30/10/2013

ENGINEERING DRAWING

→ Engineering drawing is a type of technical drawing used to fully and clearly of the required engineering items. Engineering drawing is a graphical language it is used to communicate ideas and information from one mind to another.

TOOLS ARE REQUIRED IN THE ENGINEERING DRAWING:-

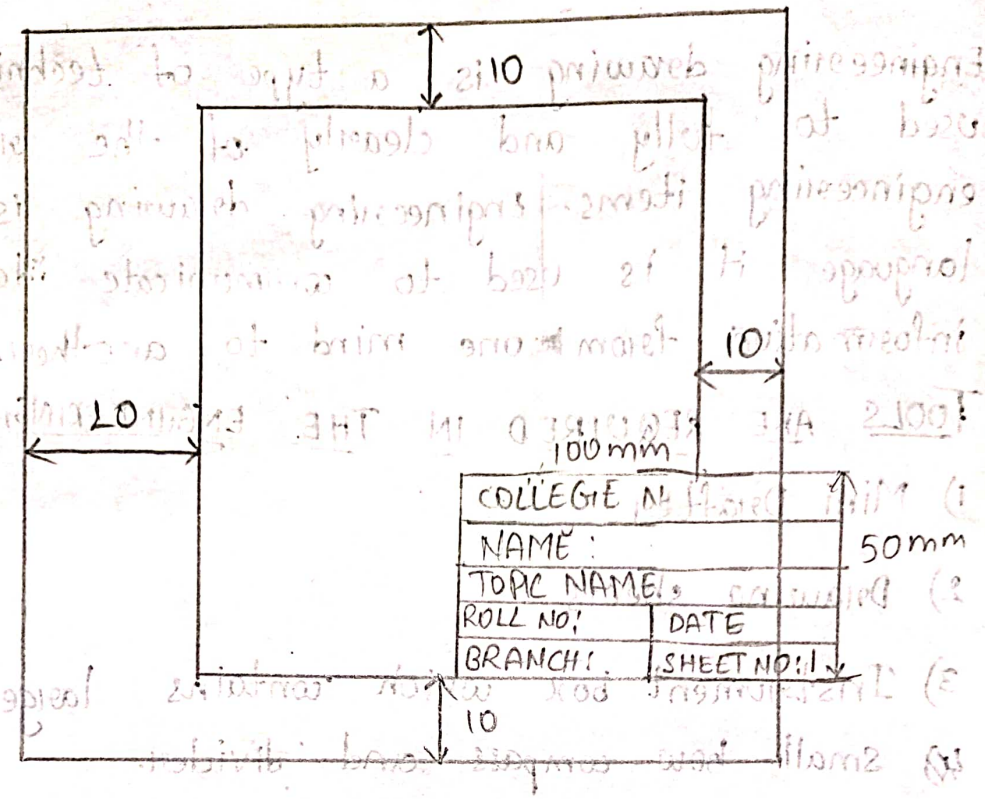
1) Mini Drafter
2) Drawing sheets
3) Instrument box which contains large size compass
4) small bow compass and divider.
4) Scales
5) Protracter
6) Drawing pencils
7) Drawing clips
8) Eraser and
9) cello tape

→ The dimensions are

DIMENSIONS(OR) SHEET SIZE) AND TRIMMED SIZE:

Sheet size	Trimmed size (mm)
A_0	841 X 1189
A_1	594 X 841
A_2	420 X 594
A_3	297 X 420
A_4	210 X 297

SHEET-1

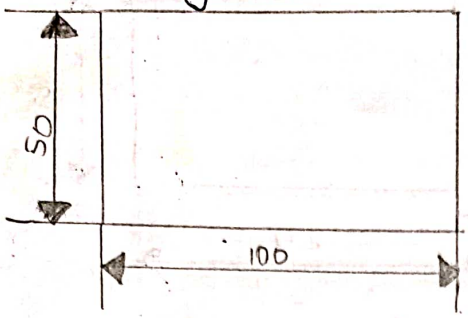


HOW TO INDICATE THE LINES (OR) REPRESENTING IN ENGINEERING DRAWING:

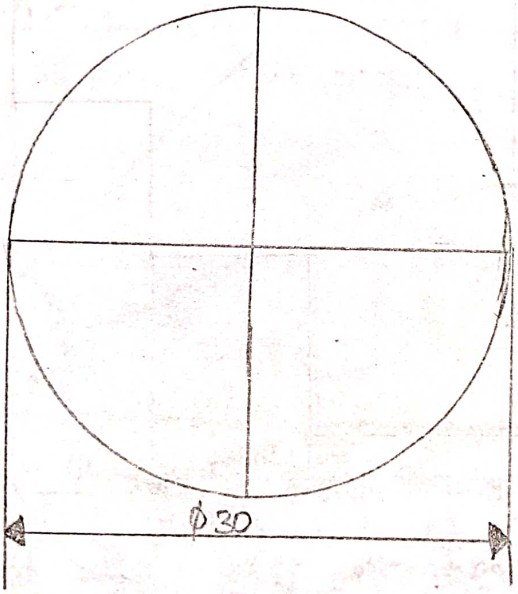
Line	Description	General applications
1) ———	contineous thick	visibled outlines and borders
2) ———	contineous thin	dimensions of lines and projection lines
3) ~~~	contineous thin free hand	Limits of lines
4) -/\/\-	contineous thin with zig-zag	Long break lines
5) —— - —— -	Centre lines	Used in the reference lines

