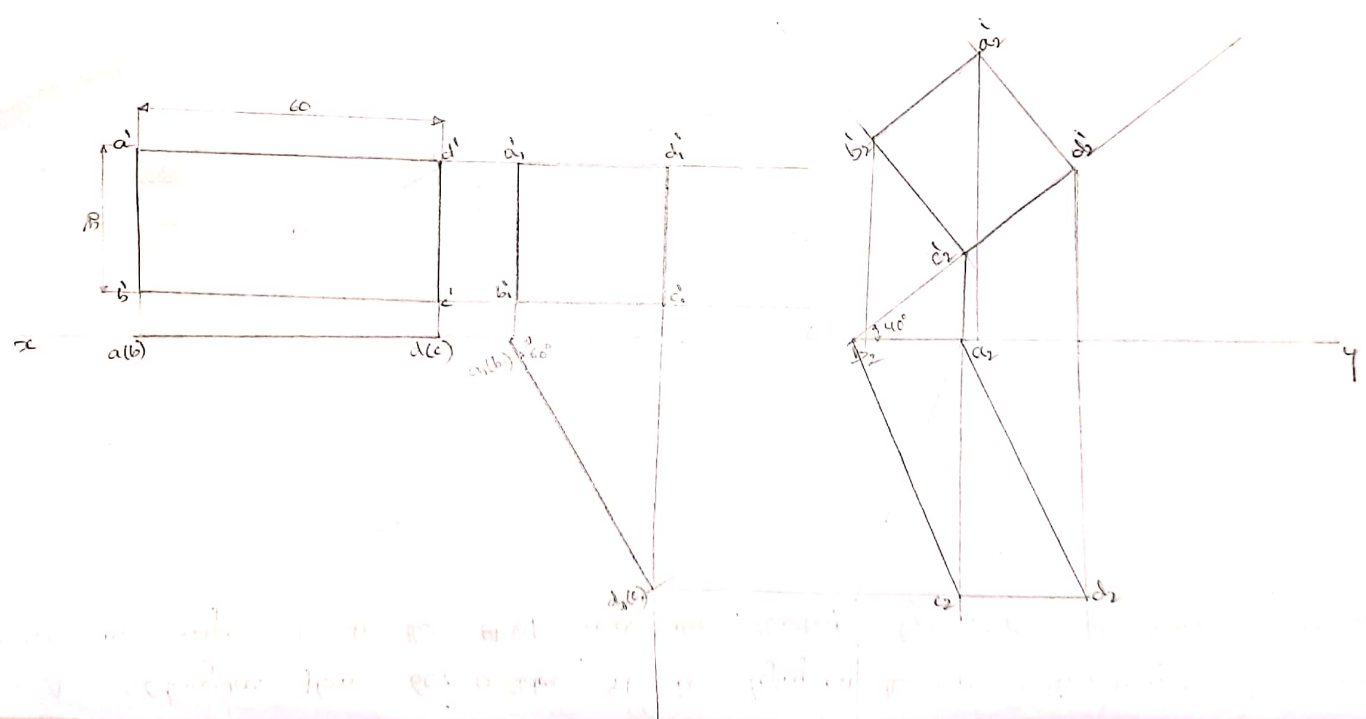


Section construction of a/c

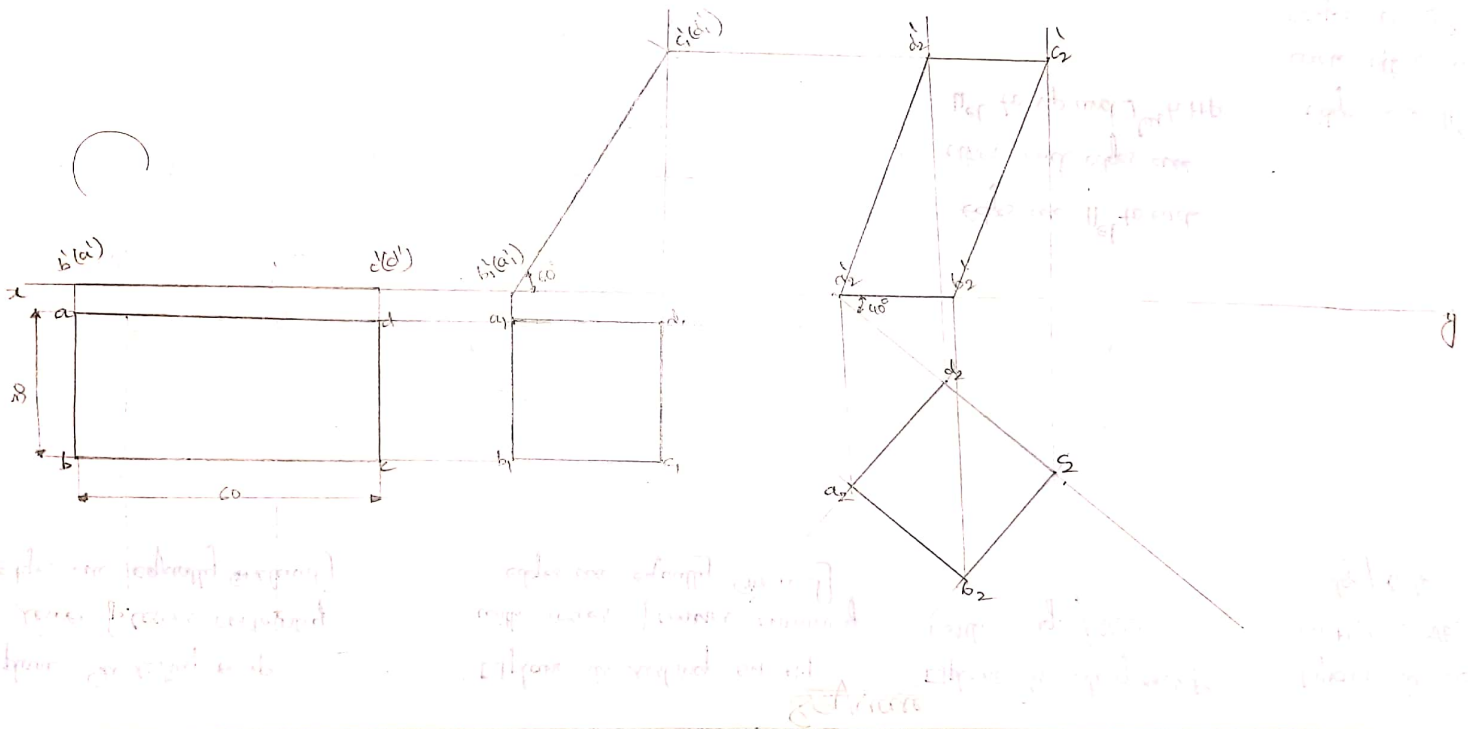
When a plane is inclined to the H.P. the true shape of the plane is not shown in the front view. The true shape is shown in the top view.

2) If a rectangular surface is inclined to the H.P. the true shape of the surface is not shown in the front view. The true shape is shown in the top view.

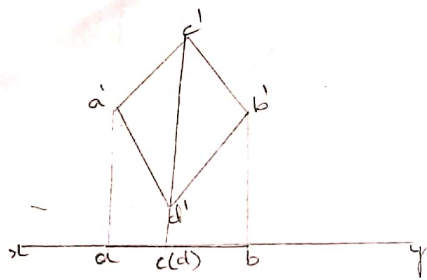
5, A rectangular lamina having 60x30 sides it is lying on VP with shortest sides. The front view appears as a square and the shortest edge of plane makes an angle  $40^\circ$  to the H.P. - find out the surface inclination of VP.



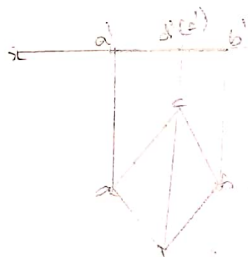
6, → A rectangular lamina having 60x30 sides. It is lying on H.P with shortest sides. The front top view appears as a square and the shortest side of plane makes an angle  $40^\circ$  to the H.P. Find out the Surface Inclination of H.P.



□ plane is resting on VP with corner [corner containing edges are equally inclined]

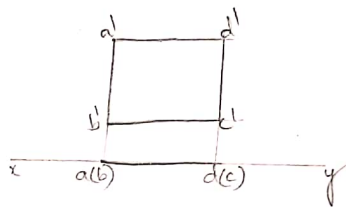


□ plane is resting on H-P with corner [corner containing edges are equally inclined]



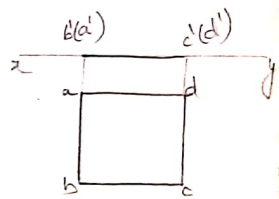
Square

□ plane is resting on VP with edge/side



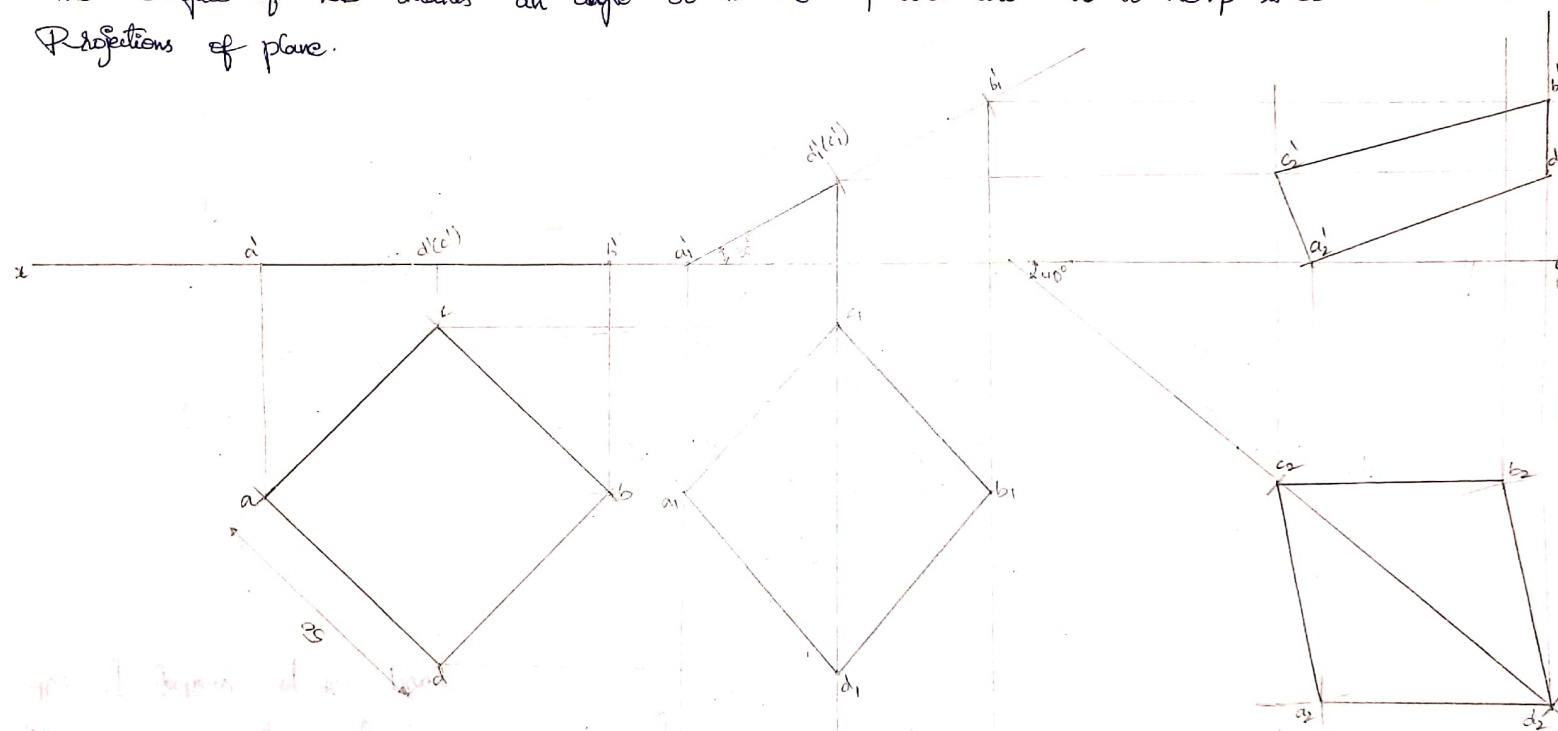
edges are  $\parallel^{el}$  to each other and edges are  $\perp^{lar}$  to VP and  $\perp^{lar}$  to HP

□ plane is resting on HP with edge/side.



edges are  $\parallel^{el}$  to each other and edges are  $\perp^{lar}$  to VP and  $\parallel^{el}$  to HP

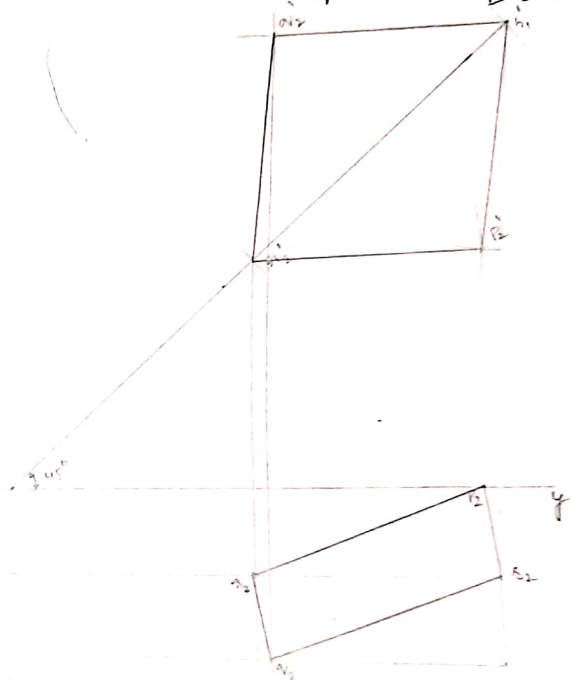
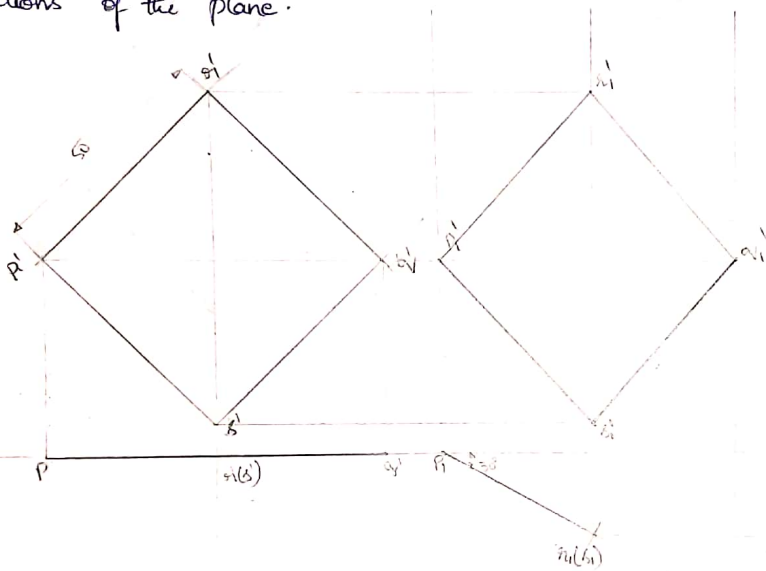
1. A Square lamina ABCD is <sup>50mm</sup> lying on H.P and the corner containing edges are equally Inclined. The surface of AB makes an angle  $30^\circ$  to the H.P and also  $45^\circ$  to the V.P is CD. Draw the Projections of plane.



*[Faint handwritten notes in Hindi, likely describing the construction steps for the projections.]*

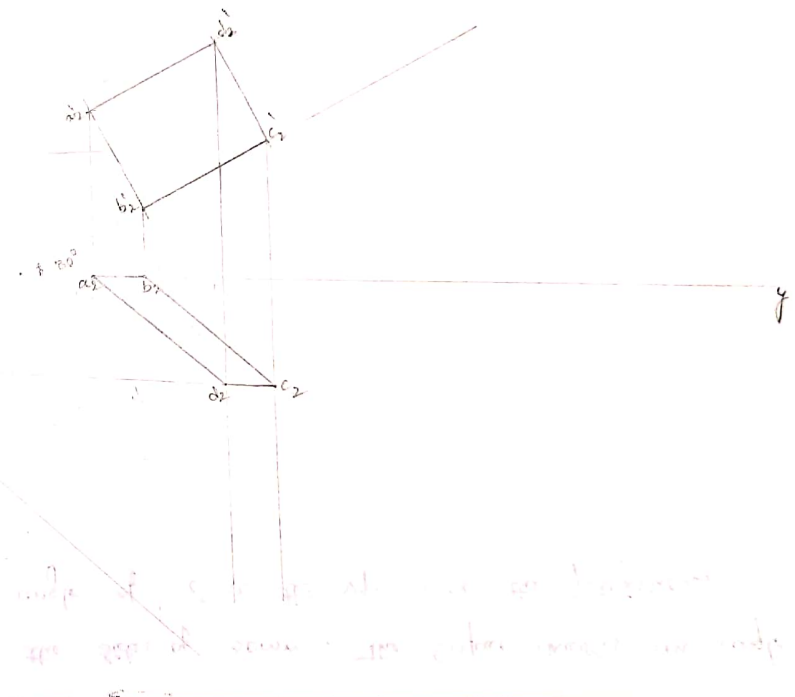
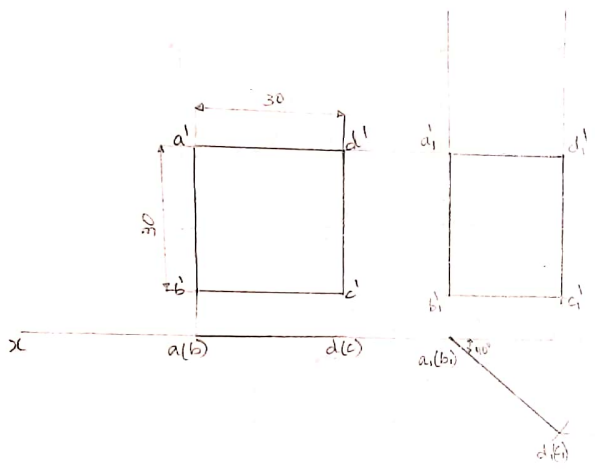


2) A square lamina PQRS is 50mm long on VP and the corner containing edges are equally inclined. The surface of PQ makes an angle  $30^\circ$  to the VP and also  $45^\circ$  to the HP is RS. Draw the projections of the plane.



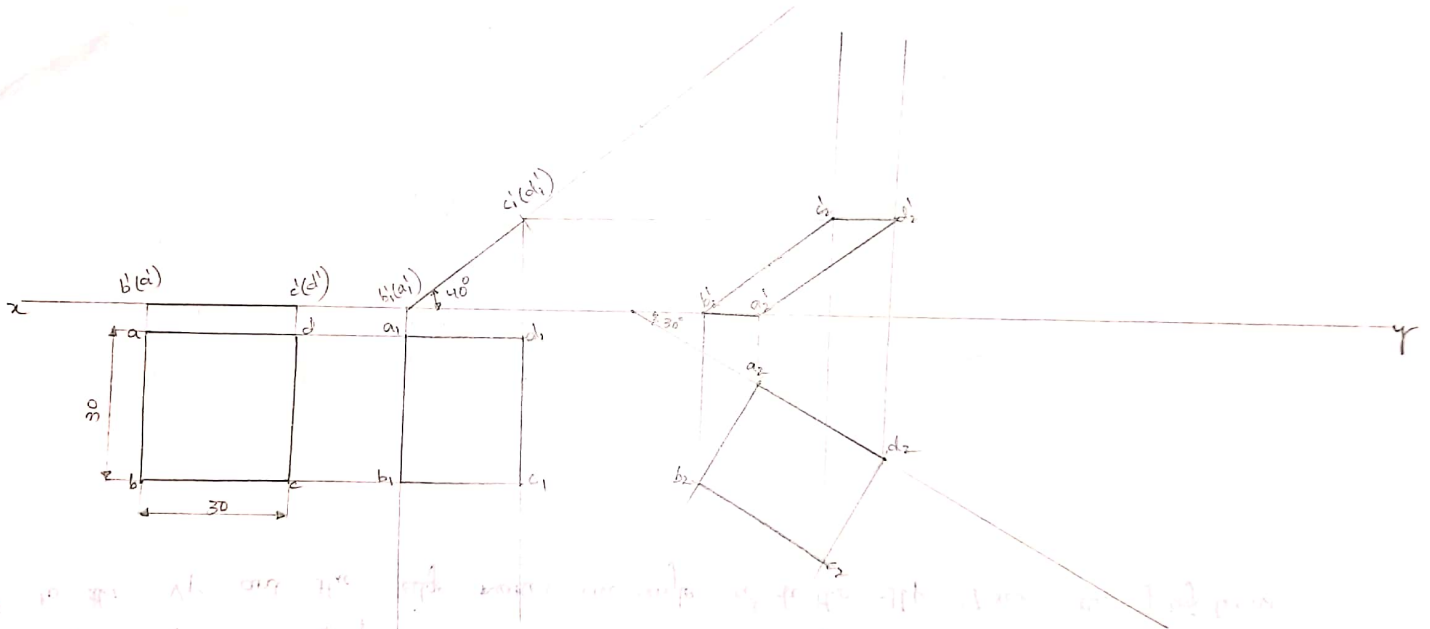
*Handwritten notes in Hindi:*  
 1. The surface of the plane is inclined to the VP and HP.  
 2. The corner containing edges are equally inclined.  
 3. The surface of PQ makes an angle of 30 degrees to the VP and 45 degrees to the HP.  
 4. The length of the square is 50mm.

