SET-A Solution
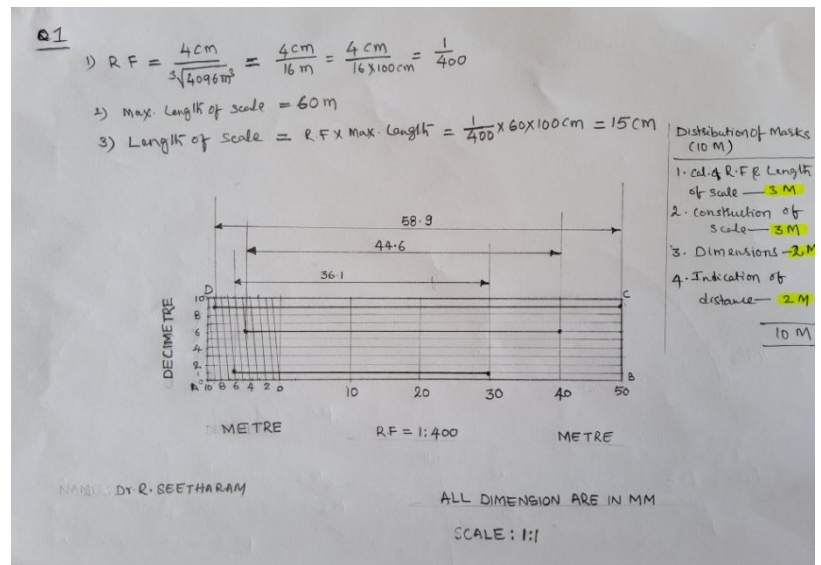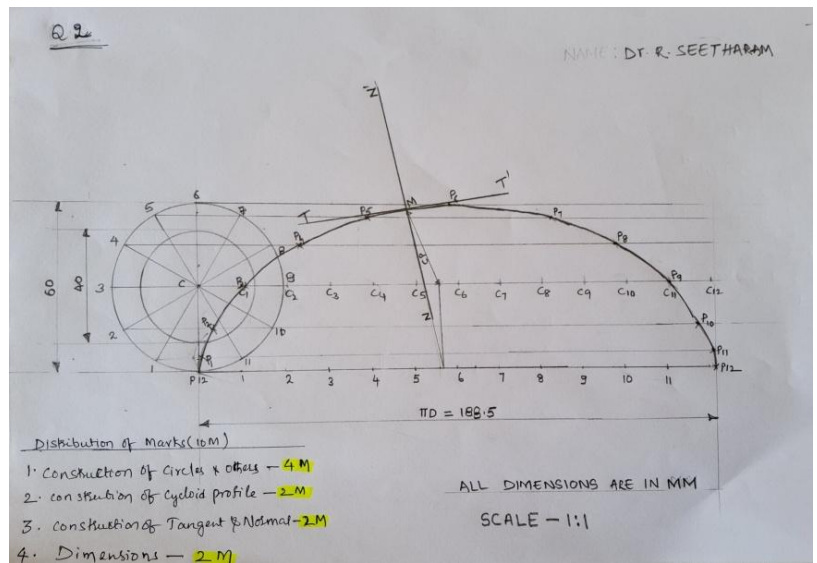
1. A room of 4096 m³ volume is shown by a cube of 4 cm side. Find the R.F and construct a scale to measure up to 60 m. Also indicate the distance of a) 36.1 m, b) 44.6 m.