DIMENSION INDICATION :-

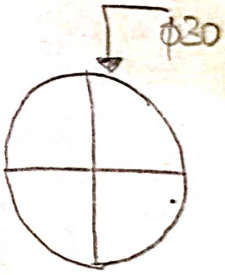
1.) Rectangle (100 X 50) :-



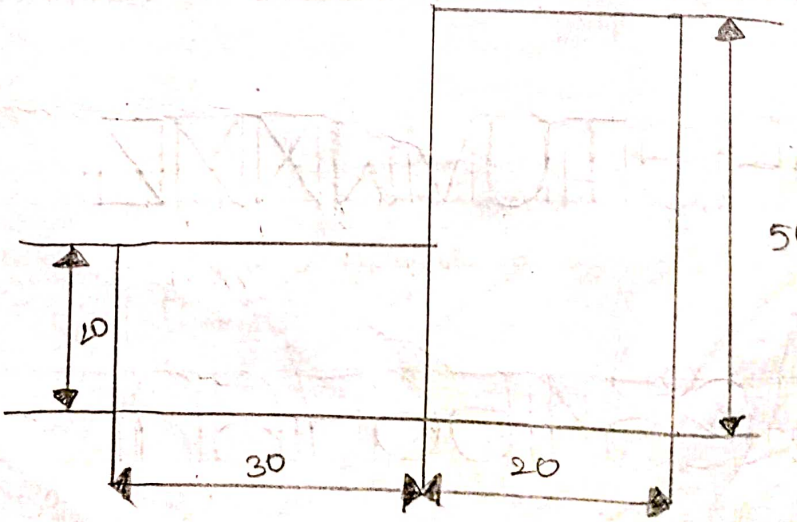
2) Circle: (ϕ30)



(OR)

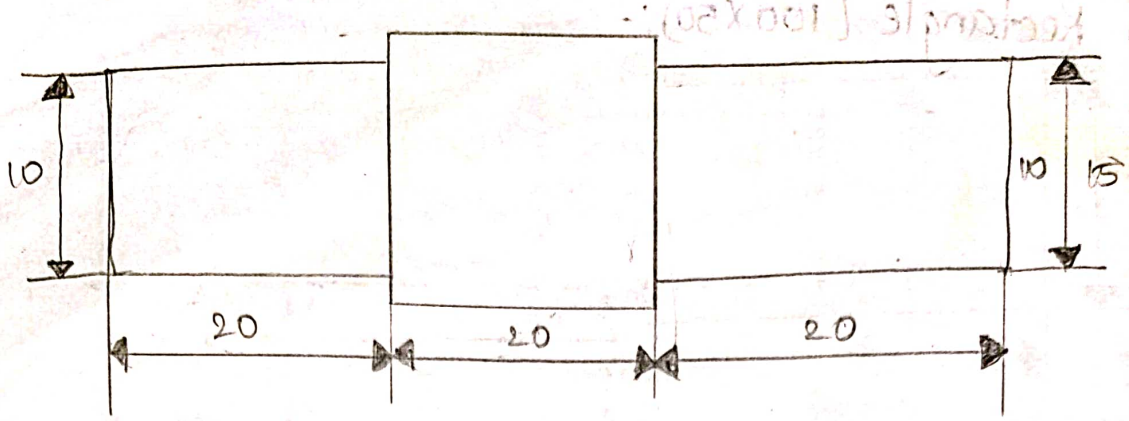


3)