3, A square plane is lying on VP with the sides having 30mm sides. The Surface makes an angle  $40^\circ$  to the VP and the edge makes an angle  $30^\circ$  to the HP. Draw the projections.



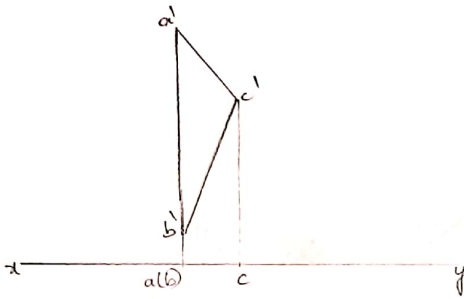
*Faint handwritten notes in red ink, likely describing the construction steps for the isometric drawing.*

4) A square plane is lying on H.P with the sides of 30mm. The surface makes an angle of  $40^\circ$  to the H.P and the edge makes an angle of  $30^\circ$  to the V.P. Draw the projections.



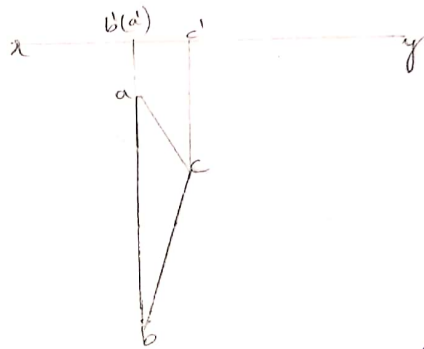
Set Squares

A set square 30.60 lying on VP with longest side.



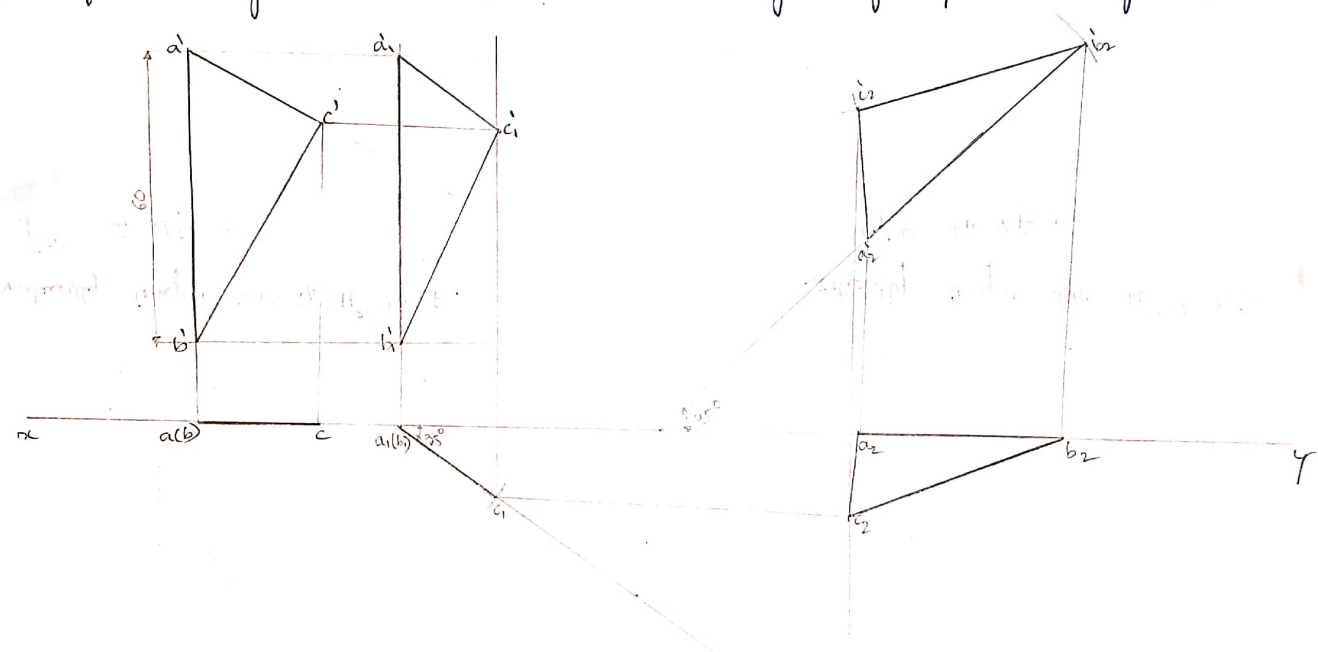
vertically longest side is  $\parallel^{el}$  to V.P.,  
 $\perp^{lar}$  to H.P.

A set square 30x60 lying on H.P with longest side.



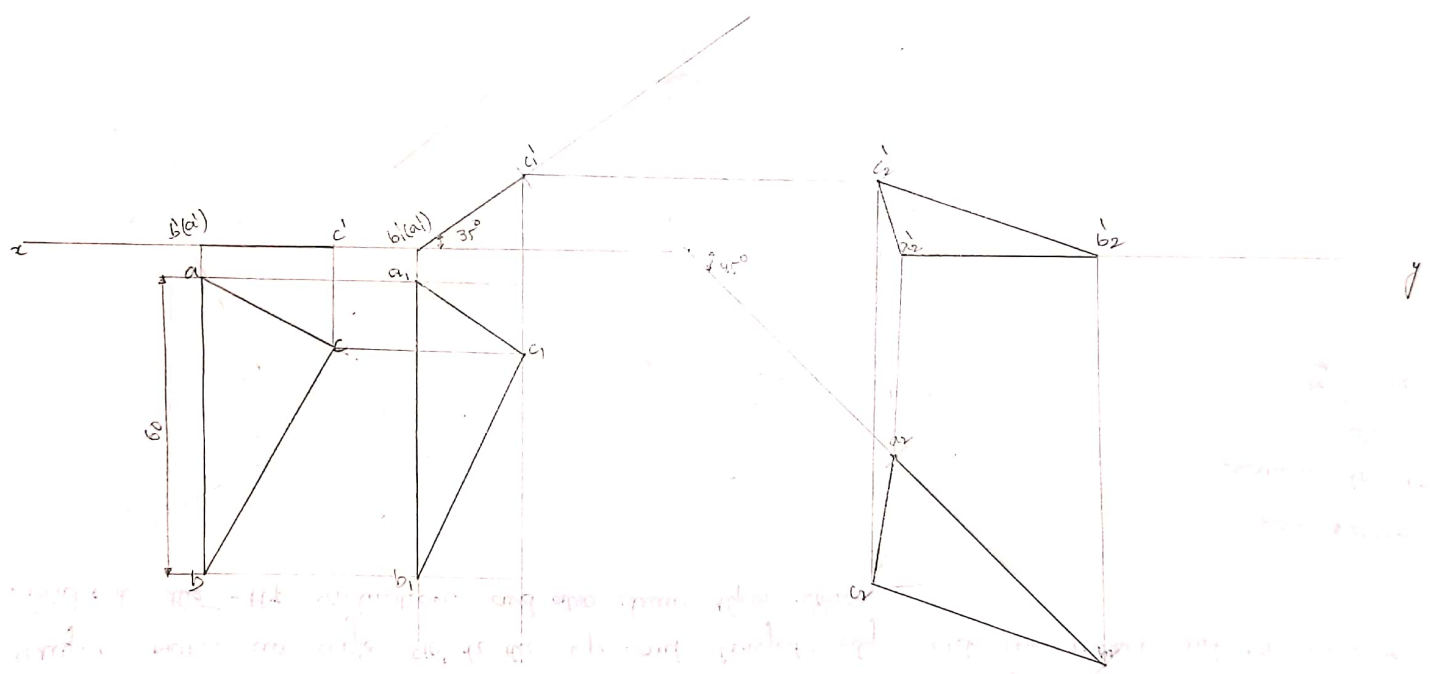
vertically longest side  $\parallel^{el}$  to H.P.  
 $\perp^{lar}$  to V.P.

1, — A set square  $30^\circ$  and  $60^\circ$  having 60mm longest side is lying on VP with longest edge and the surface makes an angle  $35^\circ$  to the VP and also the longest edge makes an angle  $45^\circ$  to the H-P

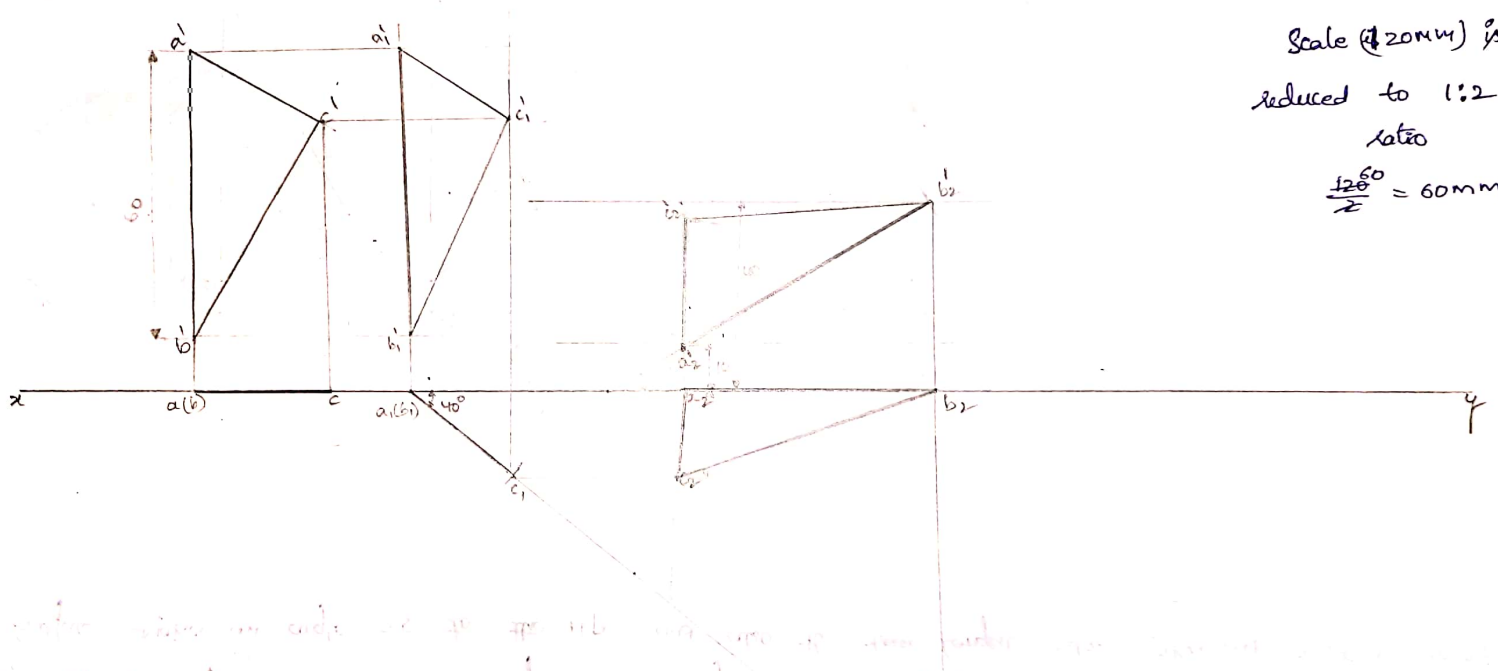


a' b' c' 60  
 a(b) c a<sub>1</sub>(b<sub>1</sub>) 35°  
 a<sub>2</sub> b<sub>2</sub> 45°  
 X Y

Q. A set square  $30^\circ$  and  $60^\circ$  having 60mm longest side is lying on H.P with longest edge and the surface makes an angle  $35^\circ$  to the H.P and also the ~~longest~~ longest edge makes an angle  $45^\circ$  to the V.P.



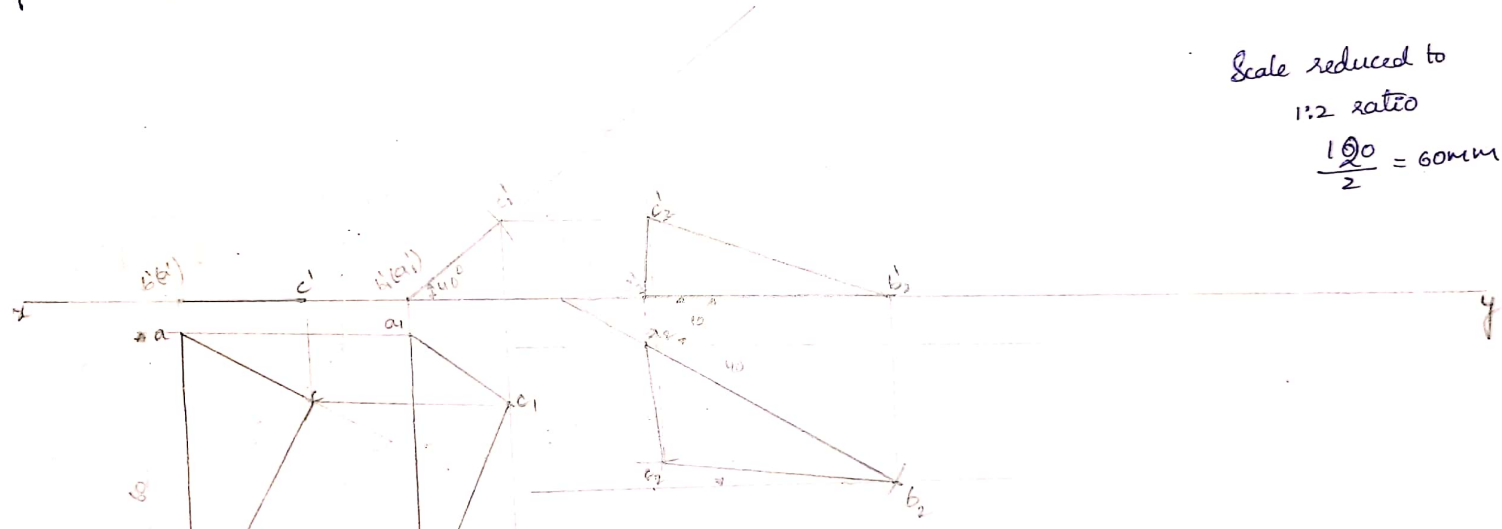
3, A set square  $30^\circ, 60^\circ$  is lying on V.P with vertical edge having 120mm long and the surface makes an angle  $40^\circ$  to the V.P and longest edge ends are 10mm and 40mm above H.P. find out the H.P inclination and also draw their views.



Scale (120mm) is  
reduced to 1:2  
ratio  
 $\frac{120}{2} = 60\text{mm}$

4. A Set Square  $30^\circ, 60^\circ$  is lying on H.P with vertical edge having 120mm long and the surface makes an angle  $40^\circ$  to the H.P and longest edge ends are 10mm and 40mm in front of V.P. find out the V.P inclination and also draw their views.

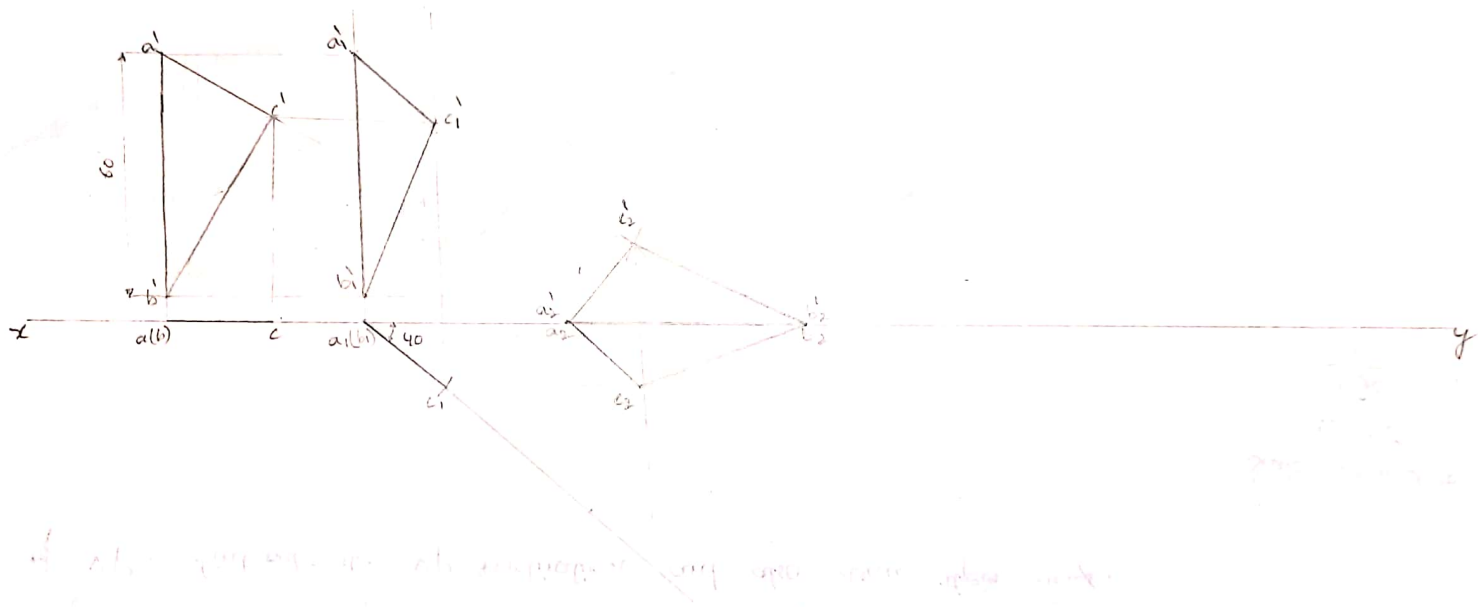
Scale reduced to  
 1:2 ratio  
 $\frac{120}{2} = 60\text{mm}$



1. To find the true shape and size of the set square, the front view is drawn as a vertical line of length 60mm. The top view is drawn as a line of length 50mm (10+40) inclined at  $40^\circ$  to the XY line. The true shape is obtained by projecting the front view and the top view and finding their intersection points.