2. Draw locus of a point, 10 mm away from the periphery of a circle which rolls on straight line path. Also draw a tangent and normal to the point 80 mm from the center of the circle. Take circle diameter as 40 mm.
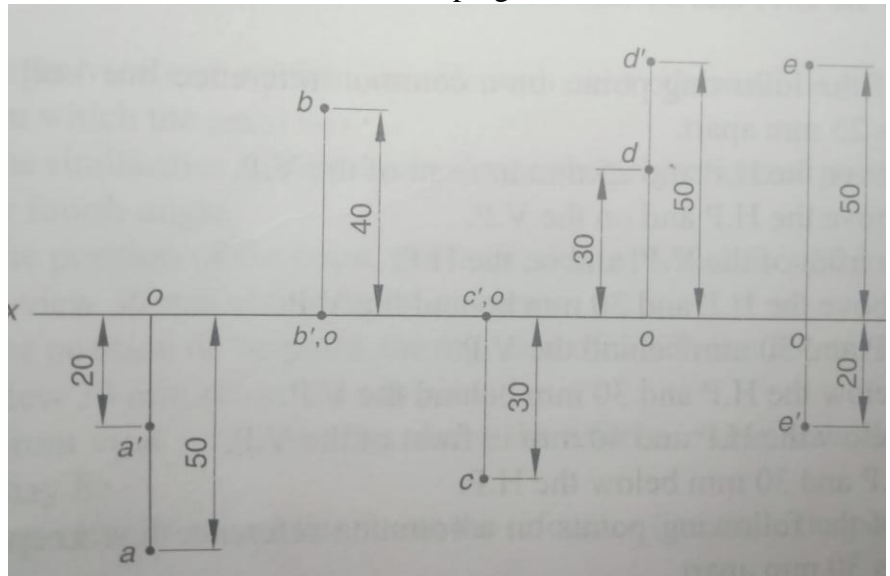
3. The front view and top view of a straight-line PQ measures 50 mm and 65 mm respectively. Point P is in the H.P. and 20 mm in front of the V.P. and the front view of the line is inclined at $45°$ to the reference line. Determine the true length of PQ, true angles of inclination with the reference planes and trace the line.
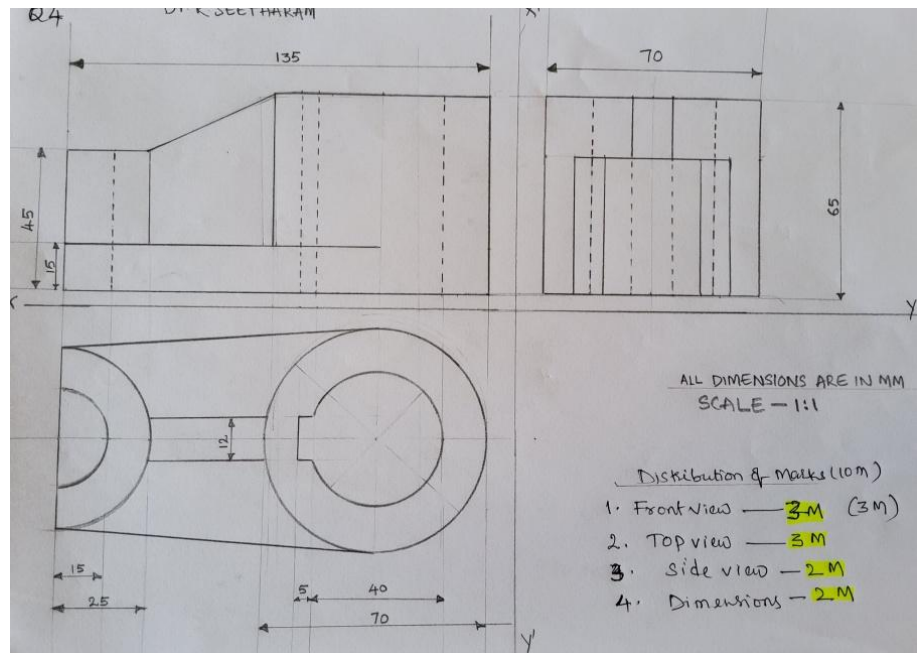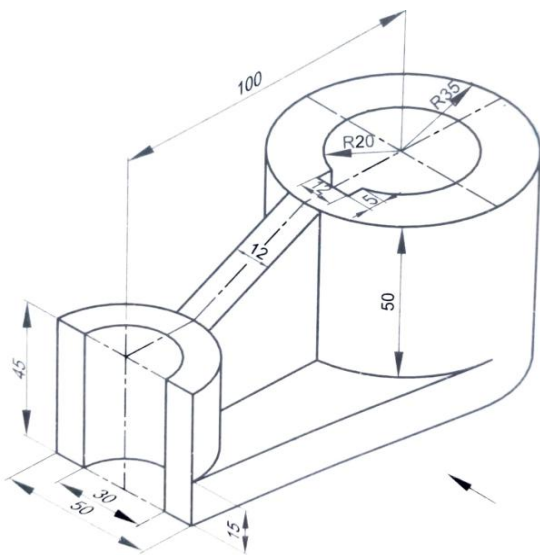
Ans: True length = 74 mm
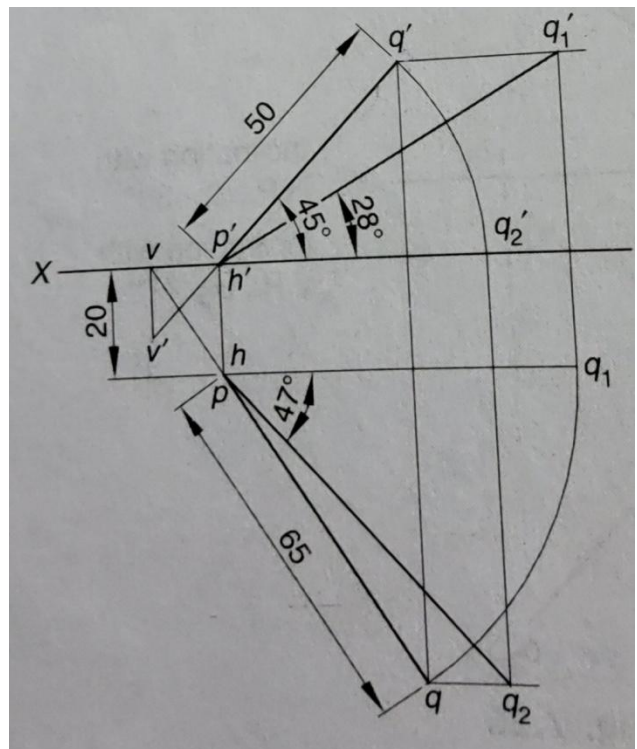
4. Draw the projections of the following points on common reference lines, keeping the distance between their projectors 30 mm apart.