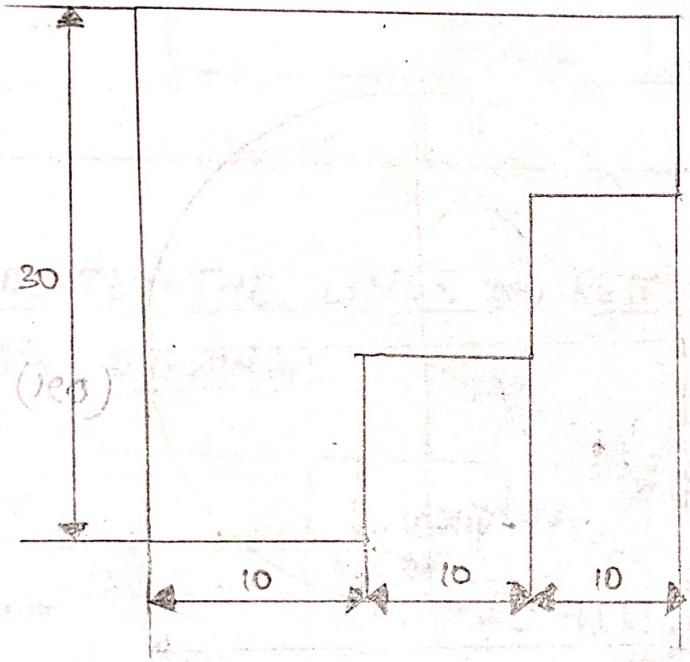


0123456789

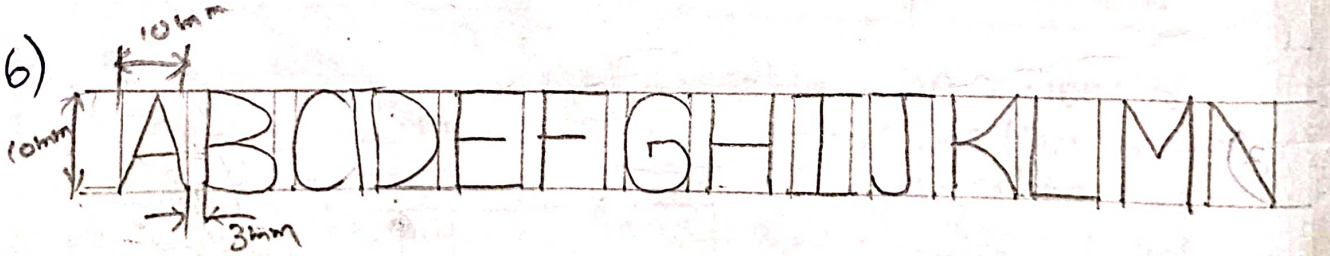
4)



5)



6)



OPQRSTUMWXYZ

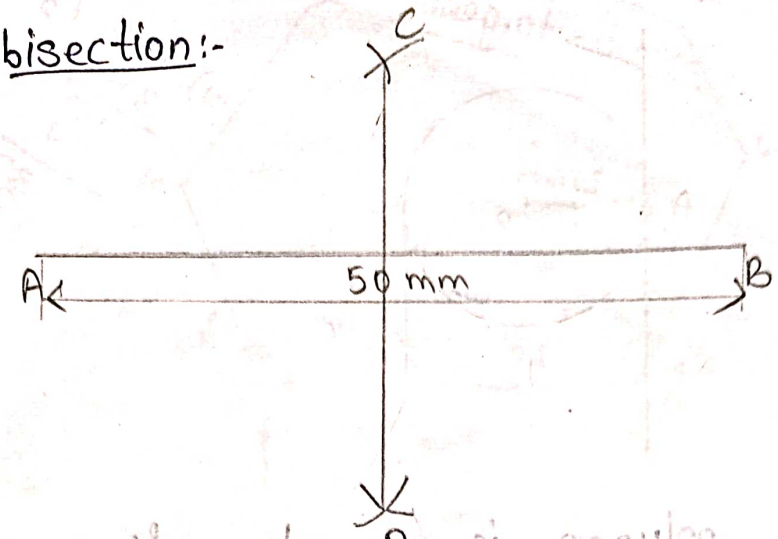
7)