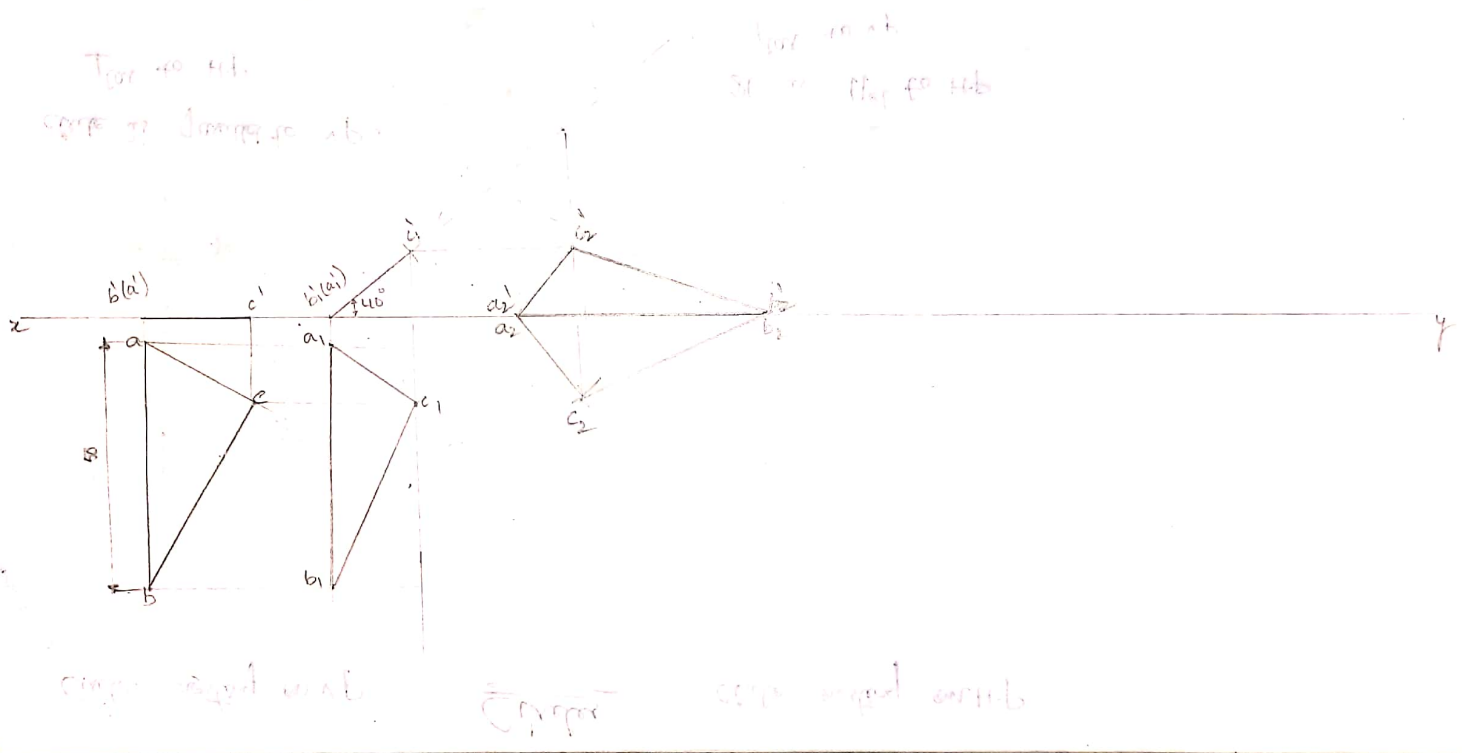


5, A set square having 50mm long vertical edge is lying on the wall vertically. And the surface makes an angle  $40^\circ$  to the v.p and the longest side is parallel to both planes and it is lying on the both H.P and V.P.



*[Faint handwritten notes in Hindi, likely describing the construction steps for the projections.]*

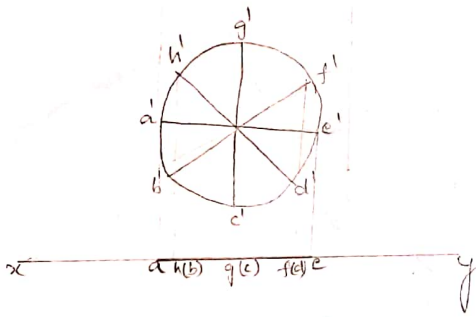
6. A set square having 50mm long vertical edge is lying on the ground vertically. And the surface makes an angle  $40^\circ$  to the H.P and the longest side is parallel to both planes and it is lying on the both H.P and V.P.



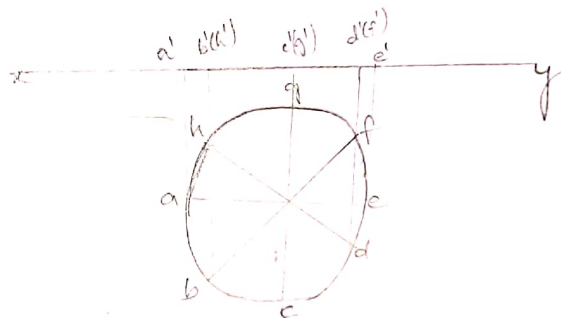
Circle resting on v.p

Circles

Circle resting on H.P

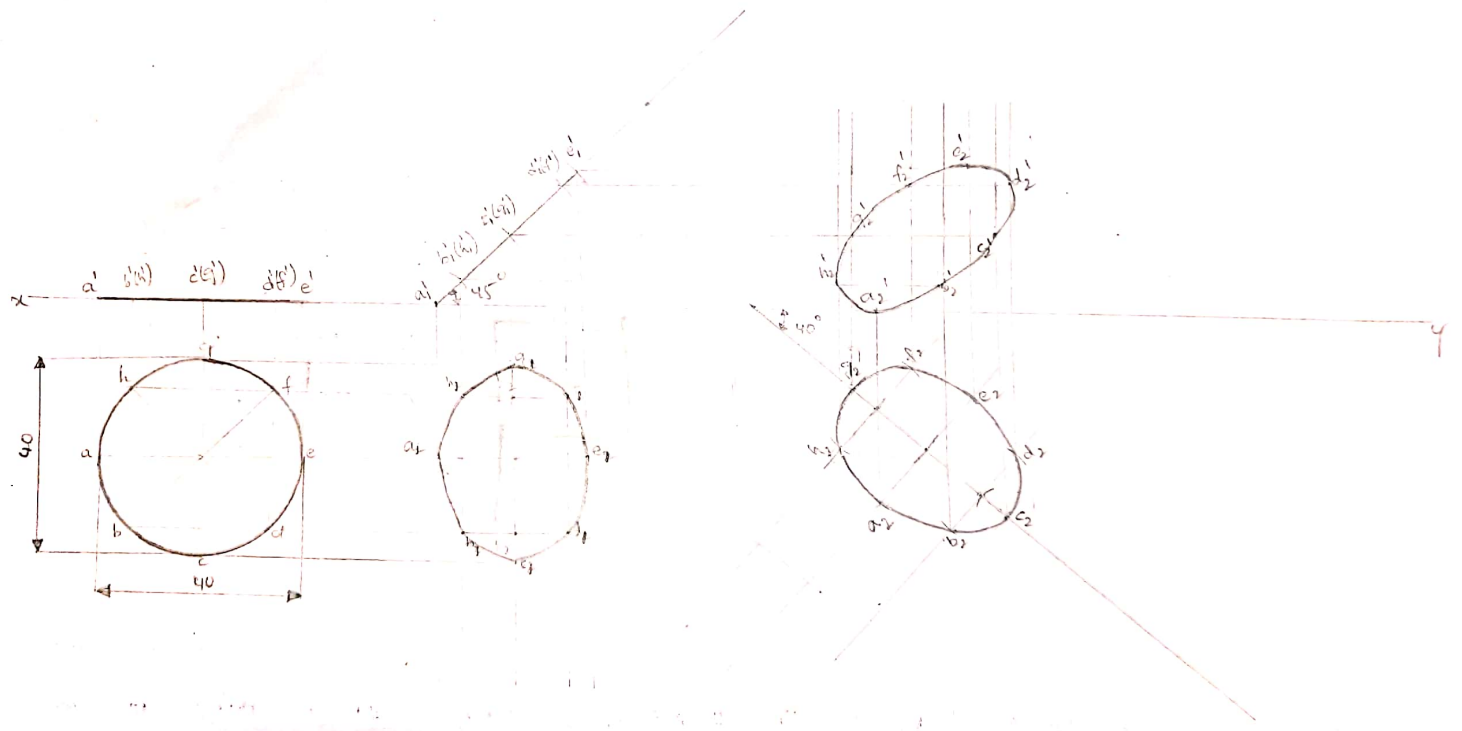


circle is parallel to v.p,  
 $\perp$  to H.P

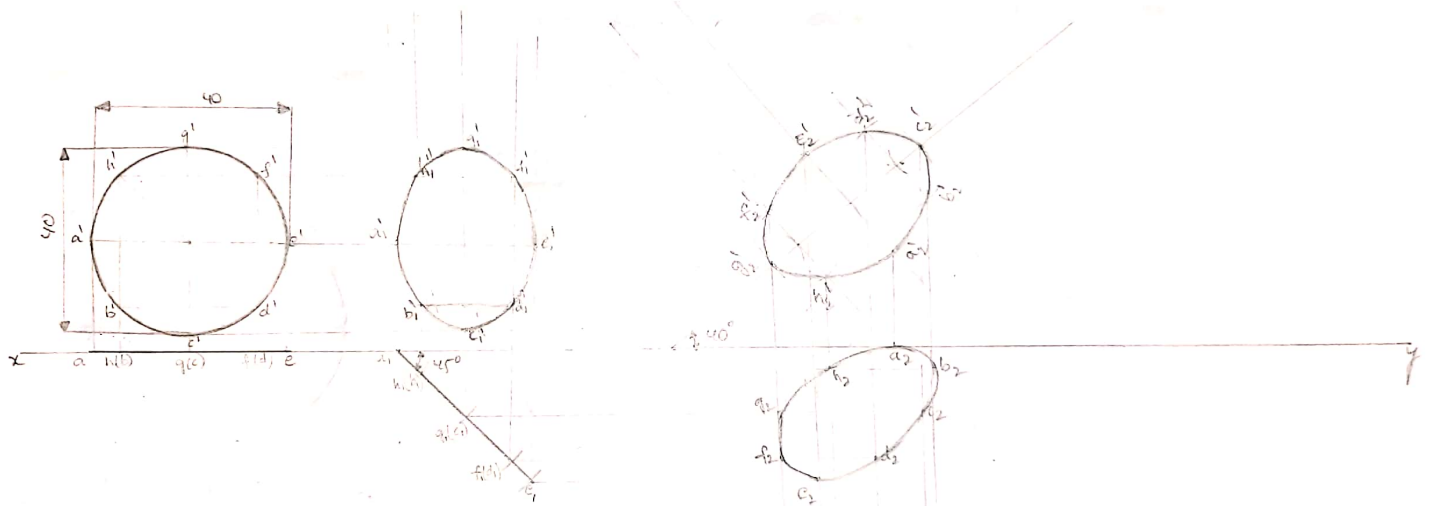


It is  $\parallel$  to H.P  
 $\perp$  to v.p

1) A circular lamina having 40mm dia is lying on H.P. The surface is  $45^\circ$  to H.P.,  $\perp$  to V.P. And the surface makes angle  $45^\circ$  to the H.P. and also  $40^\circ$  to V.P. Draw the projections.

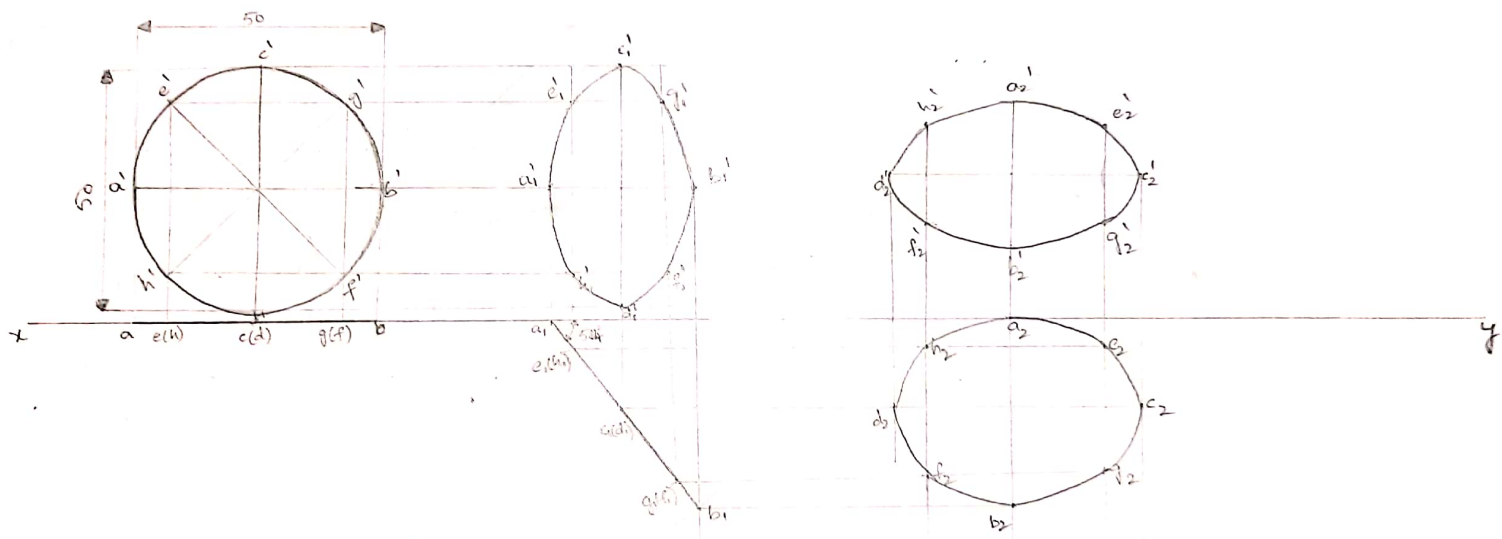


2, → A circular lamina having 40mm dia is lying on V.P. The surface is  $\parallel^{el}$  to V.P,  $\perp^{lar}$  to H.P. And the surface makes angle  $45^\circ$  to the V.P and also  $40^\circ$  to H.P. Draw the projections.



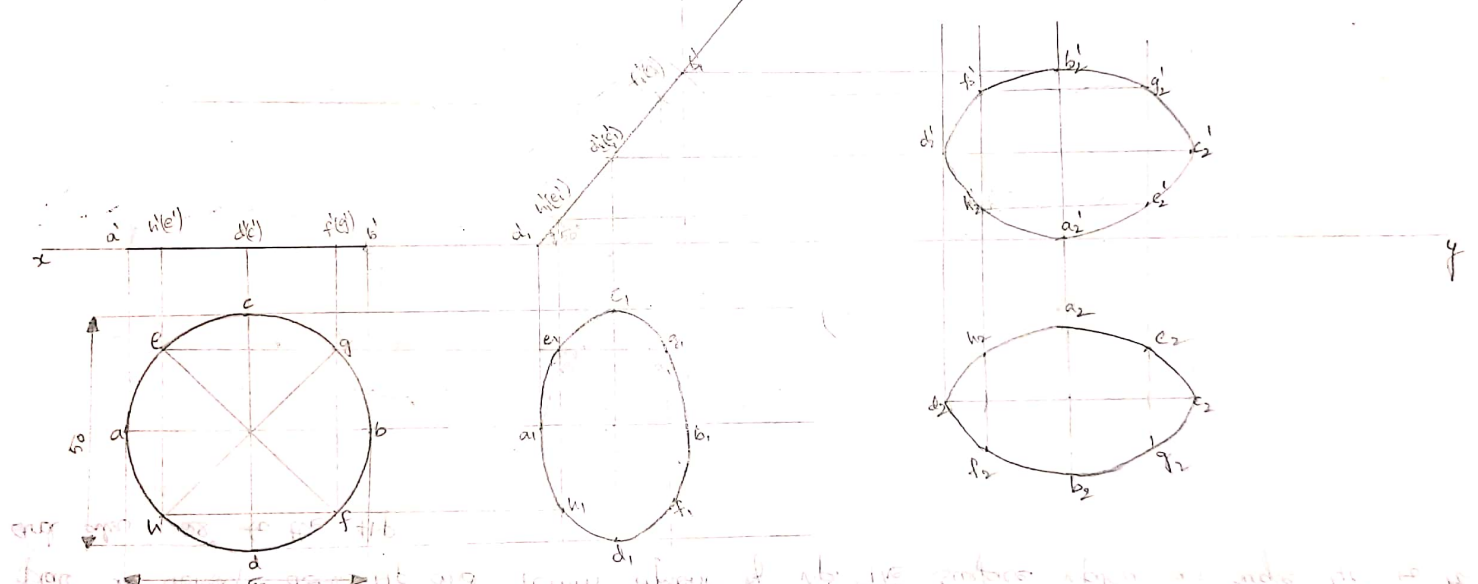
7/10/20  
 The surface is parallel to the vertical plane and perpendicular to the horizontal plane. The surface makes an angle of 45 degrees with the vertical plane and 40 degrees with the horizontal plane. The front view is a circle of diameter 40mm. The top view is an ellipse. The true shape and size of the lamina is a circle of diameter 40mm.

3, A circular lamina having 50mm diameter AB is lying on VP. The surface is  $\parallel$  to VP and  $\perp$  to HP. The front view appears as an elliptical. The major axis is 30mm - find out the VP inclination. The minor axis is vertical horizontally and  $\perp$  to the major axis. [The major axis is  $\perp$  to the HP and the minor axis is  $\parallel$  to both HP and VP]. Draw the projections.



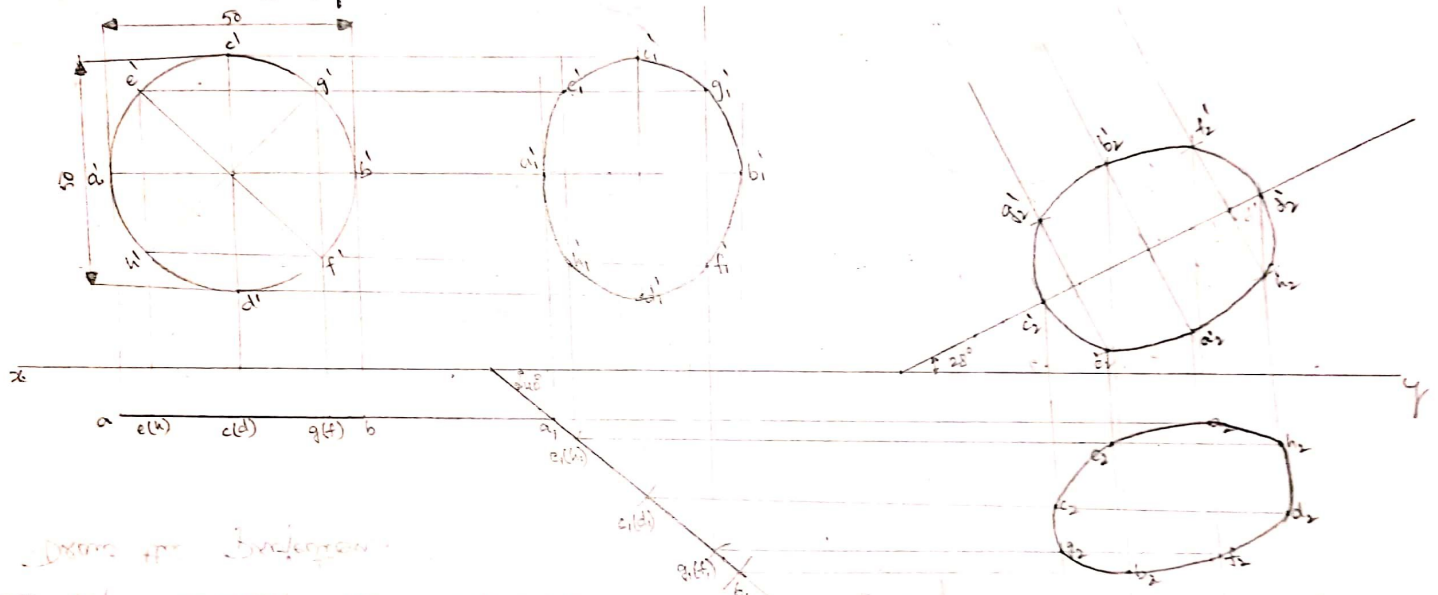
Ques. A circular lamina having 50mm diameter AB is lying on VP. The surface is  $\parallel$  to VP and  $\perp$  to HP. The front view appears as an elliptical. The major axis is 30mm - find out the VP inclination. The minor axis is vertical horizontally and  $\perp$  to the major axis. [The major axis is  $\perp$  to the HP and the minor axis is  $\parallel$  to both HP and VP]. Draw the projections.

Q. A circular lamina having 50mm diameter AB is lying on H.P. The surface is  $\parallel^{el}$  to H.P. and  $\perp^{ar}$  to V.P. The top view appears as an elliptical. The major axis is 30mm. Find out the H.P. inclination. The minor axis is rotated horizontally and  $\perp^{ar}$  to the major axis. Draw the projection.