(a) Point A is 20 mm below the HP and 50 mm in front of the VP
(b) Point B is in the HP print and 40 mm behind the VP
(c) Point C is 30 mm in front of the VP and in the HP
(d) Point D is 50 mm above HP and 30 mm behind the VP
(e) Point E is 20 mm below the HP and 50 mm behind the VP

5. Draw the orthographic projection by using first angle projection method of a given Figure.

ALL DIMENSIONS ARE IN MM
SCALE – 1:1

Distribution of Marks (10m)
1. Front view —— 3M (3M)
2. Top view —— 3M
3. Side view — 2M
4. Dimensions — 2M

SET-B Solution

1. The distance between Delhi and Agra is 200 km. In a railway map it is represented by a line 5 cm long. Find its R.F. Draw a diagonal scale to show single km. And maximum 600 km. Indicate on it following distances. i) 222 km ii) 459 km

RF = 5 cm / 200 km = 1 / 40, 00, 000, Length of scale = 1 / 40, 00, 000 X 600 X 10^5 = 15 cm
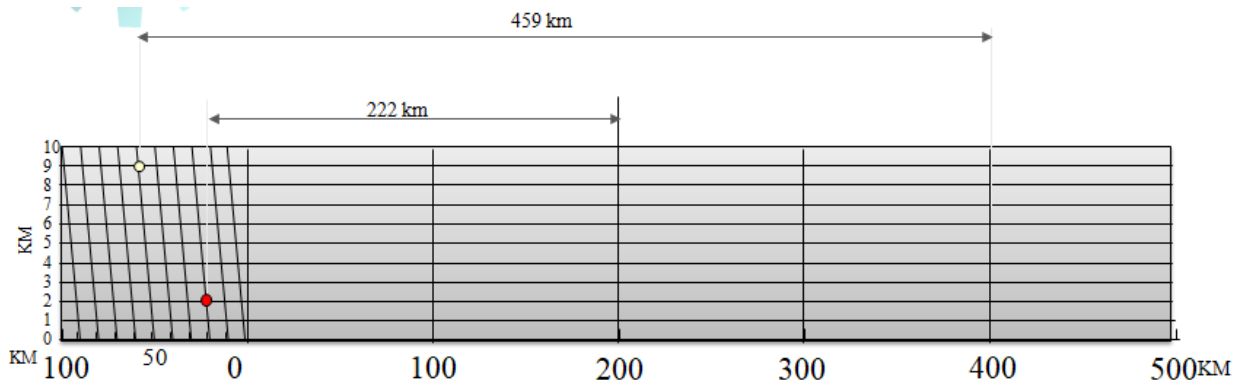
2. Draw an involute of a hexagon of 20 mm side and one of the sides is parallel to the string length. Also draw a tangent and normal to the point 100 mm from the center of the hexagon.
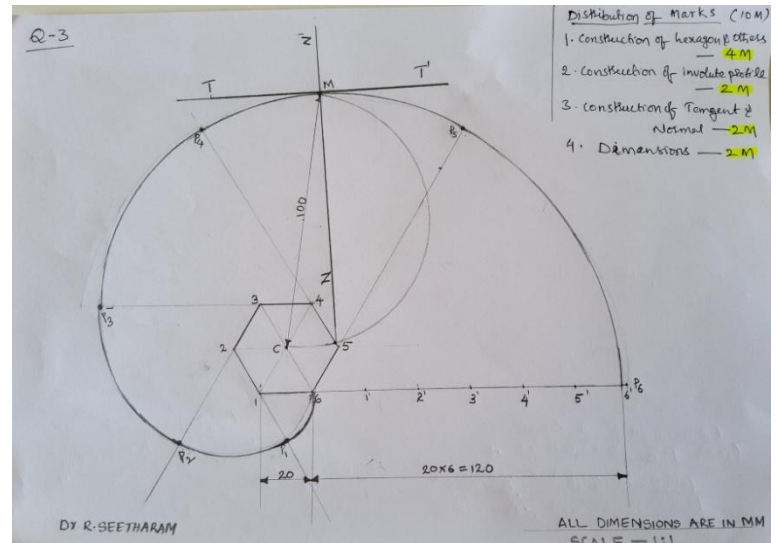