0123456789

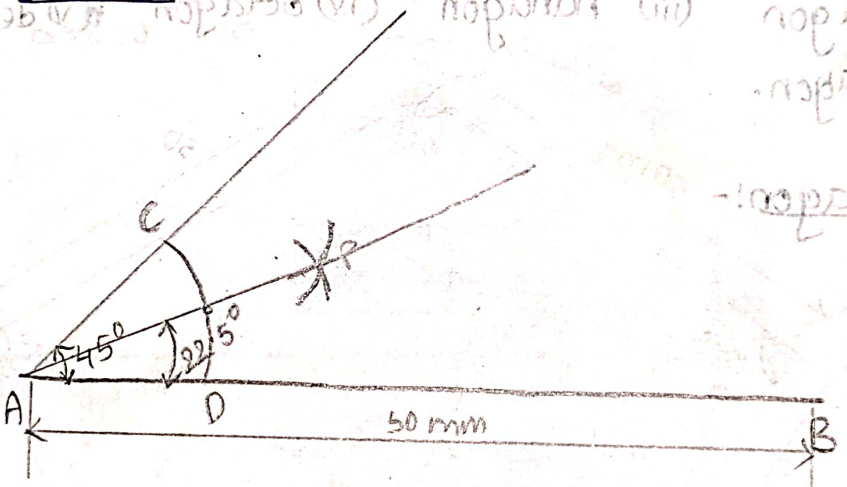
11/2013

SHEET - 2

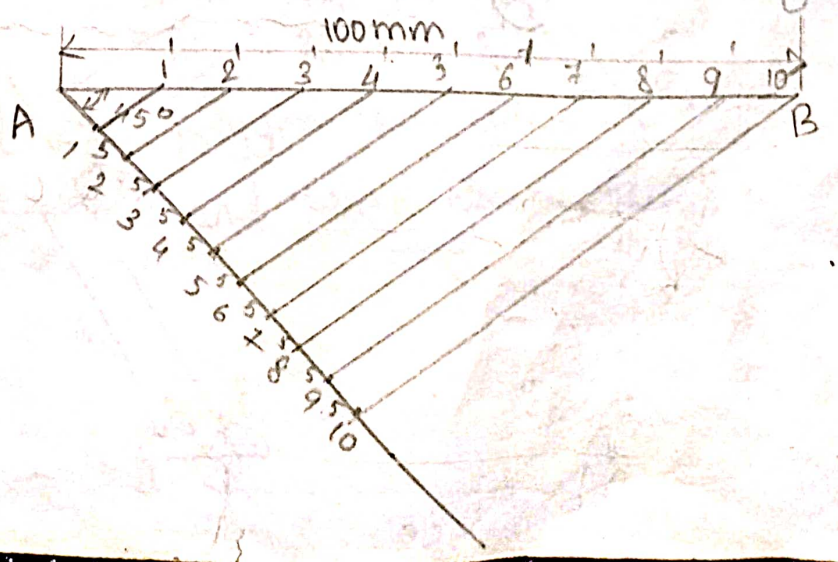
1) Line bisection :-



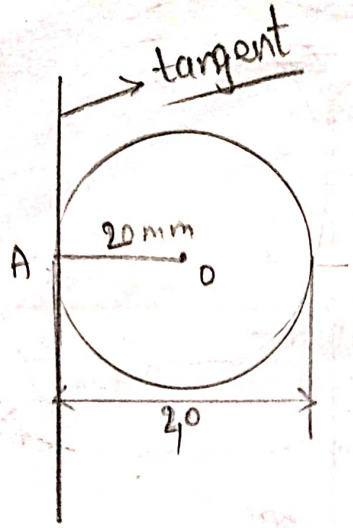
2) Angle bisection :-



3) Line divided into any number of equal parts :-

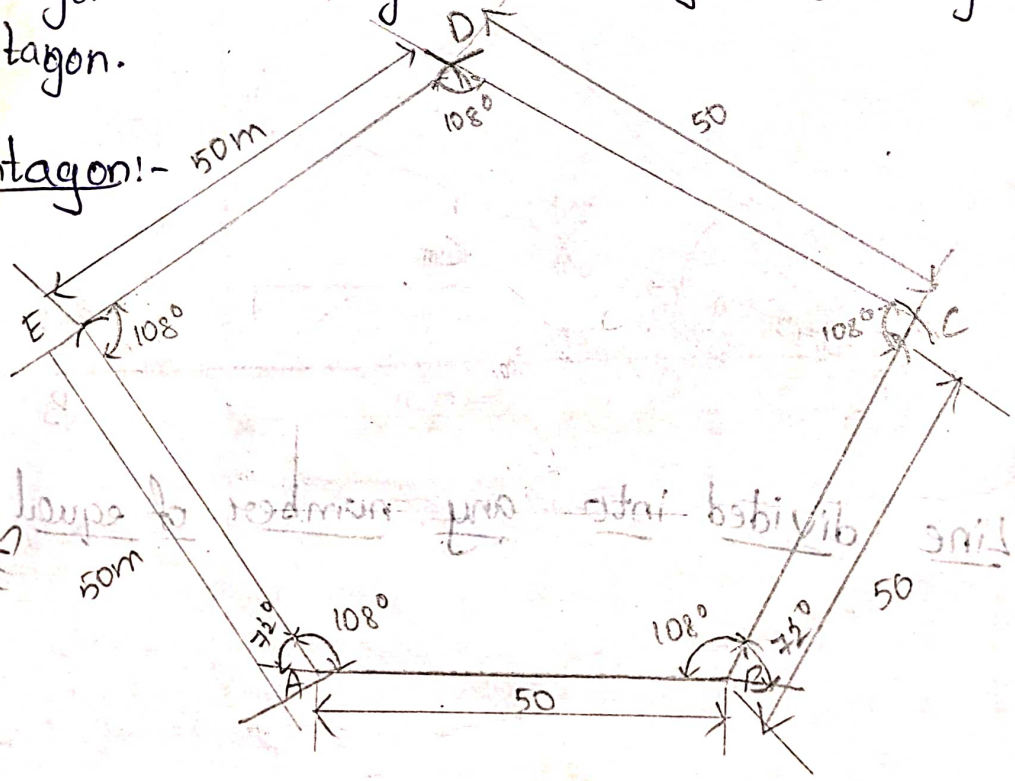


1) Tangents:

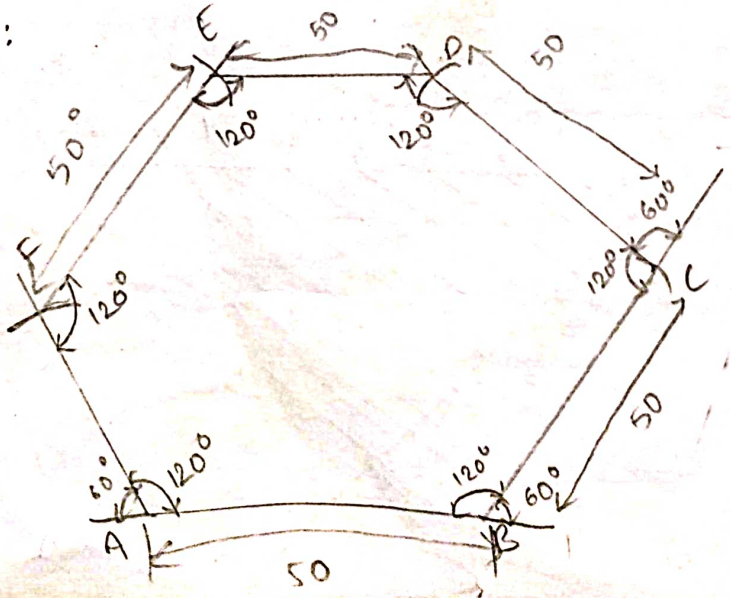


5) Polygons: A polygon is a plane figure bounded by more than 4 lines which are, (i) hexagon, (ii) pentagon (iii) nanagon (iv) octagon (v) decagon (vi) heptagon.