Handwritten notes at the bottom of the page, partially obscured and difficult to read, likely providing additional details or instructions related to the drawing.

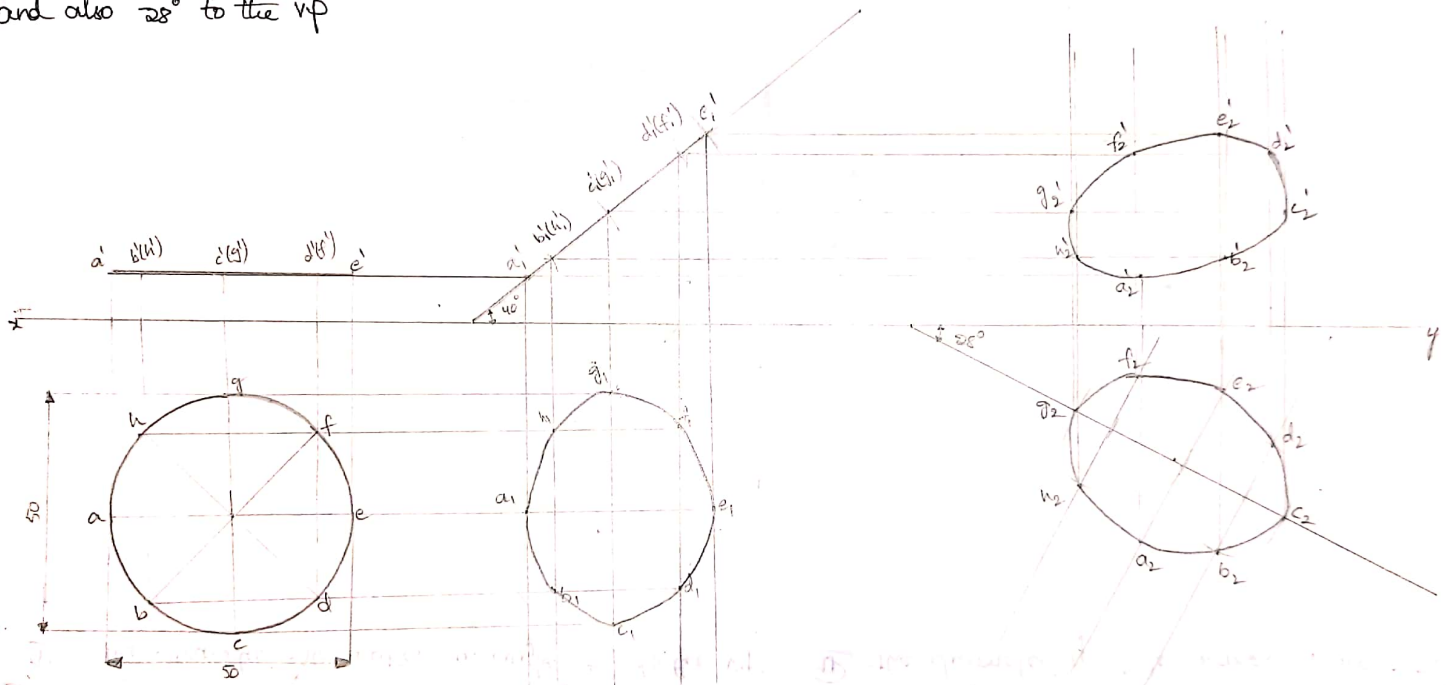
5) A thin circular plate having 50mm dia is lying on v.p. The centre point of circular plate is 40mm above H.P. and 10mm in front of v.p. The surface makes an angle  $40^\circ$  to the v.p. and also  $28^\circ$  to the H.P.



*Drawings for Envelope:*  
 The front view is a circle of 50mm diameter. The top view is an ellipse. The true shape is a circle of 50mm diameter. The front view is tilted at  $40^\circ$  to the VP and  $28^\circ$  to the HP. The top view is centered 10mm in front of the XY line. The true shape is centered 40mm above the XY line.

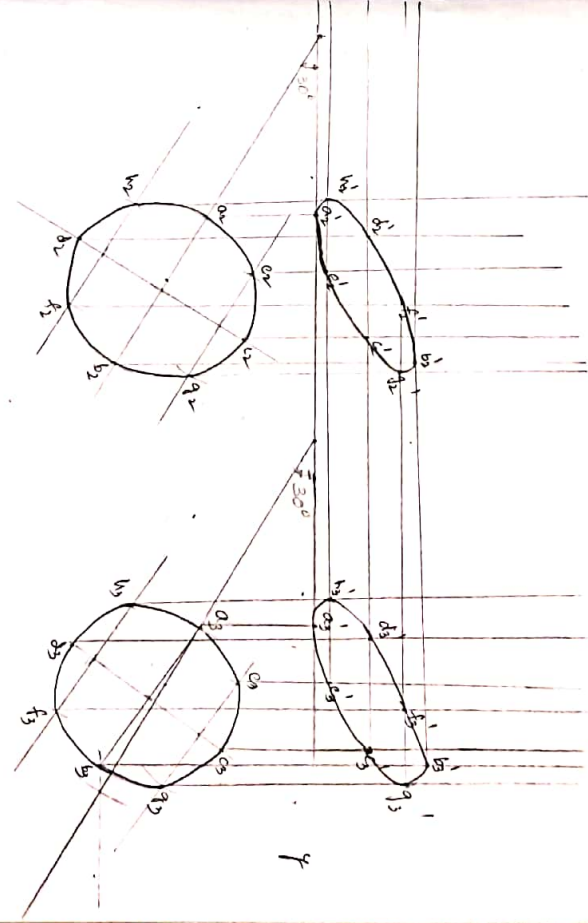
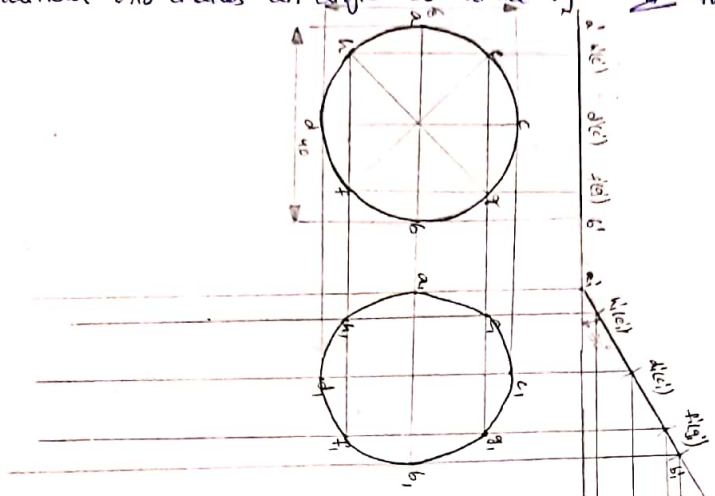


6, A thin circular plate having 50mm  $\phi$  lying on H.P. The centre point of circular plate is 10mm above H.P and 40mm in front of V.P. The surface makes an angle  $40^\circ$  to the H.P. and also  $28^\circ$  to the V.P.



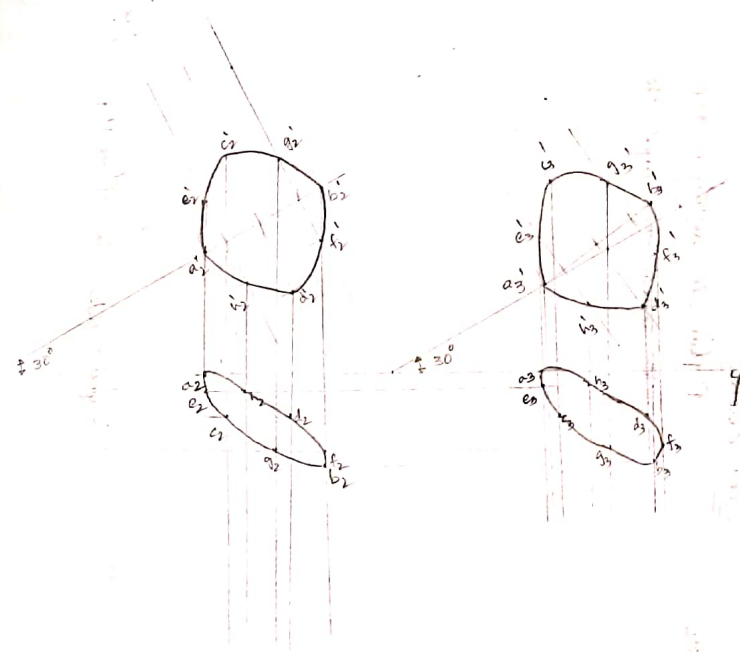
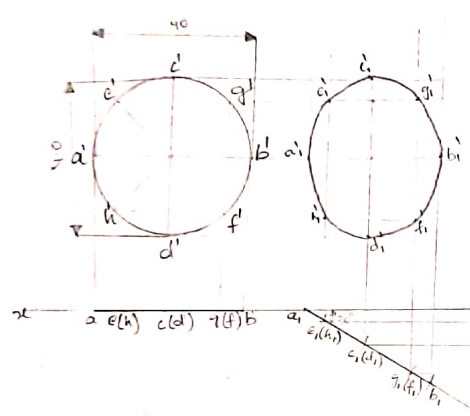
7. A circular lamina having 40mm dia AB is lying on HP and the surface is  $\parallel^{el}$  to HP &  $\perp^{lar}$  to VP. The surface makes an angle  $30^\circ$  to the HP.

I. The diameter AB makes an angle  $30^\circ$  to the VP. II. The diameter of circle makes an angle  $30^\circ$  to VP.

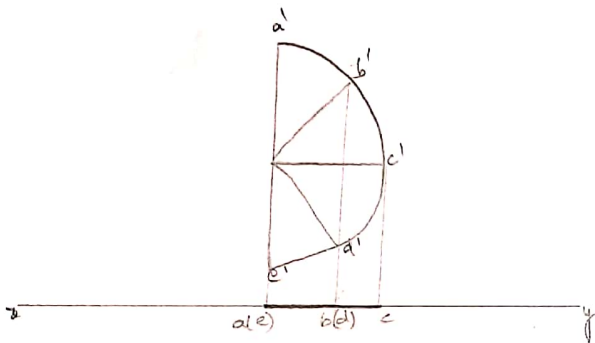


Q, A circular lamina having 40mm dia AB is lying on VP and the surface is  $\parallel^{el}$  to VP and  $\perp^{lar}$  to HP. The surface makes an angle  $30^\circ$  to the VP.

Q The dia AB makes an angle  $30^\circ$  to HP  $\perp$  The dia of circle makes an angle  $30^\circ$  to HP



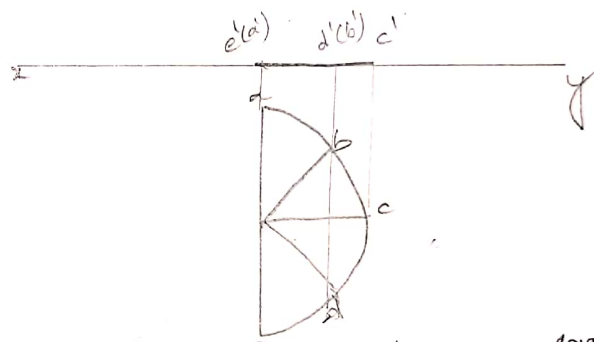
D plane is resting on v.p with  
vertical edge / longest side



longest side is  $\parallel$  to V.P.,  
 $\perp$  to H.P

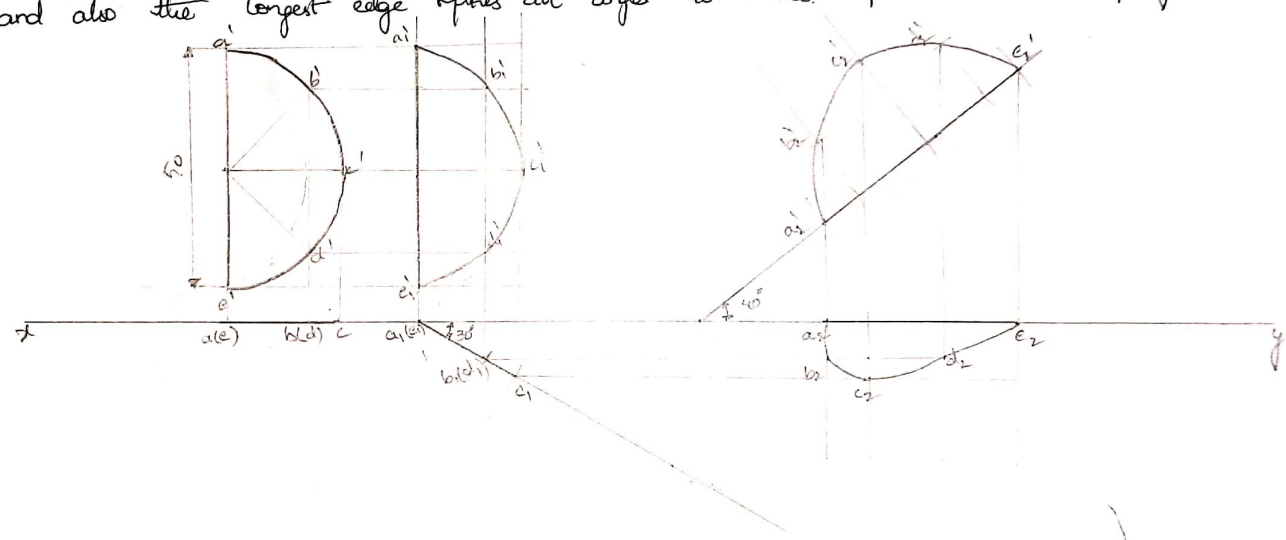
### Semi circles

D plane is resting on H.P  
with vertical edge / longest side.



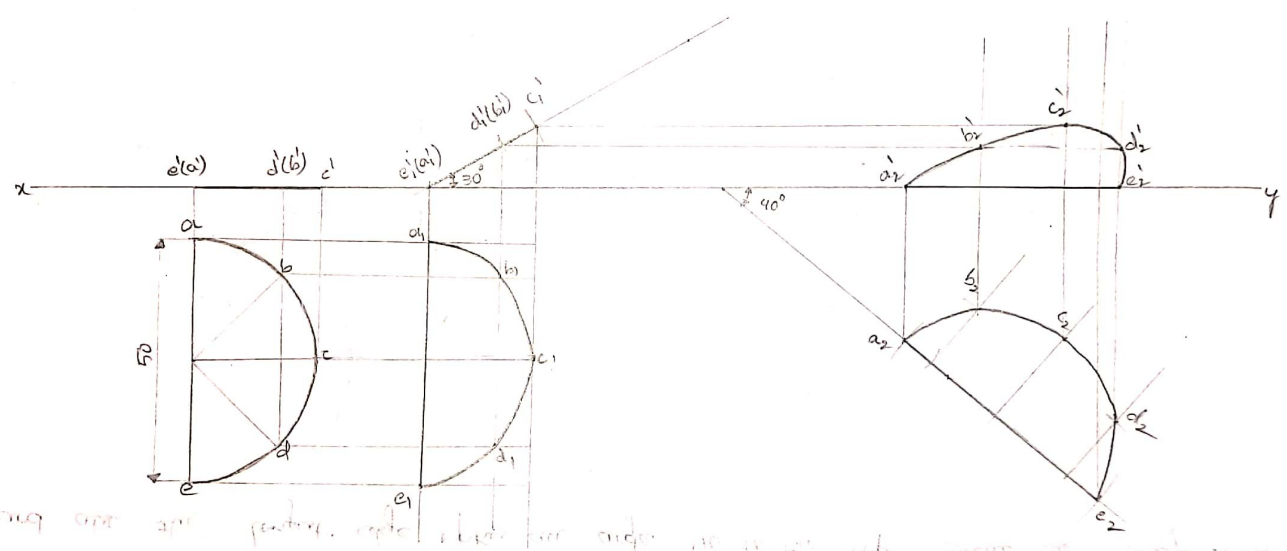
longest side is  $\parallel$  to H.P.,  $\perp$  to V.P

1, A semi-circular lamina having 50mm dia is lying on VP and the surface is  $\parallel^{el}$  to VP and  $\perp^{lar}$  to HP (longest edge is  $\parallel^{el}$  to VP,  $\perp^{lar}$  to HP). The surface makes an angle  $30^\circ$  to the VP and also the longest edge makes an angle  $40^\circ$  to the HP. Draw the projections.



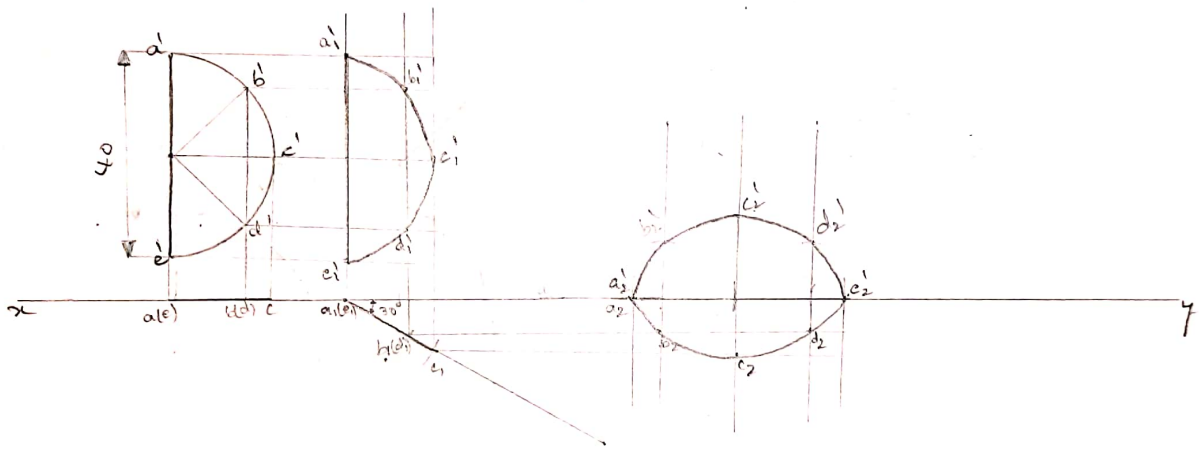
The semi-circular lamina is lying on the VP and the surface is parallel to the VP and perpendicular to the HP. The surface makes an angle of 30 degrees to the VP and the longest edge makes an angle of 40 degrees to the HP. The diameter of the lamina is 50mm. The projections are drawn as follows: 1. Front View: A semi-circle with a diameter of 50mm is drawn above the XY line. The center of the diameter is labeled 'a1' and 'e1'. The top and bottom points of the semi-circle are labeled 'b1' and 'd1' respectively. 2. Top View: A semi-circle is drawn below the XY line. The center of the diameter is labeled 'a2' and 'e2'. The top and bottom points of the semi-circle are labeled 'b2' and 'd2' respectively. 3. Side View: The lamina is shown inclined at 30 degrees to the XY line. The longest edge is inclined at 40 degrees to the XY line. The surface is represented by a semi-circular arc. The points are labeled 'a1', 'b1', 'c1', 'd1', 'e1' on the surface and 'a2', 'b2', 'c2', 'd2', 'e2' on the longest edge.

Q2, A semi circular lamina having 50mm dia. is lying on HP and the surface is  $\parallel^{el}$  to HP and  $\perp^{lar}$  to VP (longest edge is  $\parallel^{el}$  to HP and  $\perp^{lar}$  to V.P). The surface makes an angle  $30^\circ$  to the HP and also the longest edge makes an angle  $40^\circ$  to the VP. Draw the projections.