3. FV of line AB is 50° inclined to XY and measures 55 mm long while its TV is 60° inclined to XY line. If end A is 10 mm above HP and 15 mm in front of VP. Draw it's projections and find true length, top view length and true inclination angles with respective HP and VP. And also trace the line.
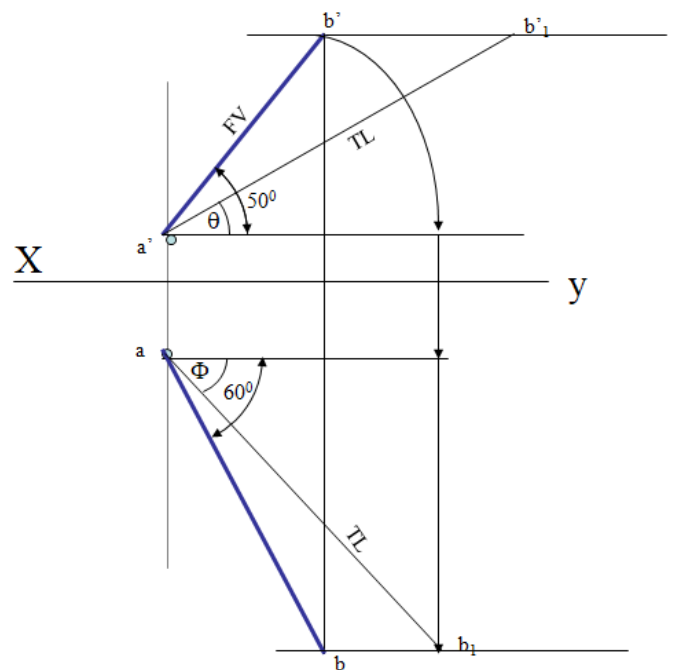
4. Draw the projections of the following points on a common reference line keeping the distance between their projectors 25 mm apart.