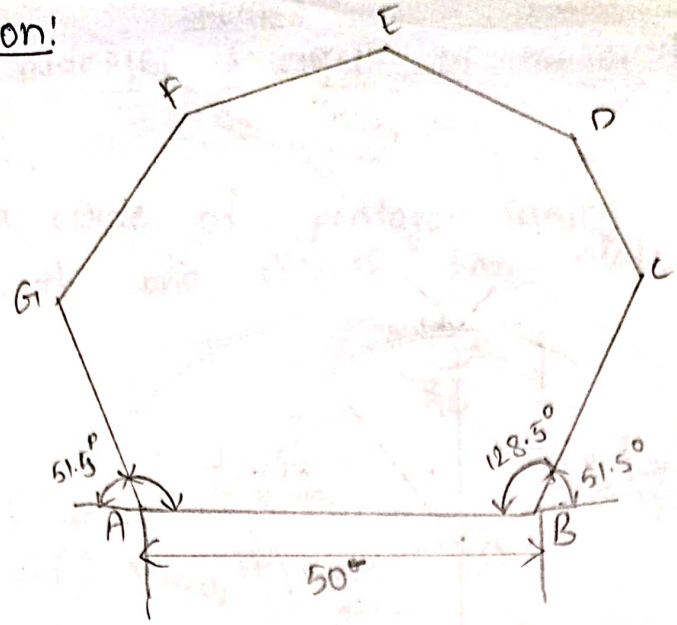
(i). Pentagon:- 50m



ii) Hexagon:

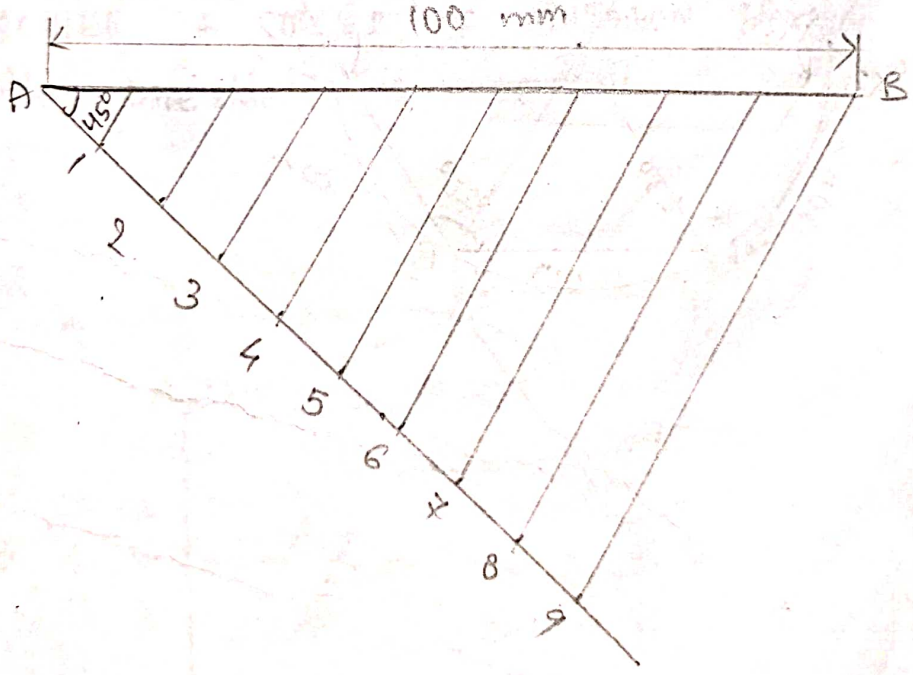


3 (iii) Heptagon:



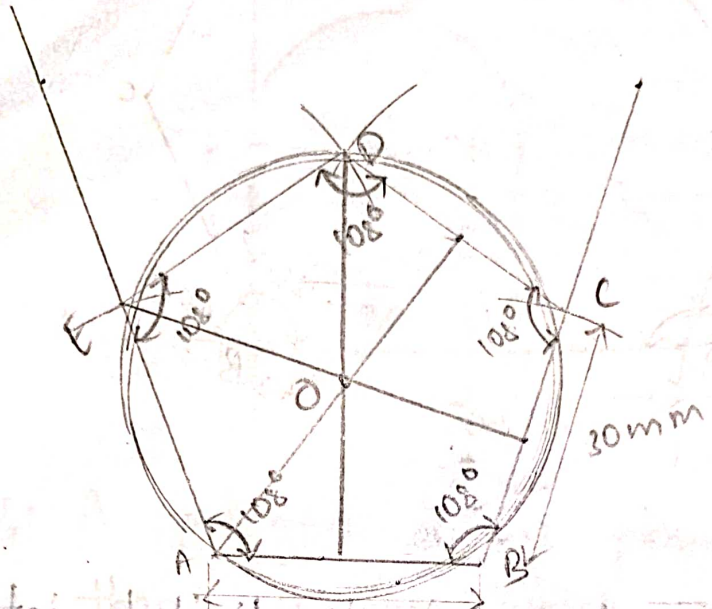
Problems:

1) A line $\overline{AB}$ (100 mm) is divided into 9 equal parts, draw in the sheet.