*[Faint handwritten notes and bleed-through from the reverse side of the page are visible below the diagram.]*

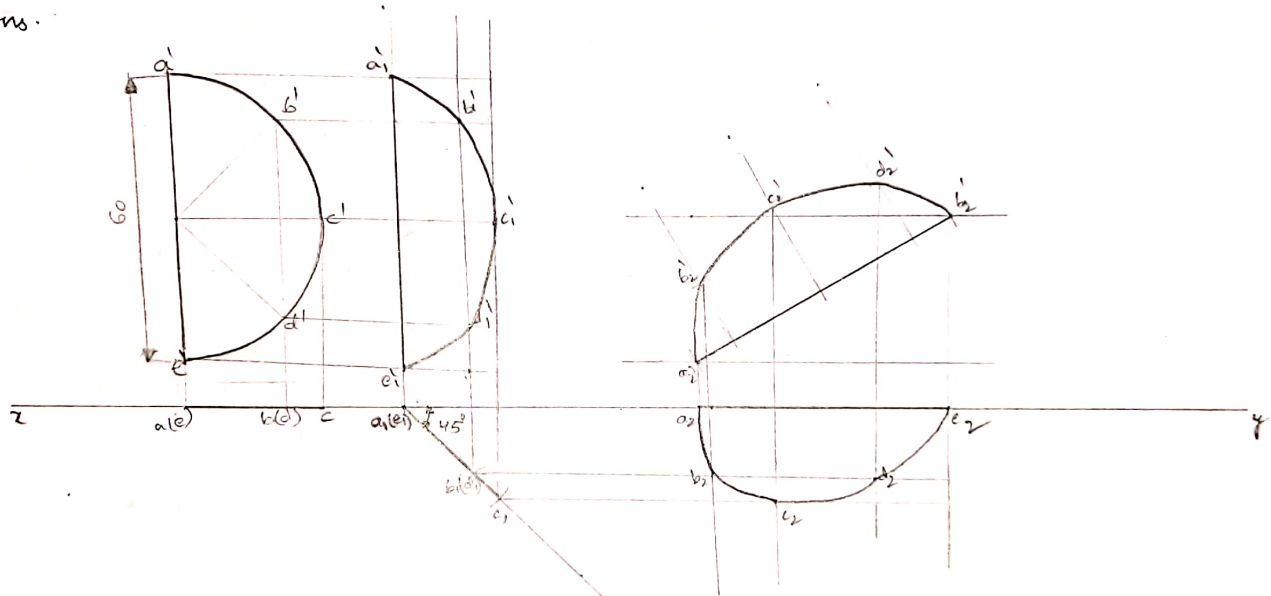
3, A Semi circular lamina having negligible thickness with 20 mm radius is lying on v.p with the longest side. Surface makes an angle  $30^\circ$  to the v.p and the longest edges lying on both H.p and v.p - {the longest side  $\perp^l$  to both H.p and v.p}



Construction:

1. Draw a horizontal line XY. 2. Draw a vertical line a'e' of length 40 mm. 3. Draw a semi-circle with center at the midpoint of a'e' and radius 20 mm. 4. Divide the semi-circle into 6 parts. 5. Project these points down to XY. 6. Draw a horizontal line a2e2 at a distance of 20 mm below XY. 7. Draw a semi-circle with center at the midpoint of a2e2 and radius 20 mm. 8. Divide this semi-circle into 6 parts. 9. Project these points up to XY. 10. Project the points from the front view down to XY. 11. Project the points from the top view up to XY. 12. The intersection of these projectors gives the true shape of the lamina in the inclined position.

A thin semi circular having 60mm longest side is lying on VP. The surface makes an angle  $45^\circ$  to the VP and the longest edge ends 10mm above HP and 40mm above HP - Draw the projections.

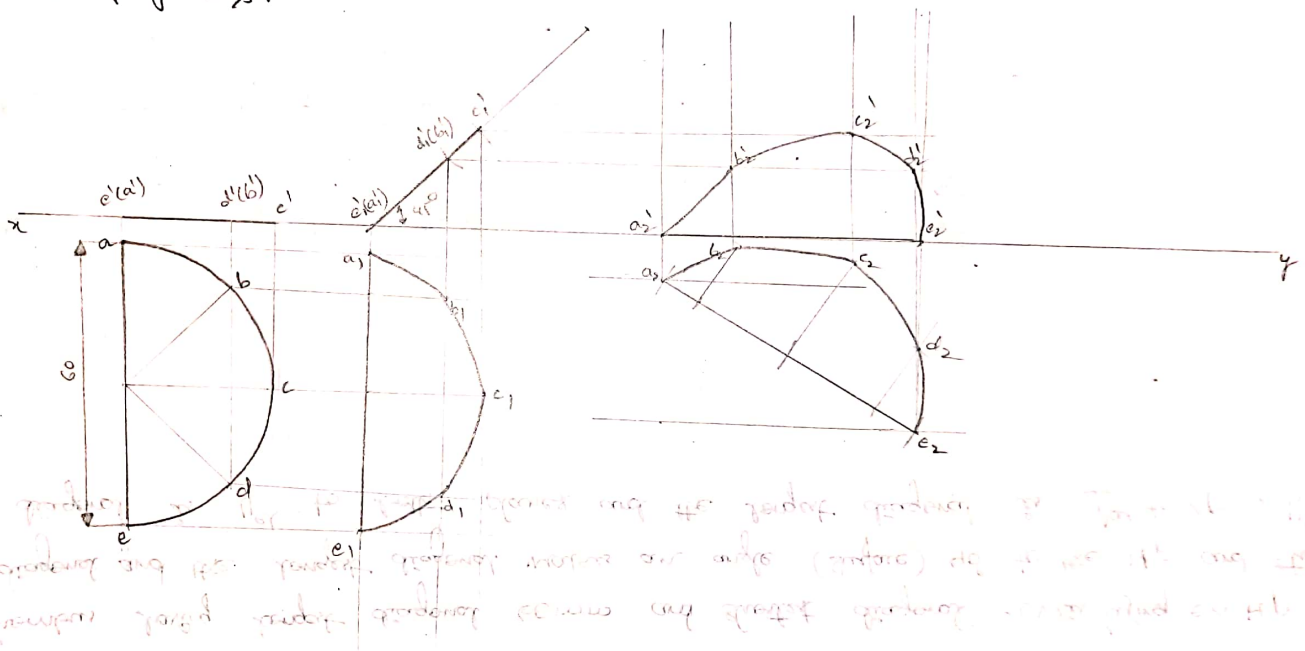


Handwritten notes in Hindi, likely describing the construction steps for the projections. The text is partially obscured and difficult to read due to the handwriting and angle.



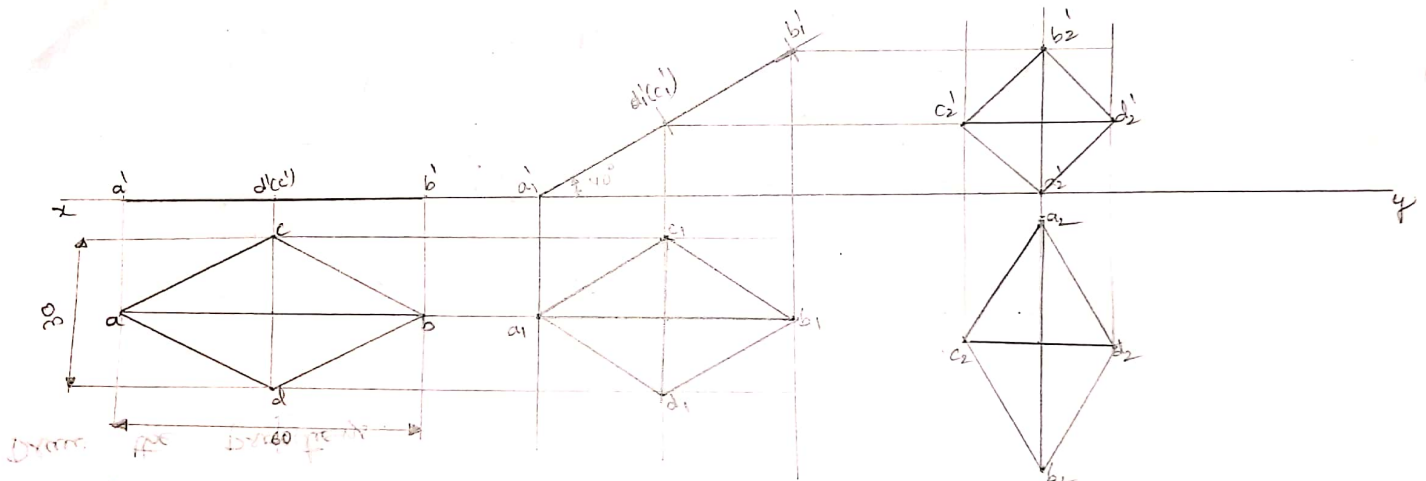
3, A thin semi-circular ~~to~~ having 60mm longest side is lying on H.P. - The surface makes an angle  $45^\circ$  to the V.P. and the longest edge ends 10mm <sup>below</sup> above H.P. and 40mm <sup>below</sup> above H.P.

Draw the projections.



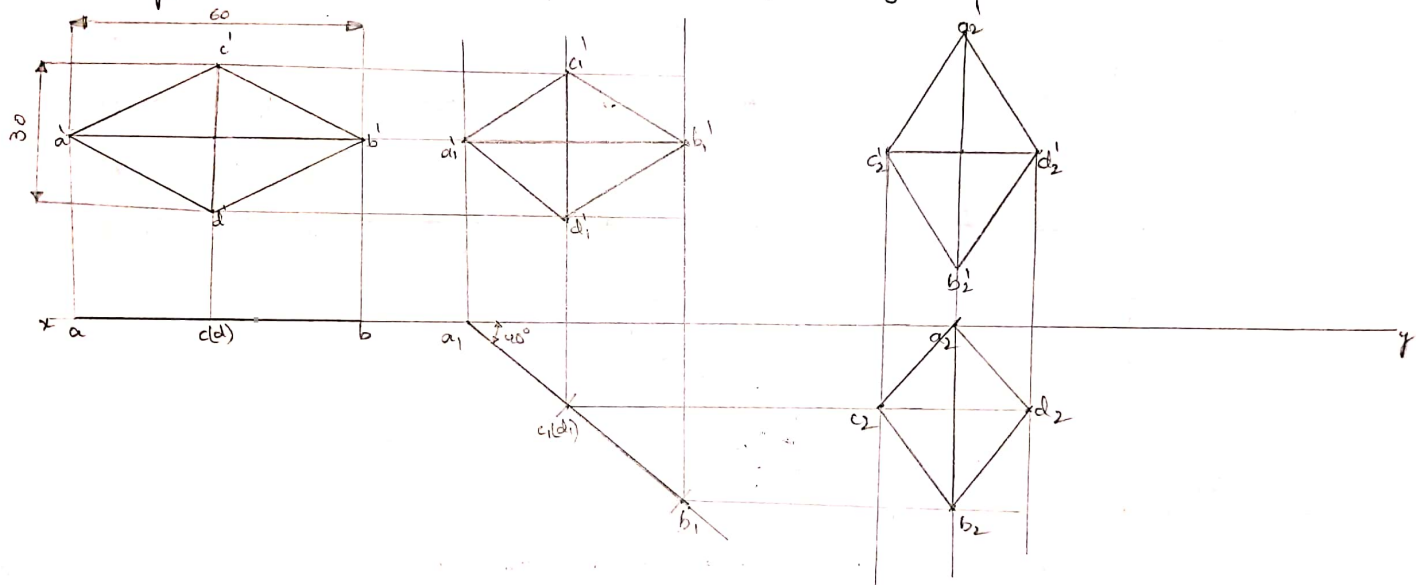
Rhombus

1) A Rhombus having longest diagonal 60mm and shortest diagonal 30mm is lying on HP with the longest diagonal and the longest diagonal makes an angle (surface)  $40^\circ$  to the HP and the shortest diagonal is  $\perp^{\text{el}}$  to both planes and the longest diagonal is  $\perp^{\text{ar}}$  to VP,  $\parallel^{\text{el}}$  to HP



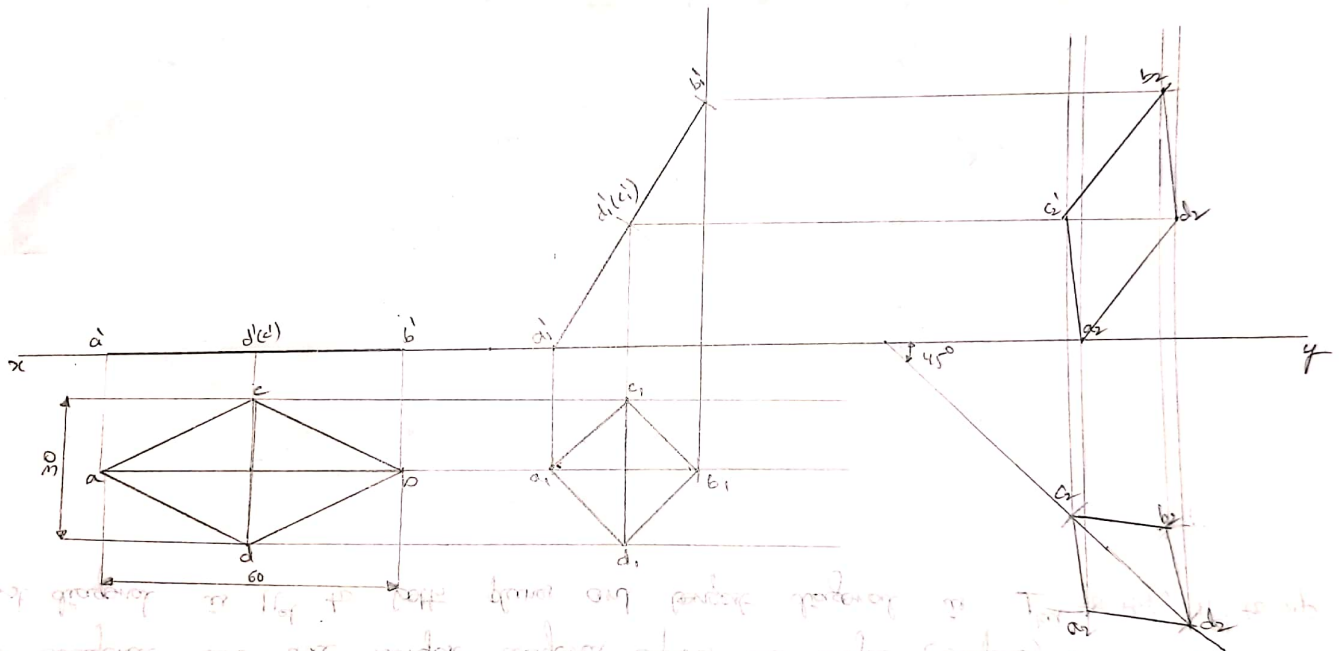
*(Faint handwritten notes at the bottom of the page, likely bleed-through from the reverse side.)*

2) A Rhombus having longest diagonal 60mm and shortest diagonal 30mm is lying on V.P with the longest diagonal and the longest diagonal makes an angle (surface)  $40^\circ$  to the VP and the shortest diagonal is  $\parallel^{el}$  to both planes and longest diagonal is  $\perp^{lar}$  to H.P,  $\parallel^{el}$  to V.P.



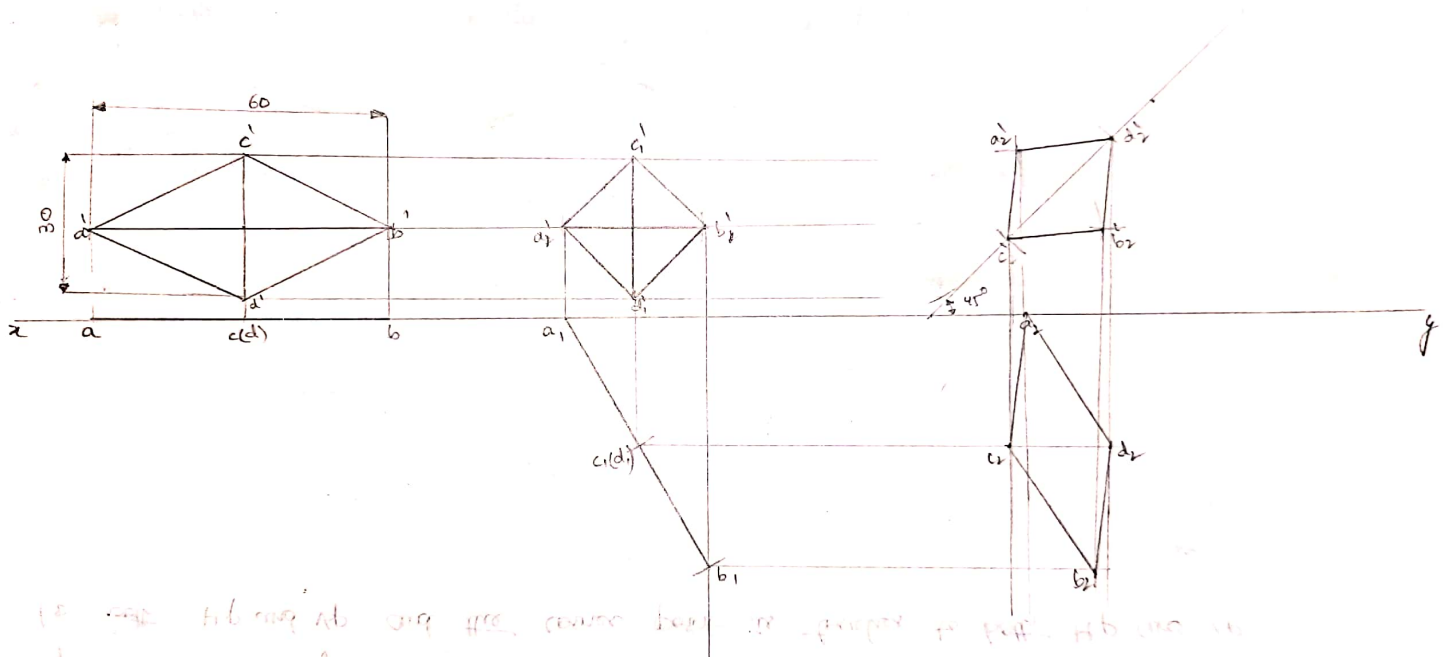
Handwritten notes at the bottom of the page, partially obscured and difficult to read, likely providing additional details or corrections to the drawing process.

3) A Rhombus having 60mm longest diagonal and 30mm shortest diagonal is lying on H.P. The top view appears as a square and the diagonal makes an angle  $45^\circ$  to the VP.



Handwritten notes in Hindi below the diagram, which are partially illegible but appear to describe the construction steps and the properties of the rhombus and its projections.

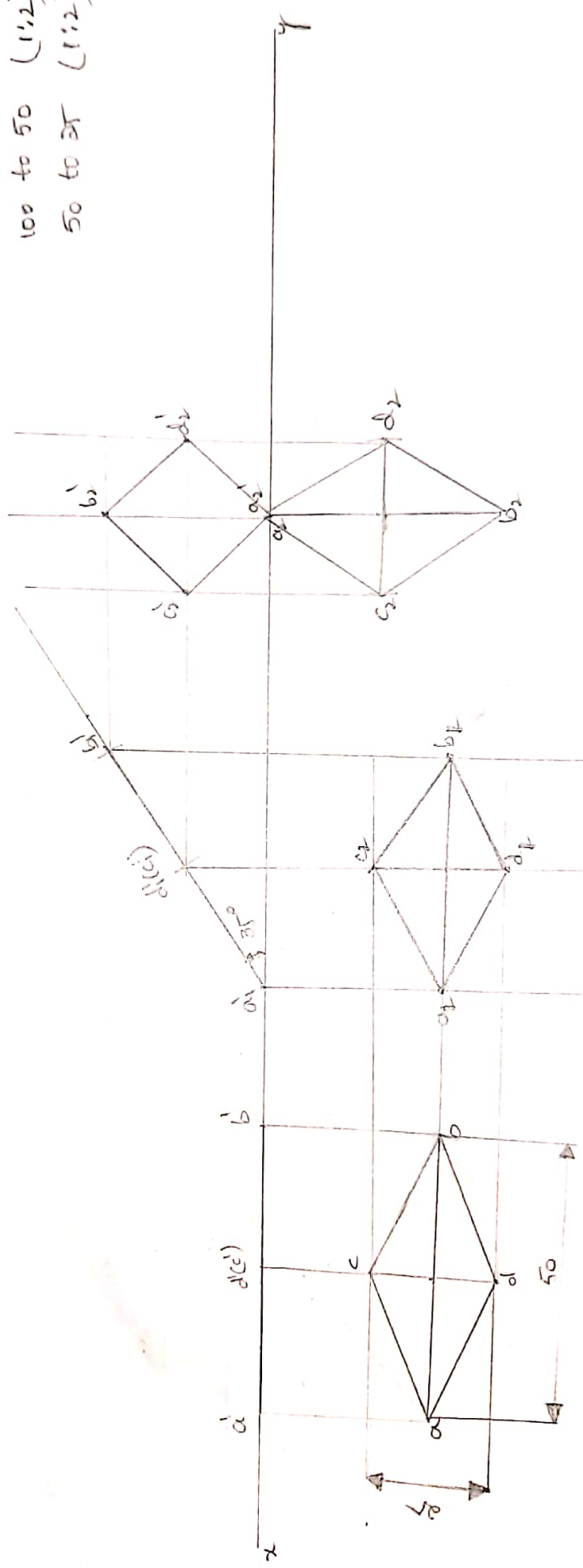
Q, A Rhombus having 60mm longest diagonal and 30mm shortest diagonal is lying on V.P. The front view appears as a square and the diagonal makes an angle  $45^\circ$  to the H.P.