(a) Point A is 40 mm above HP and 25 mm in front of the VP
(b) Point B is 40 mm above HP and on the VP
(c) Point C is 25 mm in front of the VP and on the HP
(d) Point D is 25 mm above the HP and 30 mm behind the VP
(e) Point E is on HP and 30 mm behind the VP
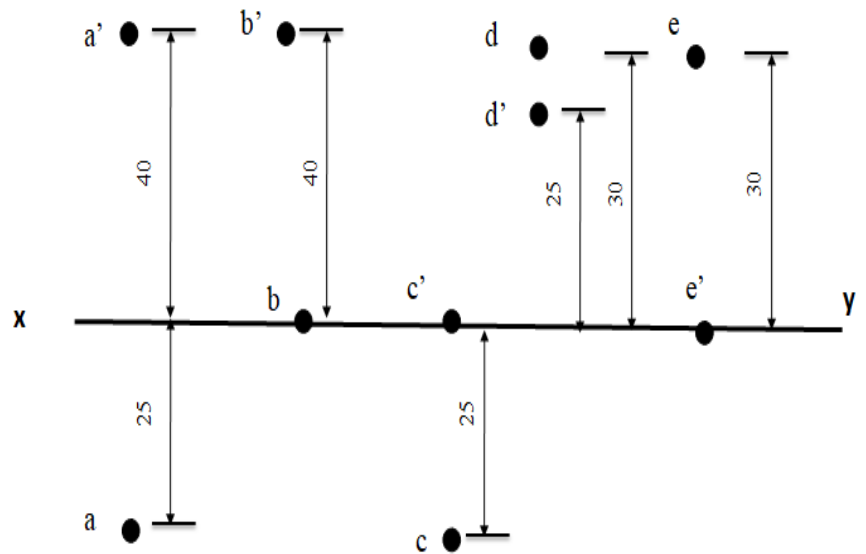
5. Draw the orthographic projection by using first angle projection method of a given Figure.
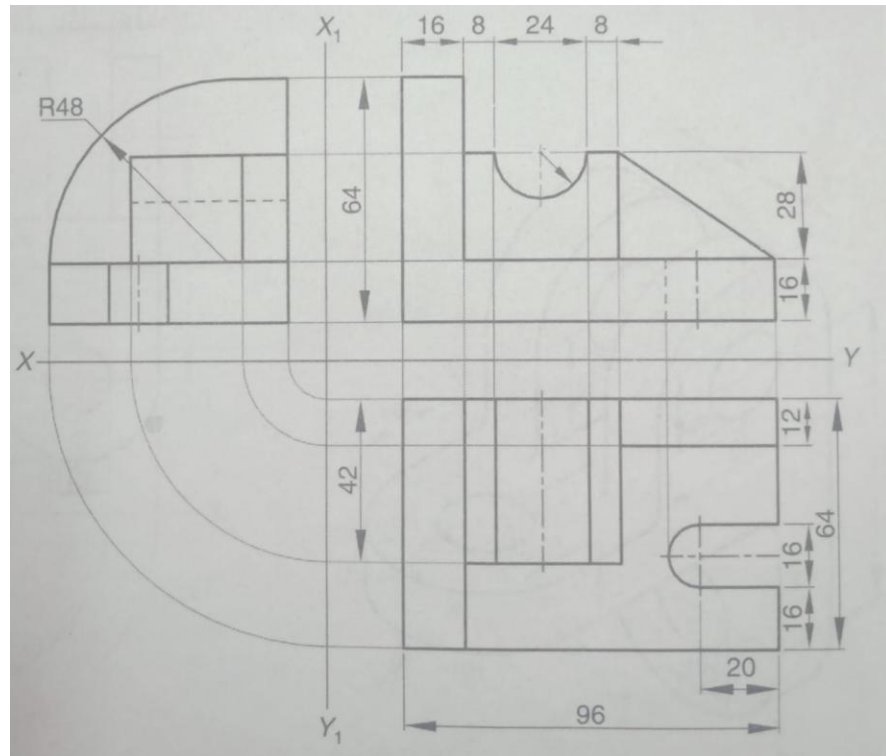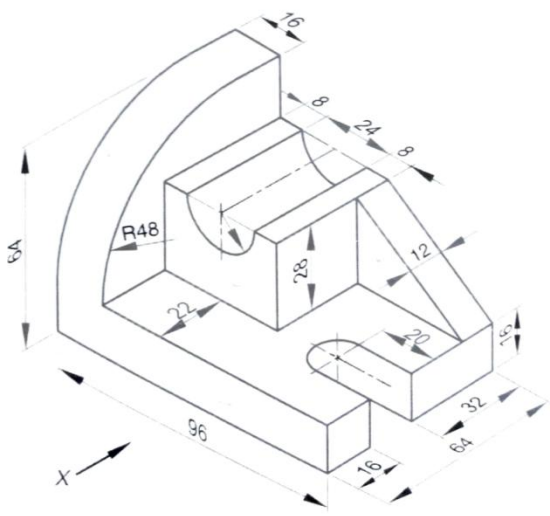
SET-C Solution

1. If 1 cm long line on a map represents a real length of 4 m. Calculate the R.F. and draw a diagonal scale long enough to measure up to 50 metres. Show 44.5 m and 37.8m on it.