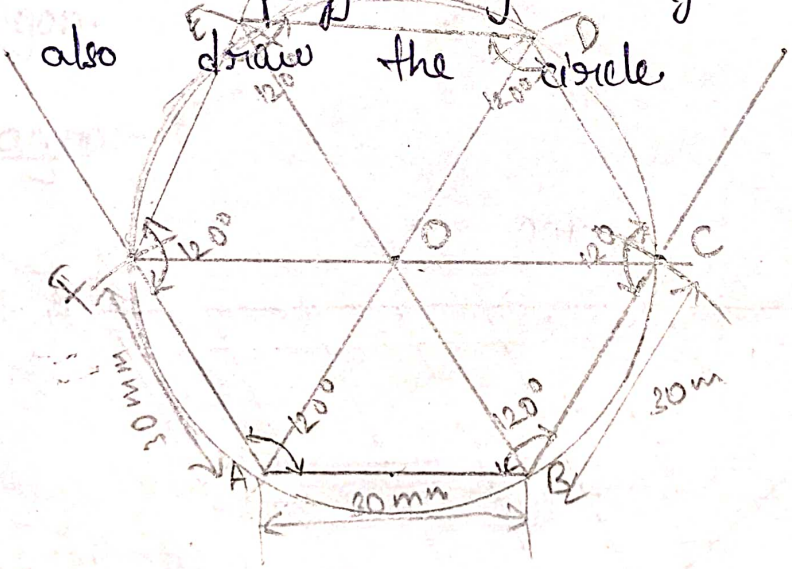


2) Construct a polygon of side 30mm. The polygon is pentagon. and also draw the circle

(i) pentagon.