The top view is a rhombus with side length 30mm. The front view is a square with side length 30mm. The side view is a rhombus with side length 30mm. The diagonal of the rhombus makes an angle of  $45^\circ$  to the horizontal axis.

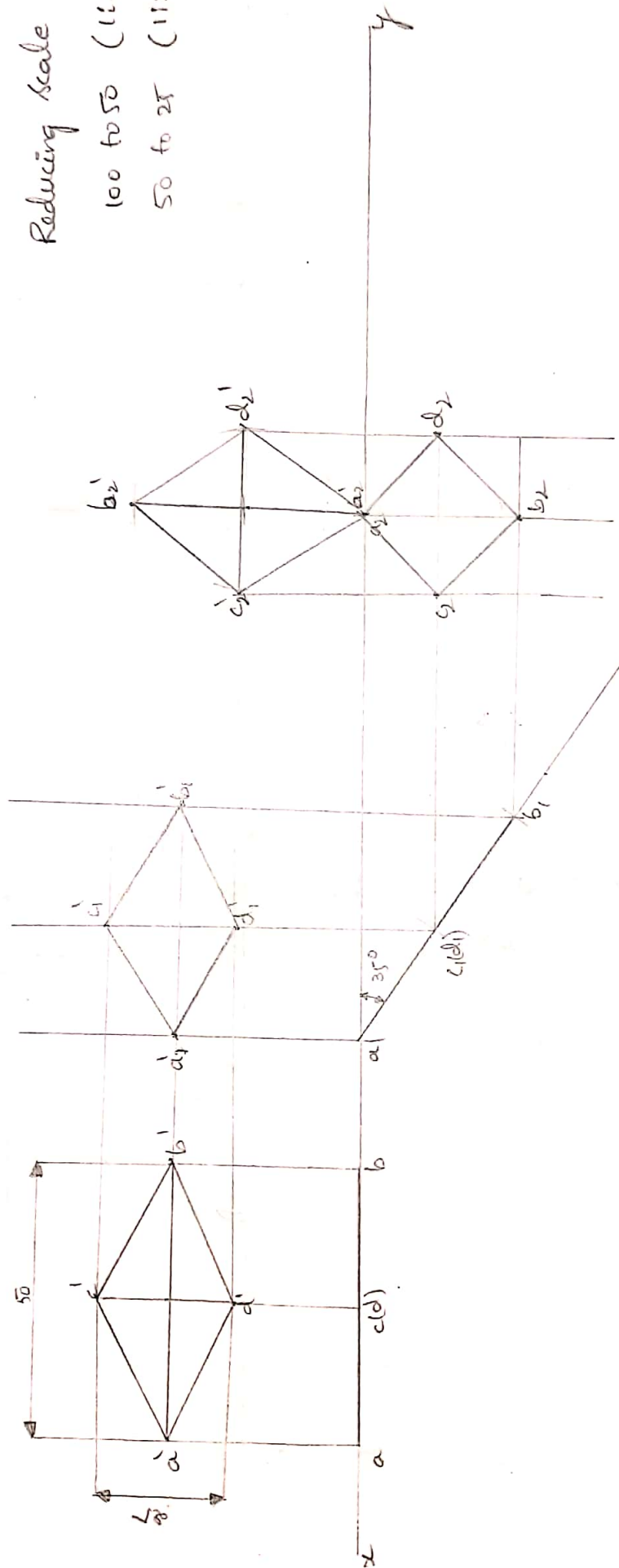
5) A Rhombus having 100mm longest diagonal 50mm shortest diagonal is lying on HP horizontally and the longest diagonal makes an angle  $35^\circ$  to the HP. The shortest diagonal is  $\parallel$  to both HP and VP and the corner point is touches to both HP and VP.

reducing scale  
 100 to 50 (1:2)  
 50 to 25 (1:2)



1) For this problem on a rhombus of 100mm longest diagonal and 50mm shortest diagonal is lying on HP horizontally and the longest diagonal makes an angle  $35^\circ$  to the HP. The shortest diagonal is  $\parallel$  to both HP and VP and the corner point is touches to both HP and VP.

6, A Rhombus having 100 mm longest diagonal 50 mm shortest diagonal is lying on V.P. & horizontally and the longest diagonal makes an angle  $35^\circ$  to the V.P. The shortest diagonal is  $\perp$  to both H.P and V.P and the corner point is touches to both H.P and V.P.



Reducing scale

100 to 50 (1:2)

50 to 25 (1:2)

True shape is rhombus  
 Rhombus is reduced as 1/2

True shape is rhombus  
 Rhombus is inclined with VP

True shape is rhombus  
 Rhombus is reduced as 1/2

True shape is rhombus  
 Rhombus is reduced as 1/2

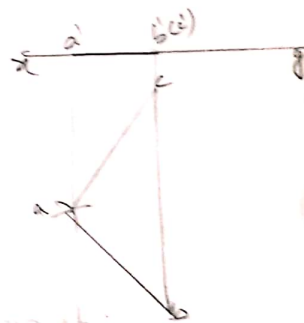
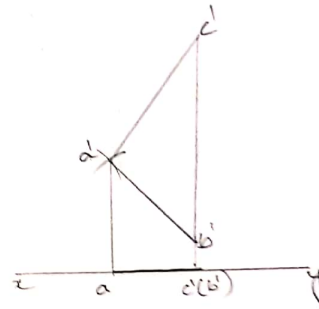
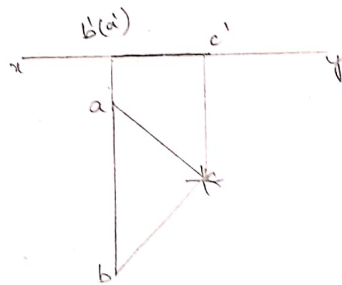
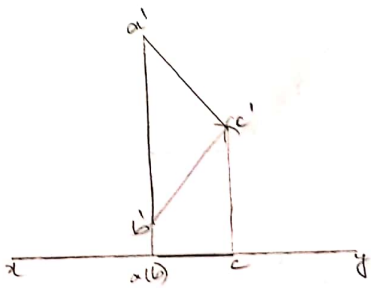
Triangles

△ plane is resting on VP with side/edge.

△ plane is resting on HP with side/edge.

△ plane is resting on V.P with corner.

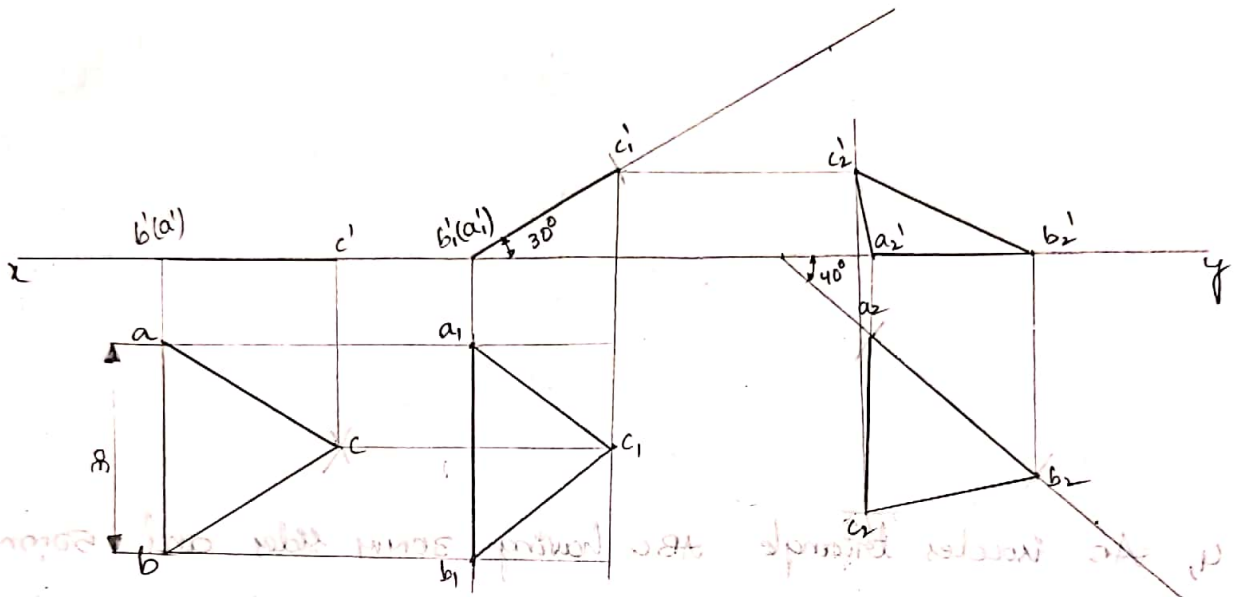
△ plane is resting on H.P with corner.



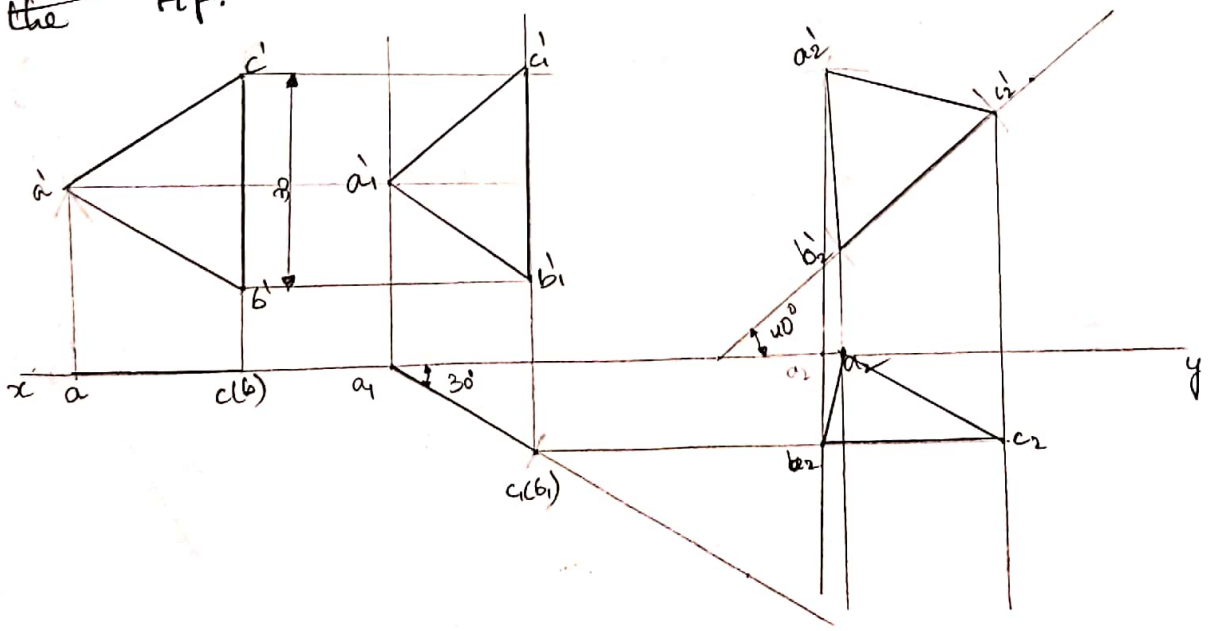
The true shape of the triangle is shown in red. The front view is projected on the XY line. The top view is projected on the XY line. The true shape is shown in red.



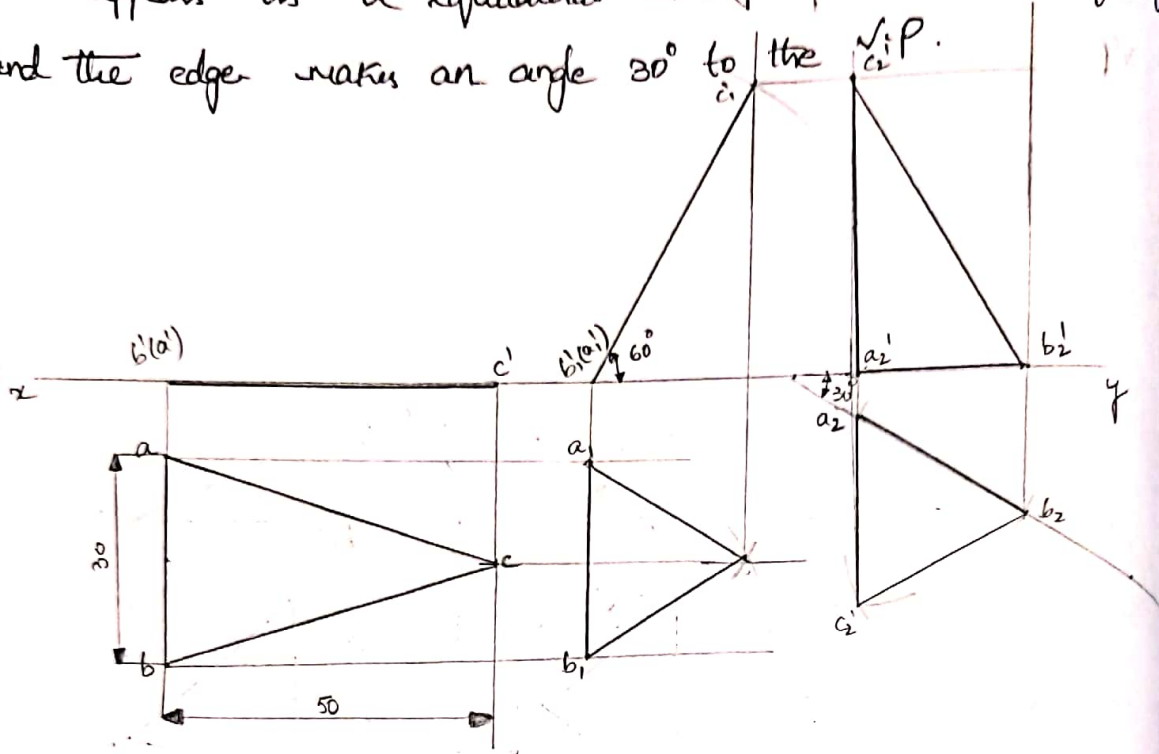
1, A triangular lamina ABC having 30mm sides is lying on Hp with the side and the surface makes an angle  $30^\circ$  to the Hp. And the edge makes an angle  $40^\circ$  to the Vp.



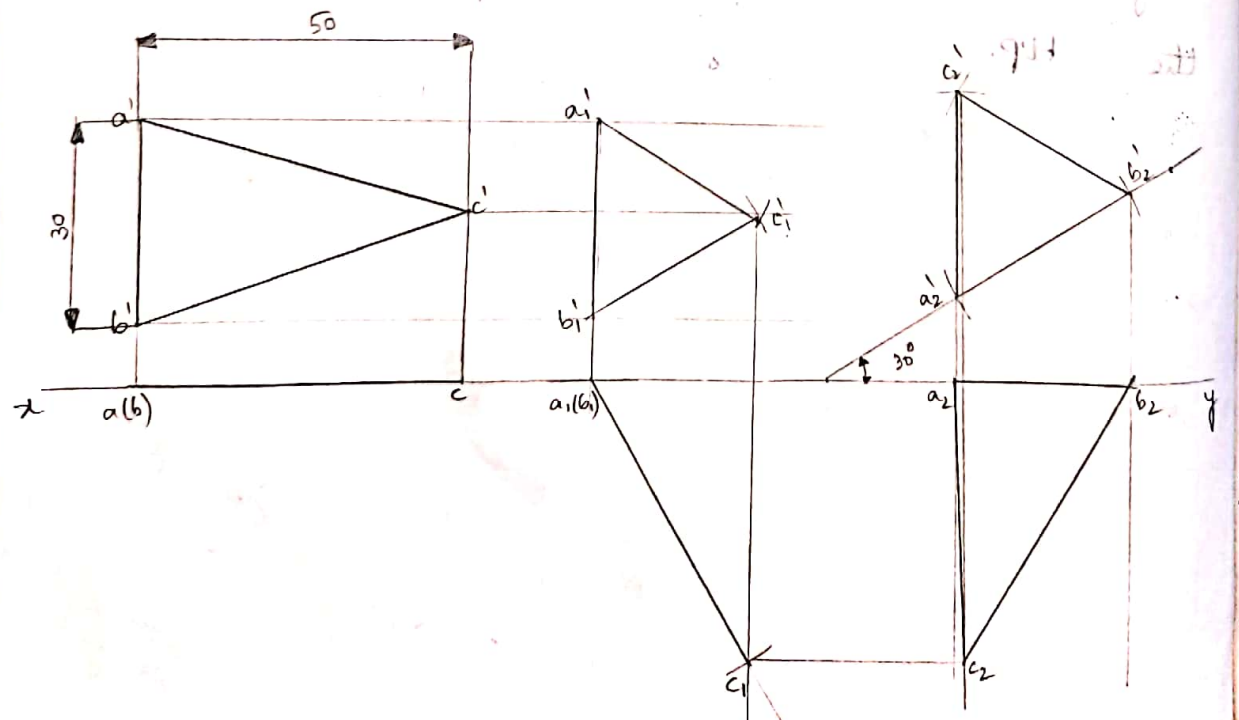
2, A triangular lamina ABC having 30mm sides corner is lying on Vp with the side and the surface makes an angle  $30^\circ$  to the Vp. And the edge makes an angle  $40^\circ$  to the Hp.



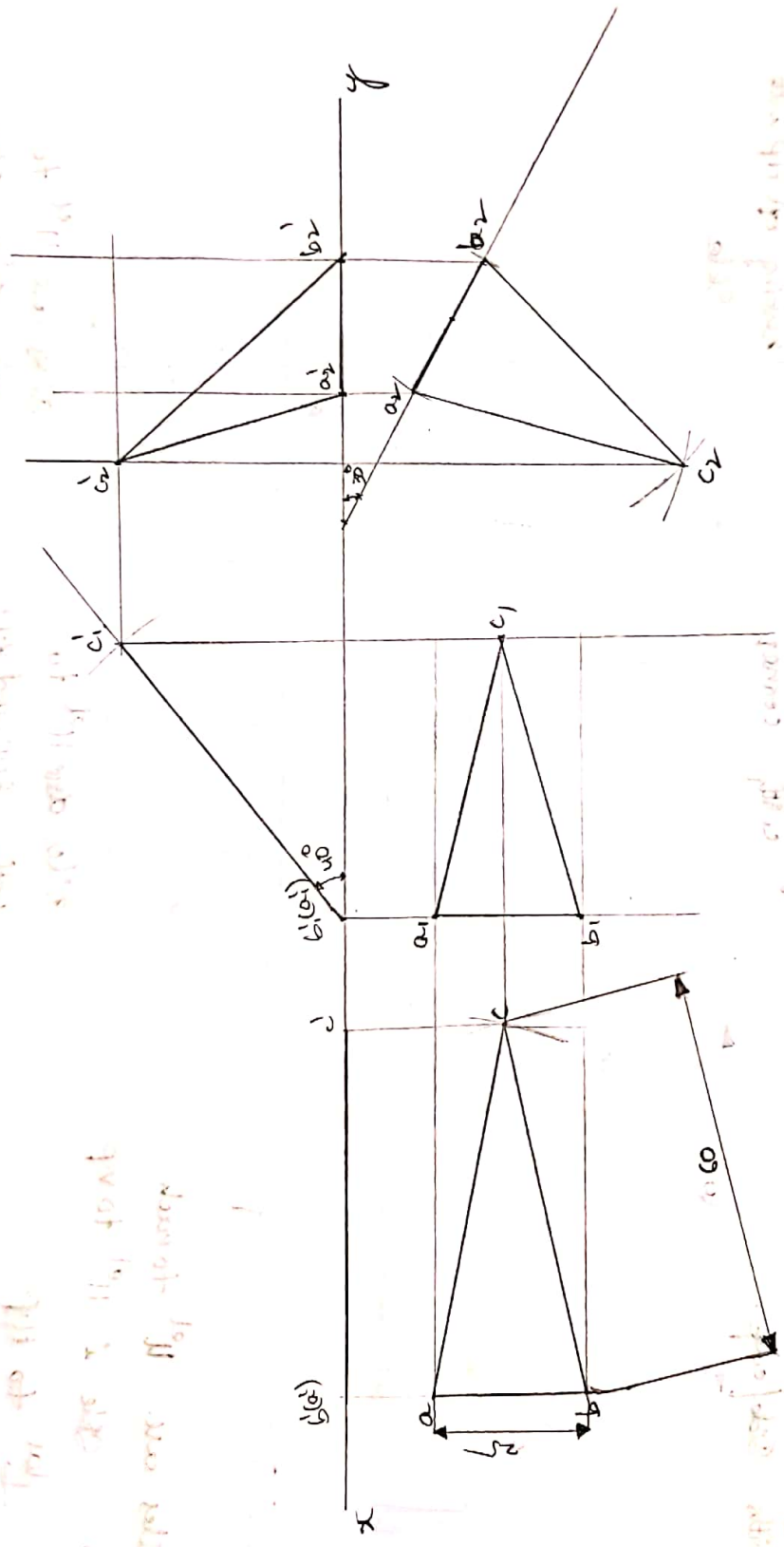
3, An isosceles triangle ABC, having 30mm sides and 50mm altitude is lying on H.P with the side. And the top view appears as a equilateral  $\Delta$ . find out H.P inclination and the edge makes an angle  $30^\circ$  to the V.P.