Solution

44.5 m

DECIMETRE

METRE   METRE

R.F. = 1:400

1. $R.F. = \dfrac{1\,cm}{4\,m} = \dfrac{1\,cm}{4\times100\,cm} = \dfrac{1}{400}$
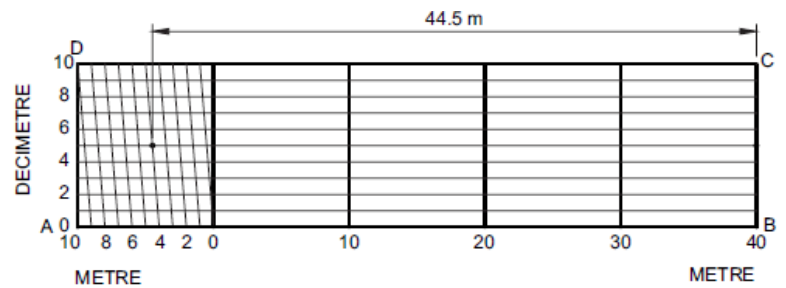
2. Since scale has to show a distance of 44.5 m, assume the least count as

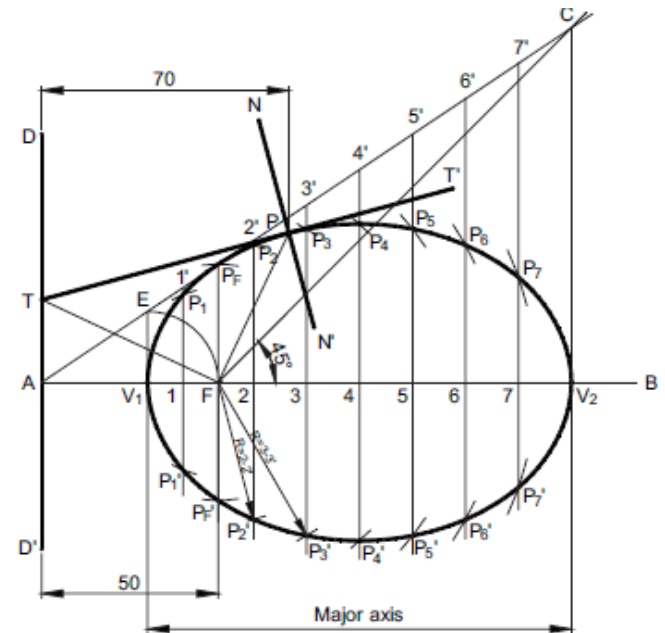3. Length of scale, $L_s = R.F. \times$ Maximum length $= \dfrac{1}{400}\times 50\times 100 = 12.5$

2. Identified curve, having eccentricity 2/3, with focal distance of 50mm from the directrix. Also draw a tangent and a normal to identified curve at a point 70 mm away from the directrix.
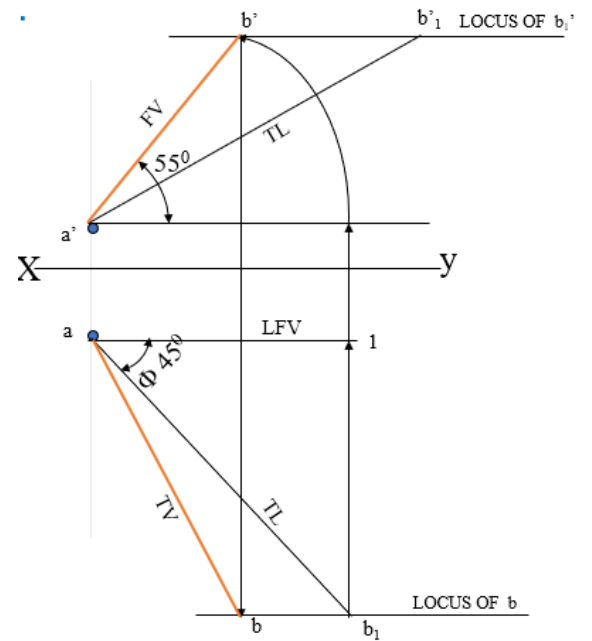
Solution

**Section Identified: "Ellipse"**

3. Draw the projections of the following points on a common reference line keeping the distance between their projectors 30 mm apart.