2.) Construct a polygon say hexagon of length 30mm and also draw the circle

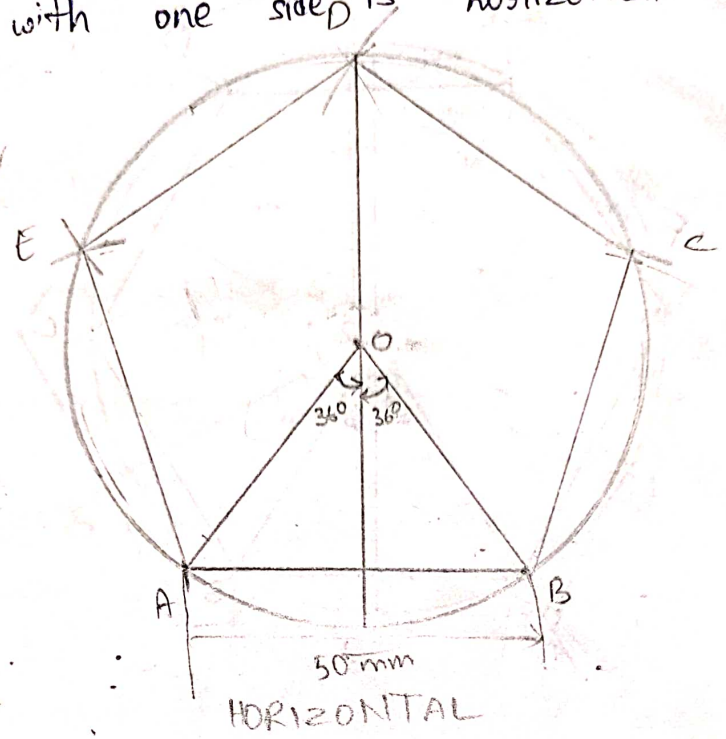


8/11/2013

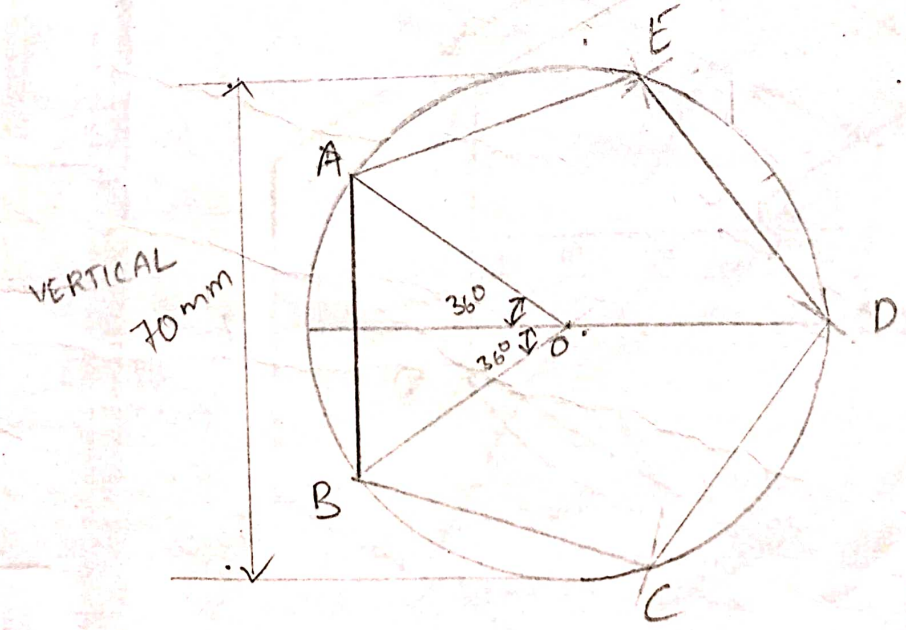
SHEET-3

INSCRIBE A CIRCLE OF POLYGONS

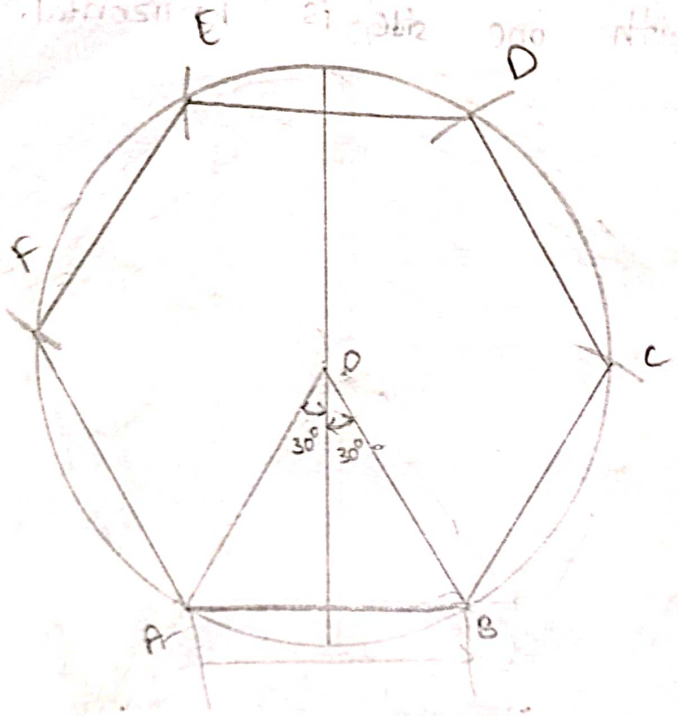
1) Inscribe a circle of pentagon taking the diameter = 70mm with one side D is horizontal.



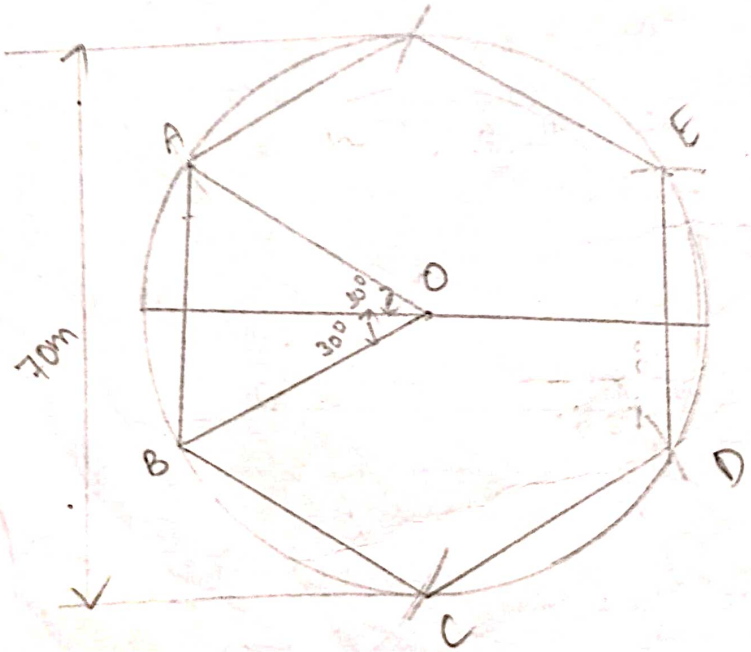
2) INSCRIBE A CIRCLE OF PENTAGON TAKING DIAMETER = 70mm with one side is vertical.