4, An isosceles triangle ABC having 30mm sides and 50mm altitude is lying on V.P with the side. And the front view appears as a equilateral  $\Delta$  - find the V.P inclination and the edge makes an angle  $30^\circ$  to the H.P.

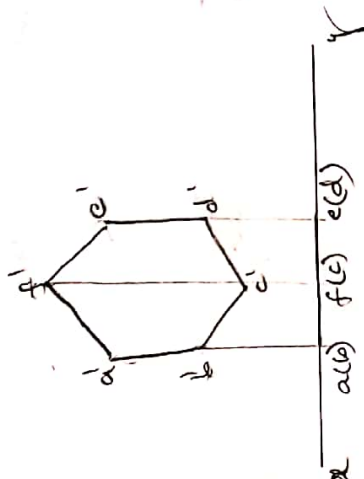


4, A isosceles triangle having 25mm sides AB and AC 60mm side is lying on HP with the shortest side and the surface makes an angle  $40^\circ$  to the HP and the edge AB makes  $30^\circ$  to the VP. Draw the projection.



# Hexagon

Hexagonal plane is resting on VP with side/edge.



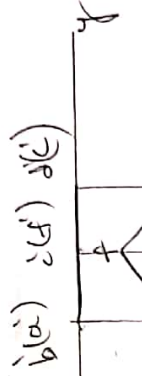
Sides are  $\parallel^{el}$  to VP  
 other, Side is  $\parallel^{el}$  to VP  
 $\perp$  to HP

Hexagonal plane is resting on HP with corner.



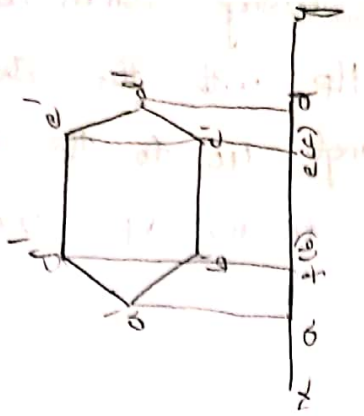
sides are  $\parallel^{el}$  to both HP and VP  
 -corner is  $\parallel^{el}$  to HP  
 $\perp$  to VP

Hexagonal plane is resting on HP with side



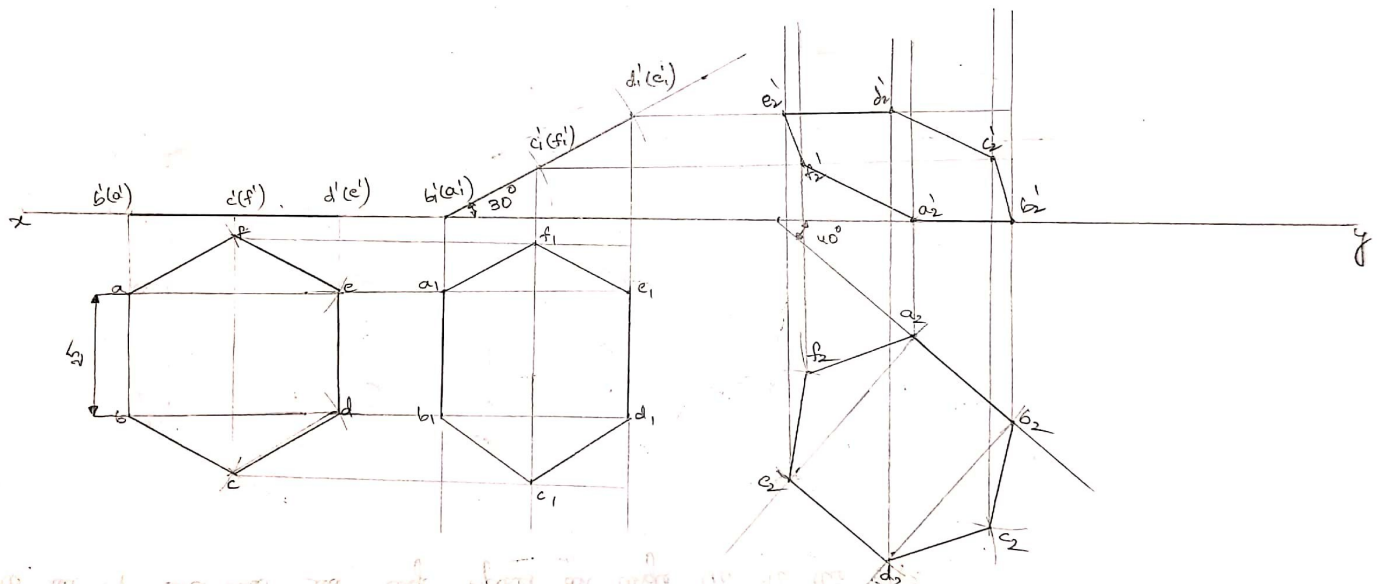
sides are  $\parallel^{el}$  to each other - side is  $\parallel^{el}$  to HP,  
 $\perp$  to VP

Hexagonal plane is resting on VP with corner.

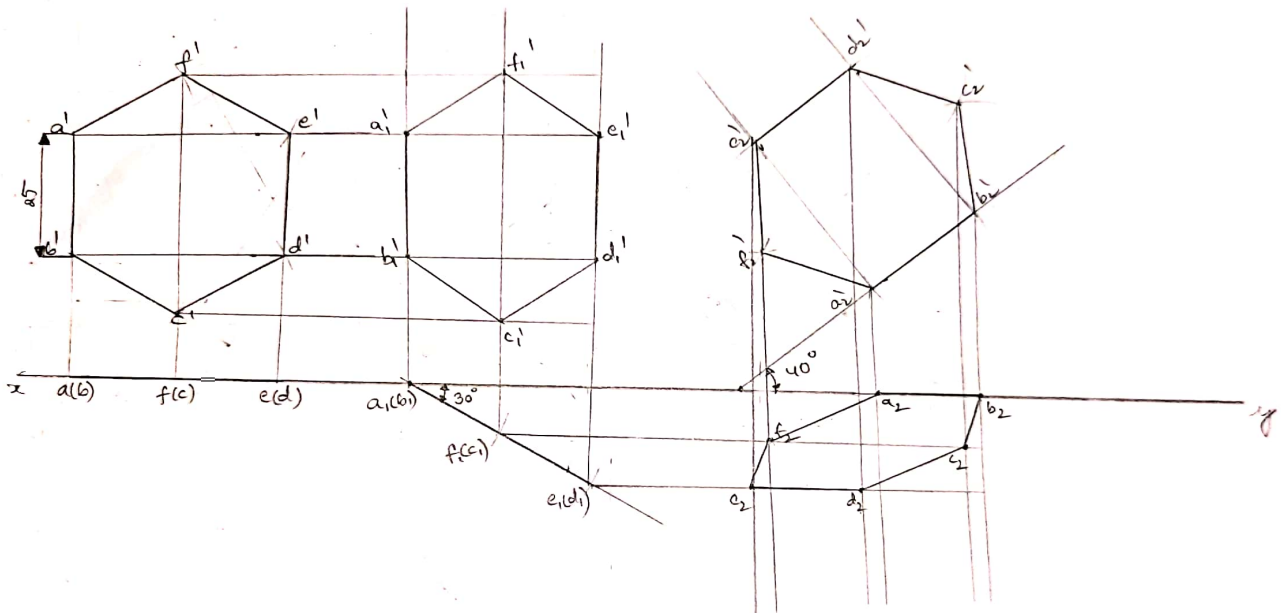


sides are  $\parallel^{el}$  to both HP and VP  
 corner is  $\parallel^{el}$  to HP  
 $\perp$  to VP

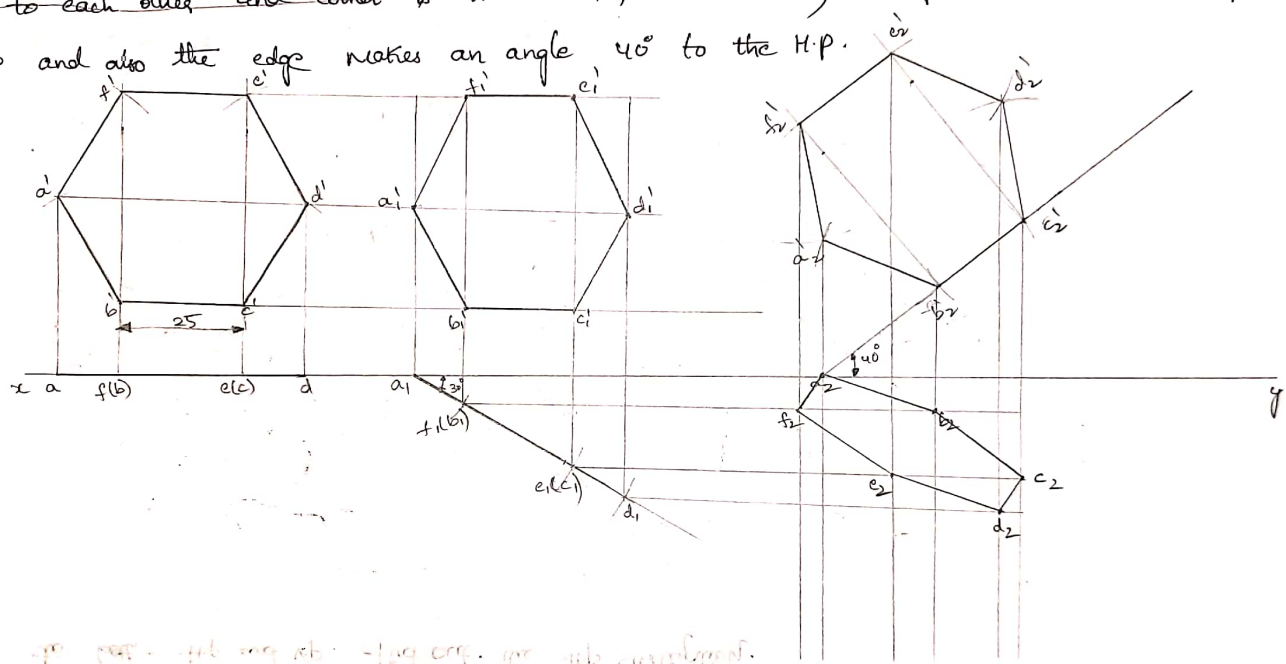
Q. A hexagonal plane having  $\sqrt{3}$  sides is lying on H.P. with side. [The both sides are  $\perp$  to each other and the side is  $\perp$  to H.P.,  $\perp$  to V.P.]. Then the surface makes an angle  $30^\circ$  to the H.P. and also the edge makes an angle  $40^\circ$  to the V.P. (The diagonal makes an angle  $40^\circ$  to the V.P.)



2) A hexagonal plane having 50mm sides is lying on VP with sides. The surface makes an angle  $30^\circ$  to the VP and also the edge makes an angle  $40^\circ$  to the HP.

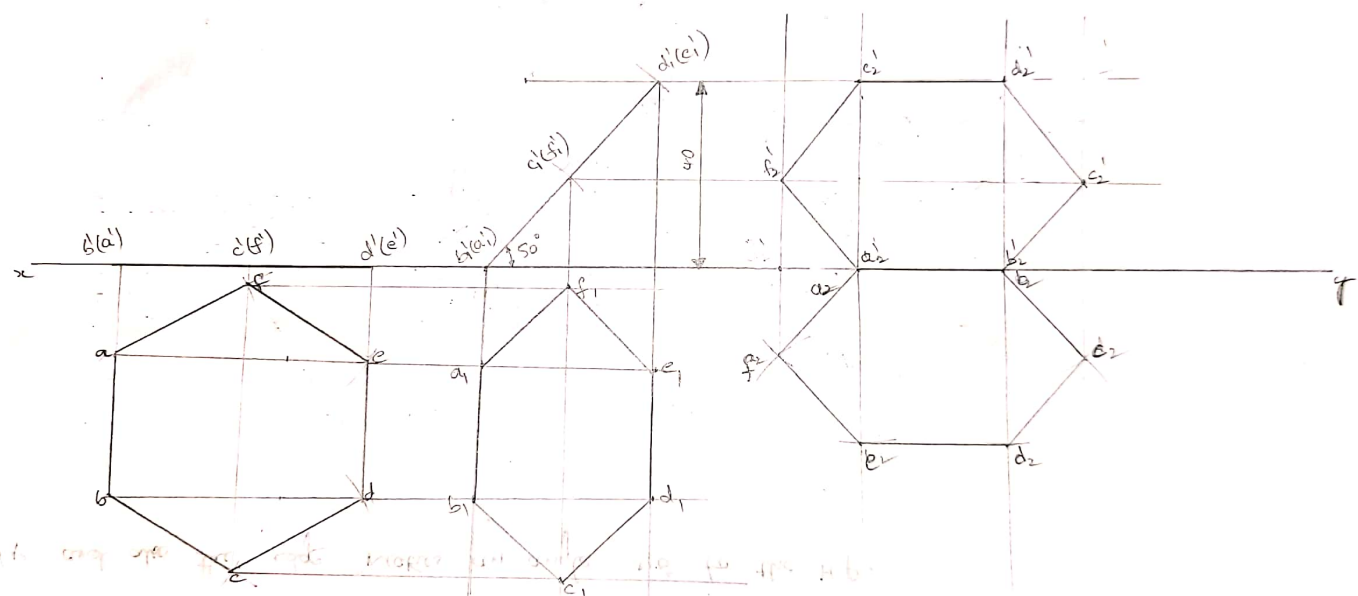


3, A hexagonal plane having 25mm sides is lying on VP with corner. [The both sides are  $\perp$  to each other and corner is  $\parallel$  to VP, and  $\perp$  to HP]. Surface makes an angle  $30^\circ$  to the VP and also the edge makes an angle  $40^\circ$  to the H.P.



Projection of a hexagonal plane having 25mm sides is lying on VP with corner. [The both sides are  $\perp$  to each other and corner is  $\parallel$  to VP, and  $\perp$  to HP]. Surface makes an angle  $30^\circ$  to the VP and also the edge makes an angle  $40^\circ$  to the H.P.

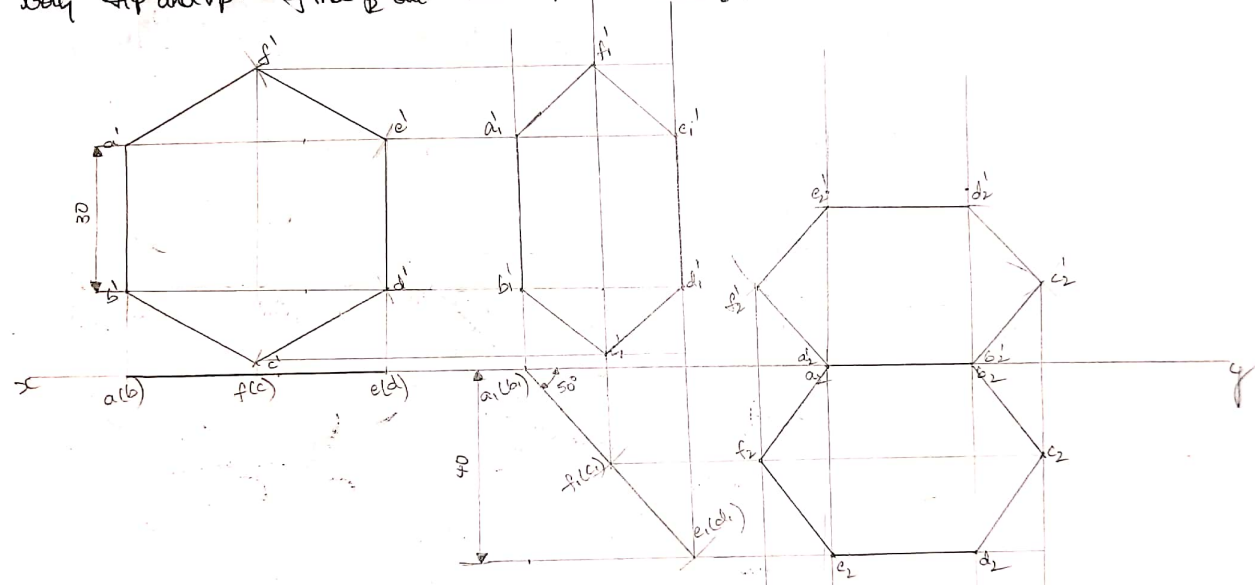
Q. A Hexagonal lamina having 30mm sides is lying on H.P and the sides are parallel to each other. One side is parallel to H.P,  $\perp$  to V.P. The side opp side is 30mm above H.P and the side is touches to both H.P and V.P. find out the H.P projection.



Handwritten notes in Telugu describing the construction steps for the front view of the hexagonal lamina.

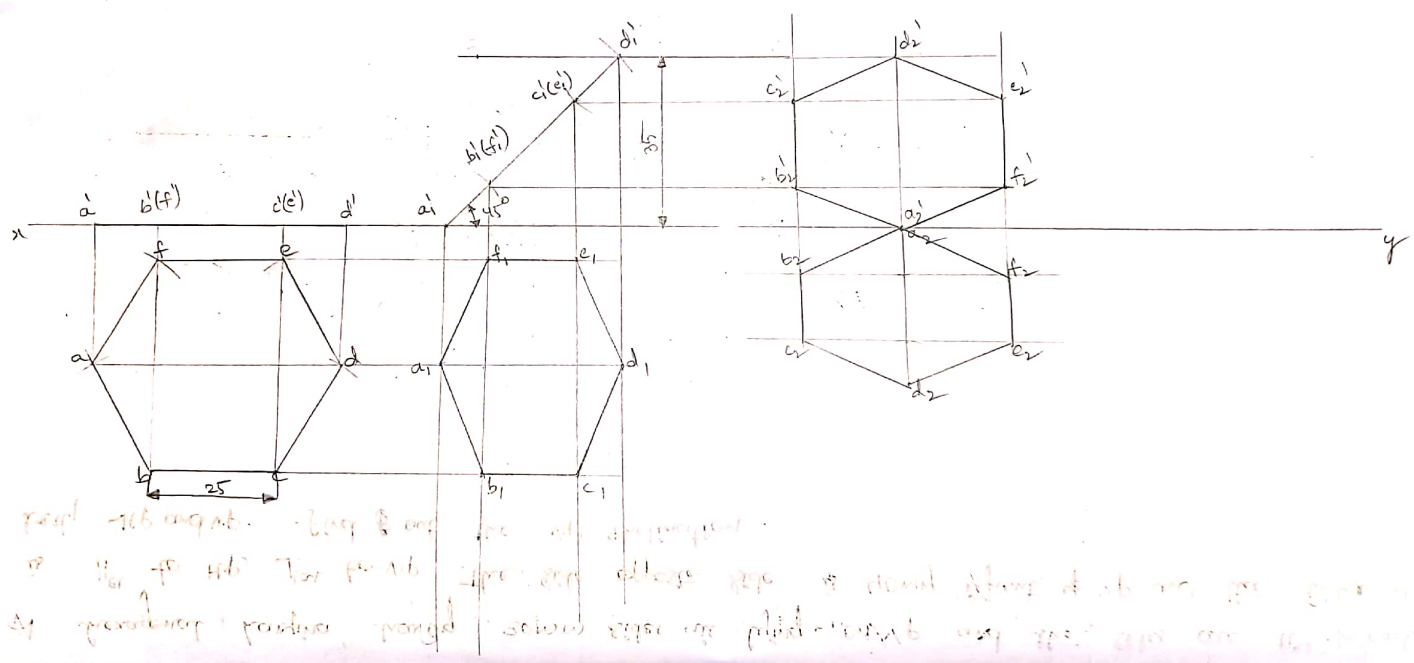


5) A hexagonal lamina having 30mm sides is lying on V.P and the sides are  $\parallel$  to each other. Side is  $\parallel$  to H.P,  $\perp$  to V.P. The side opposite side is 40mm in front of V.P and the side is touches to both H.P and V.P. Find out the V.P inclination.