(a) Point A is 20 mm below the H.P. and 50 mm in front of the V.P.
(b) Point B is in the H.P. and 40 mm behind the V.P.
(c) Point C is 30 mm in front of the V.P. and in the H.P.
(d) Point D is 50 mm above the H.P. and 30 mm behind the V.P.
(e) Point E is 20 mm below the H.P. and 50 mm behind the V.P.
(f) Point F is in the V.P. and 50 mm below the H.P.
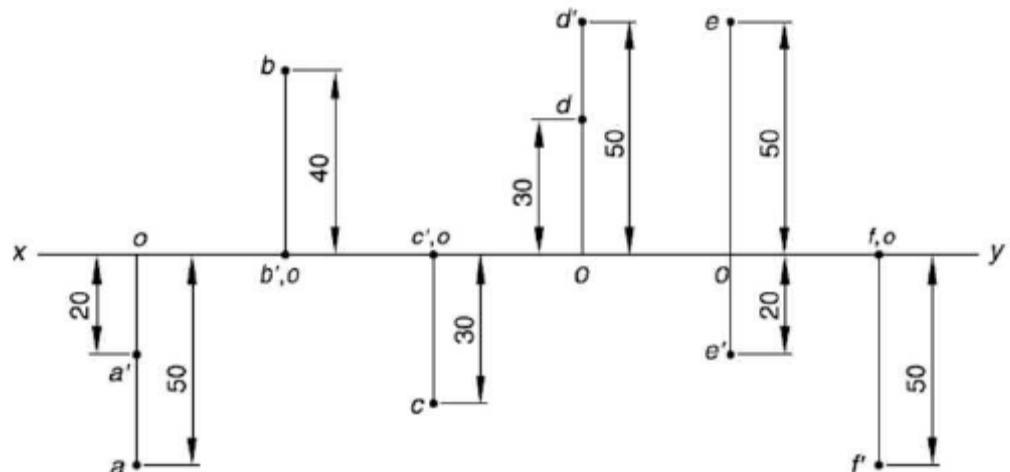
4. Line AB 75mm long makes 450 inclinations with VP while it's FV makes 550 .End A is 10 mm above HP and 15 mm in front of VP. If line is in 1st quadrant draw it's projections, find it's inclination with HP and also draw the traces.
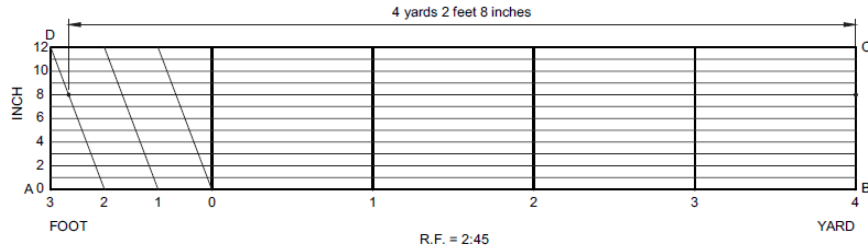

5. **Draw Orthographic projection of the figure**
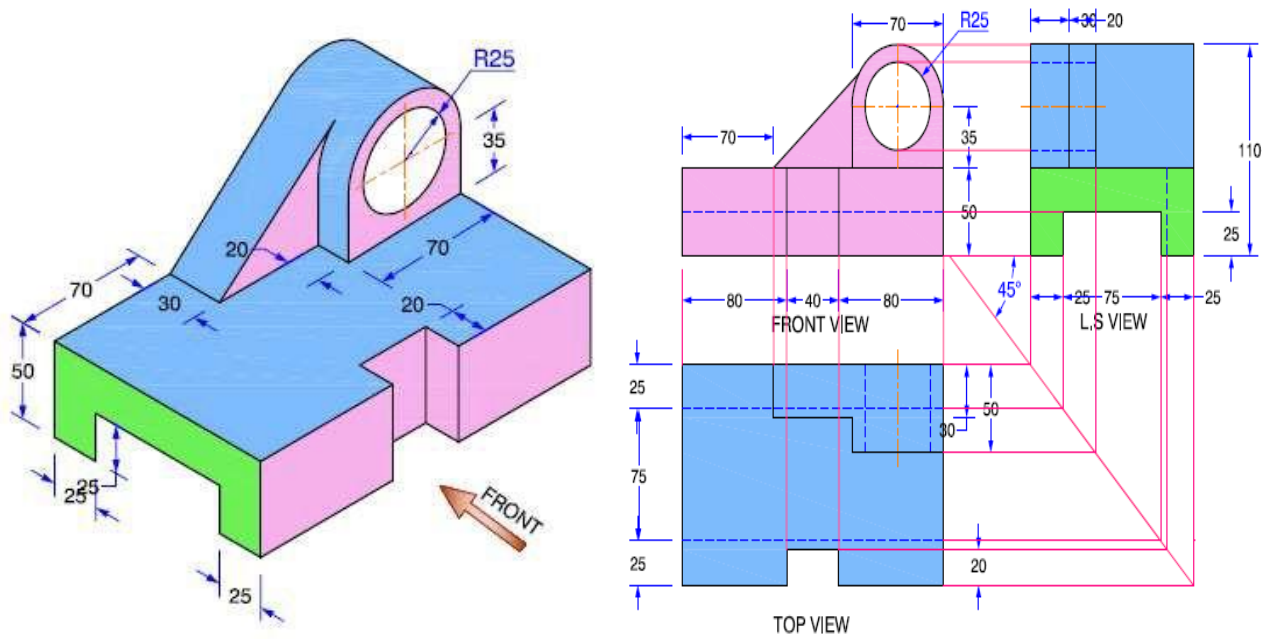
SET-D Solution