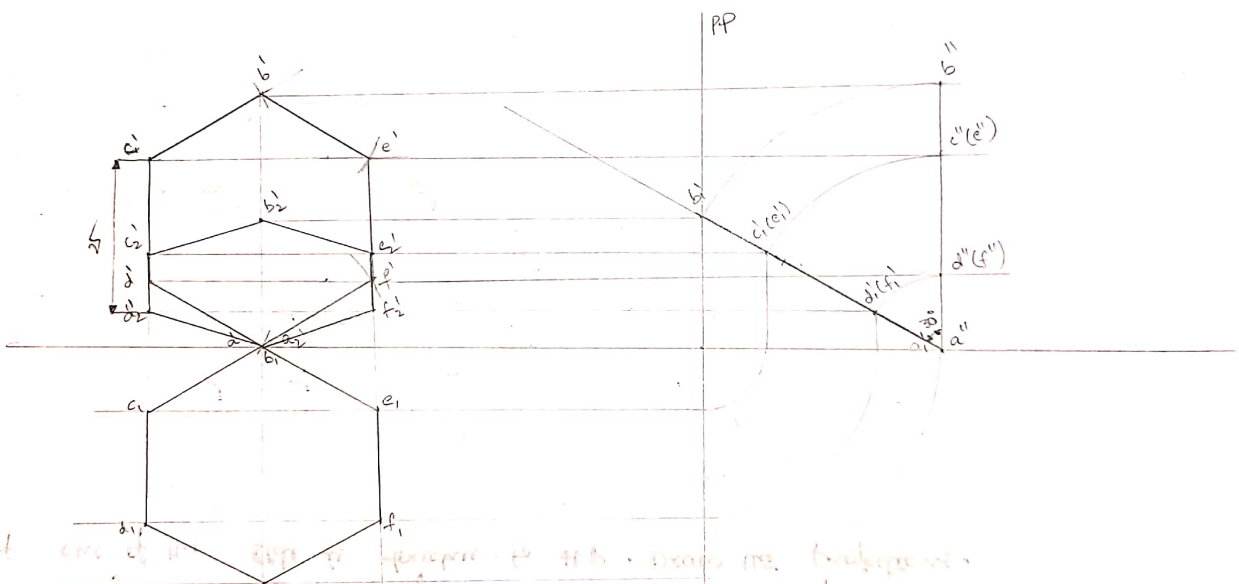


*Handwritten notes in Hindi:*  
 The drawing shows the true shape and true position of the lamina. The front view is a rectangle with height 30mm. The top view is a hexagon with one side on the XY line and the opposite side 40mm below it. The true inclination of the lamina is 50 degrees to the XY line.

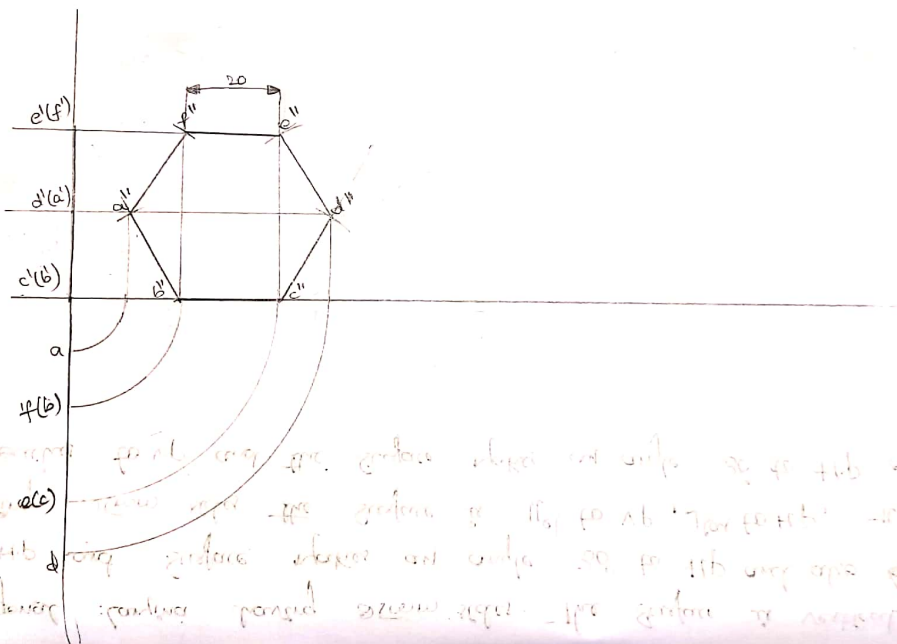
6) A Hexagonal plane having negligible thickness of 25mm sides is lying on ground with corner 'a'. The corner opposite corner is 35mm above HP. Find out the HP projection. The corner 'a' is touches to both HP and VP. Draw the projections.



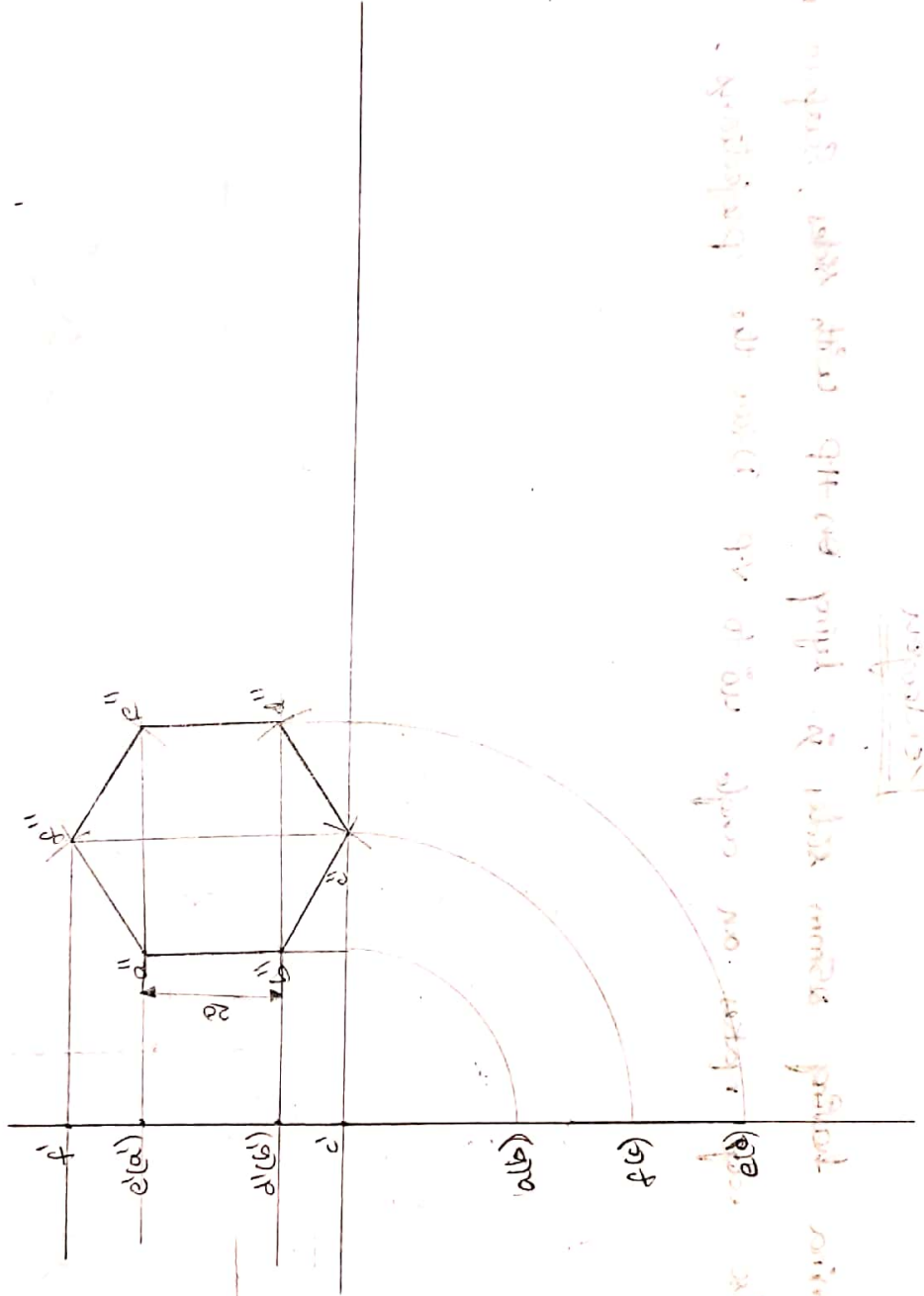
7) A hexagonal lamina having 25mm sides. The surface is vertical one of the corner point is touches to H.P and surface makes an angle  $30^\circ$  to H.P and also  $60^\circ$  to V.P. (SP) A hexagonal lamina having 25mm sides the surface is  $\parallel^{el}$  to V.P,  $\perp^{lar}$  to H.P, the corner A is touches to H.P and D is touches to V.P and the surface makes an angle  $30^\circ$  to H.P and also  $60^\circ$  to V.P.



Q A hexagonal lamina having 20 mm sides the surface is vertical and  $\perp^{lar}$  to both H.P and V.P one of the side is touches to H.P. Draw the projections.



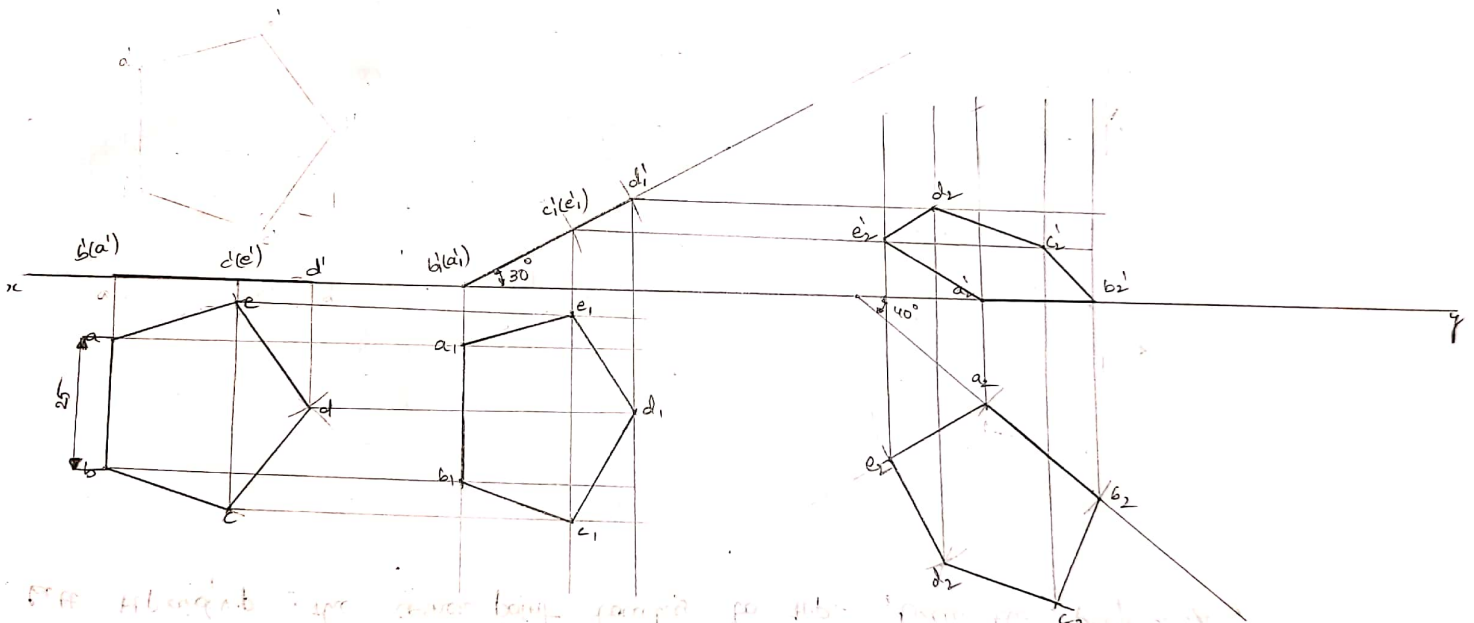
ii) A square having 20mm sides. The surface is vertical and also parallel to both H.P. and V.P. The corner point touches to H.P. Draw the projections.



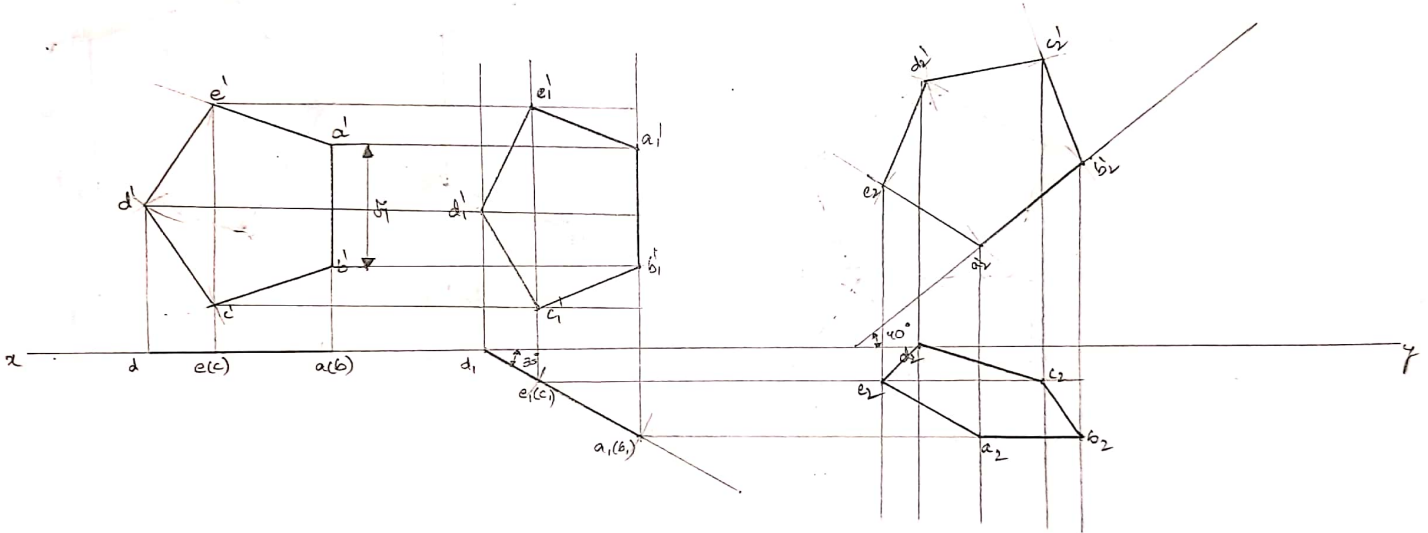
Handwritten notes in Hindi: "The surface is vertical and also parallel to both H.P. and V.P. The corner point touches to H.P. Draw the projections." The word "Banshi" is written vertically on the right side.

## Pentagon

1. A pentagonal lamina having 25mm sides is lying on HP with sides, surface makes an angle  $30^\circ$  to the HP & also edge makes an angle  $40^\circ$  to V.P. Draw the projections.



2) A pentagonal lamina having 25mm corner is lying on VP, with corner, surface makes an angle  $30^\circ$  to the VP & also edge makes an angle  $40^\circ$  to the HP. Draw the projections.

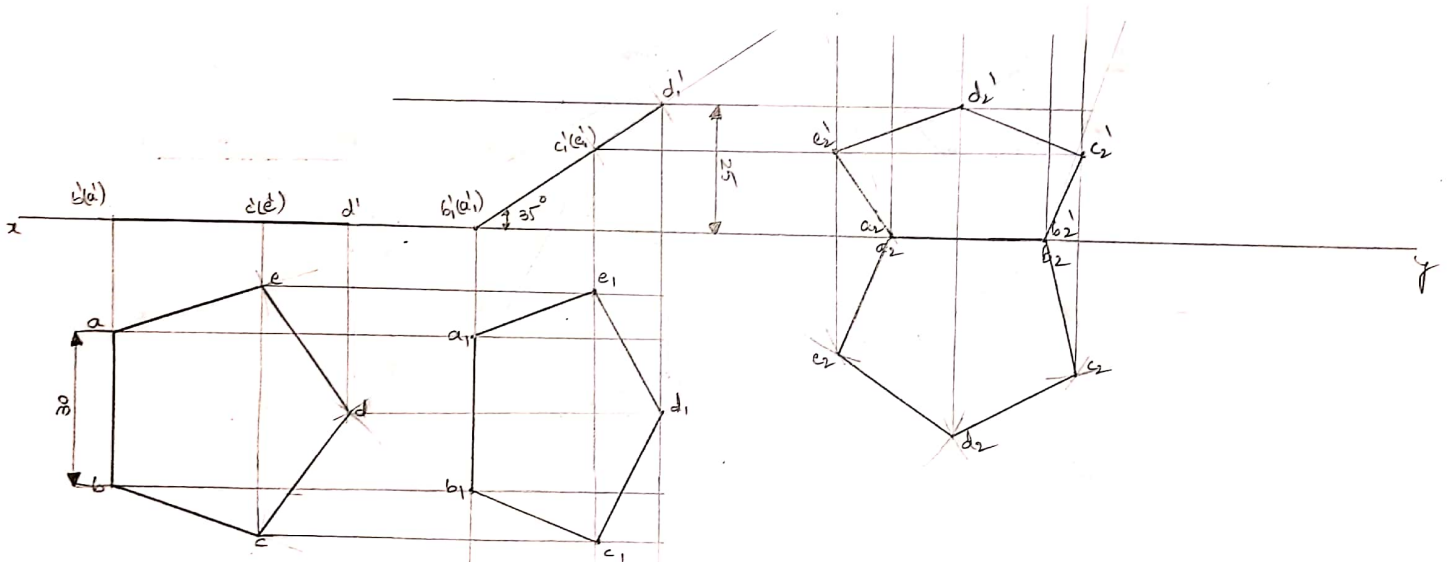


-1/16 construction.

1/16 construction of the corner of the pentagon. The corner is 25mm. The surface makes an angle of  $30^\circ$  to the VP and the edge makes an angle of  $40^\circ$  to the HP.

2) A pentagonal lamina having 25mm corner is lying on VP, with corner, surface makes an angle  $30^\circ$  to the VP & also edge makes an angle  $40^\circ$  to the HP. Draw the projections.

A pentagonal plane having negligible thickness is lying on H.P with side 30mm, the side opposite ~~side~~ corner is 25mm above H.P & the side is lying on both H.P and V.P. find out the H.P inclination.



Handwritten notes in Hindi at the bottom of the page, which are partially illegible but appear to describe the construction steps and the final result.



4, - A pentagonal plane having negligible thickness is lying on VP with corner 30mm, the side opposite corner is 25mm in front of VP & the corner is lying on both HP and VP. Draw the Projections.