1. **Construct a diagonal scale showing yards, feet and inches in which 2 inches long line represents 1.25 yards and is long enough to measure up to 5 yards. Find R.F. and mark a distance of 4 yards 2 feet 8inches and 3 yards 1feet 7inches.**
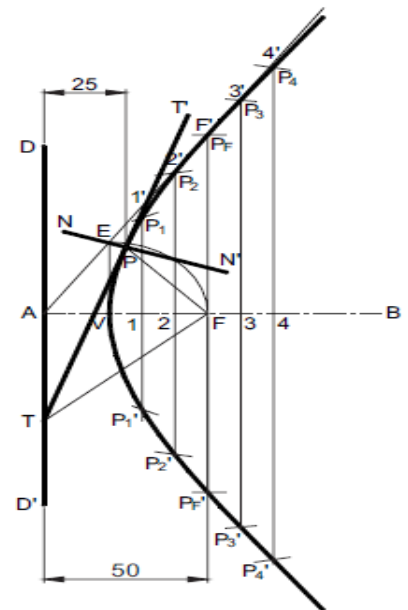
Solution:

$$R.F. = \frac{2 \text{ inches}}{1.25 \text{ yards}} = \frac{2 \text{ inches}}{1.25 \times 3 \times 12 \text{ inches}} = \frac{2}{45}$$

$$\text{Length of scale, } L_s = R.F. \times \text{Maximum length} = \frac{2}{45} \times 5 \times 3 \times 12 \text{ inches} = 8 \text{ inches} = 20.32 \text{ cm}$$

2. **The curve used to represent Boyles's law, identify the curve. For the identified, draw a curve with focal distance of 50mm from the directrix. Also draw a tangent and a normal to the identified curve at a point 25mm mm away from the directrix. Take eccentricity 3/2.**

   Solution
   Section Identified: "Hyperbola"

3. **Projection of various points is given in Fig. State the position of each point with respect to the planes of projection.**
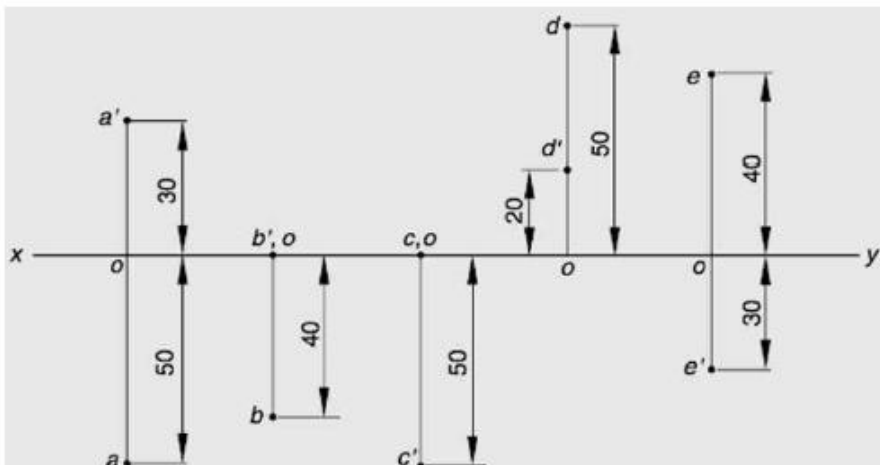
Solution
(a) Point A is 30 mm above the H.P. and 50 mm in front of the V.P.
(b) Point B is in the H.P. and 40 mm in front of the V.P.
(c) Point C is 50 mm below the H.P. and in the V.P.
(d) Point D is 20 mm above the H.P. and 50 mm behind the V.P.
(e) Point E is 30 mm below the H.P. and 40 mm behind the V.P.

4. Line AB is 75 mm long. It's FV and TV measure 50 mm & 60 mm long respectively. End A is 10 mm above HP and 15 mm in front of VP. Draw projections of line AB if end B is in first quadrant. Find angle with HP and VP and also draw the traces.

5. **Draw Orthographic projection of the figure**