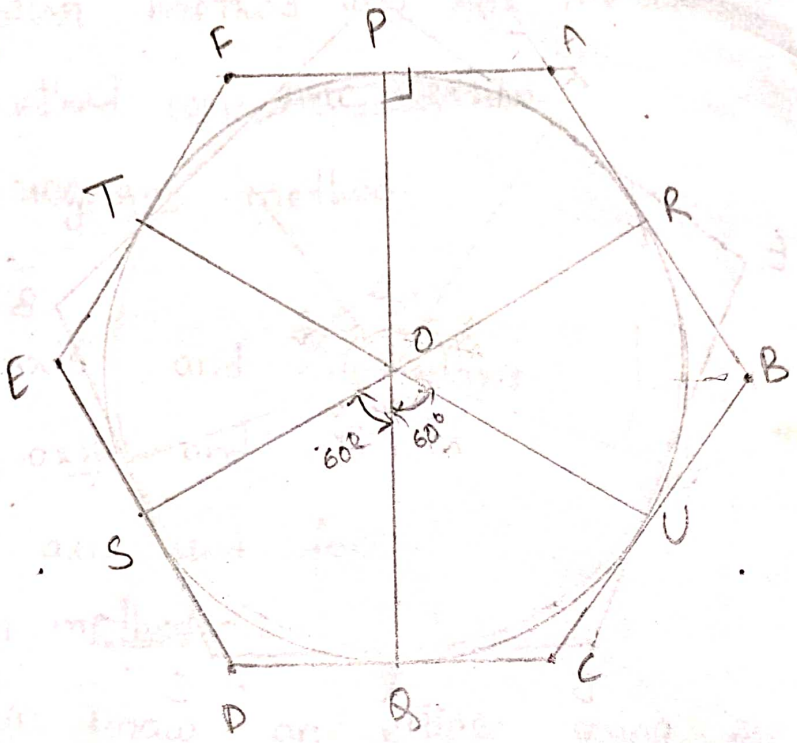
3) Inscribe a circle of hexagon of diameter = 70mm with one side is horizontal.



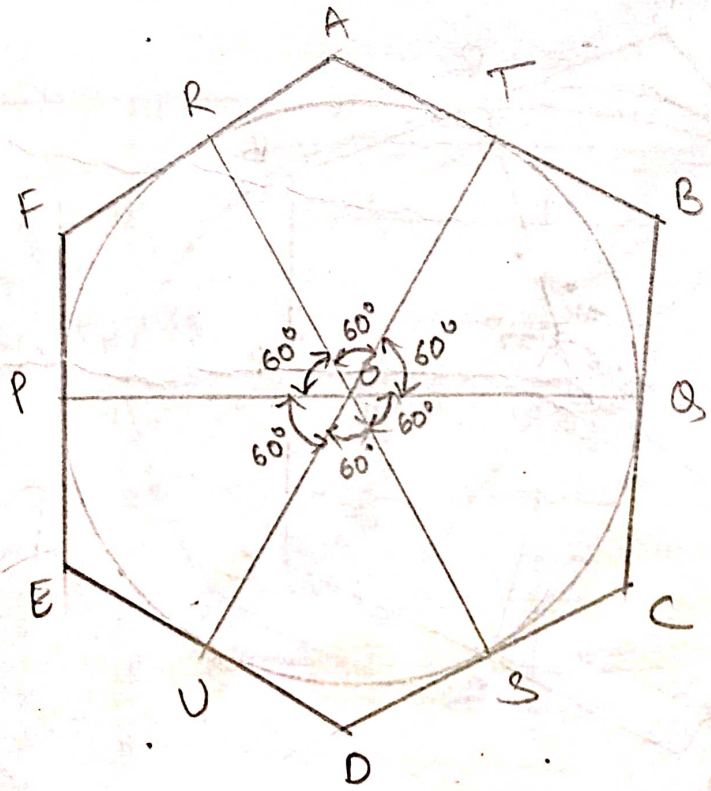
4) Inscribe a polygon of hexagon of diameter = 70 mm with one side is vertical.



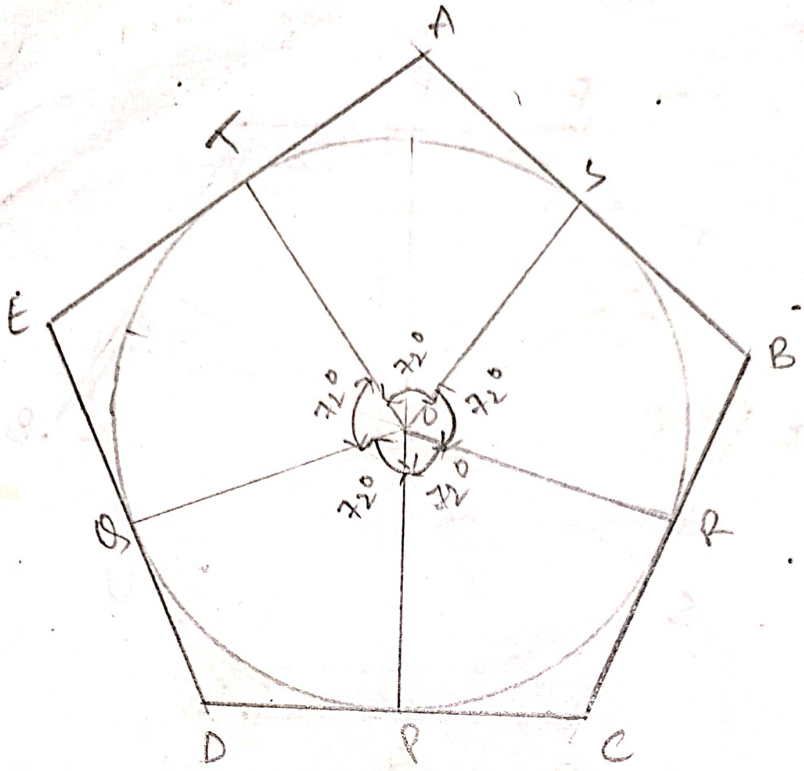
1) Superscribe of a ~~circle~~ of polygons of hexagon taking diameter = 70mm with one side is horizontal,



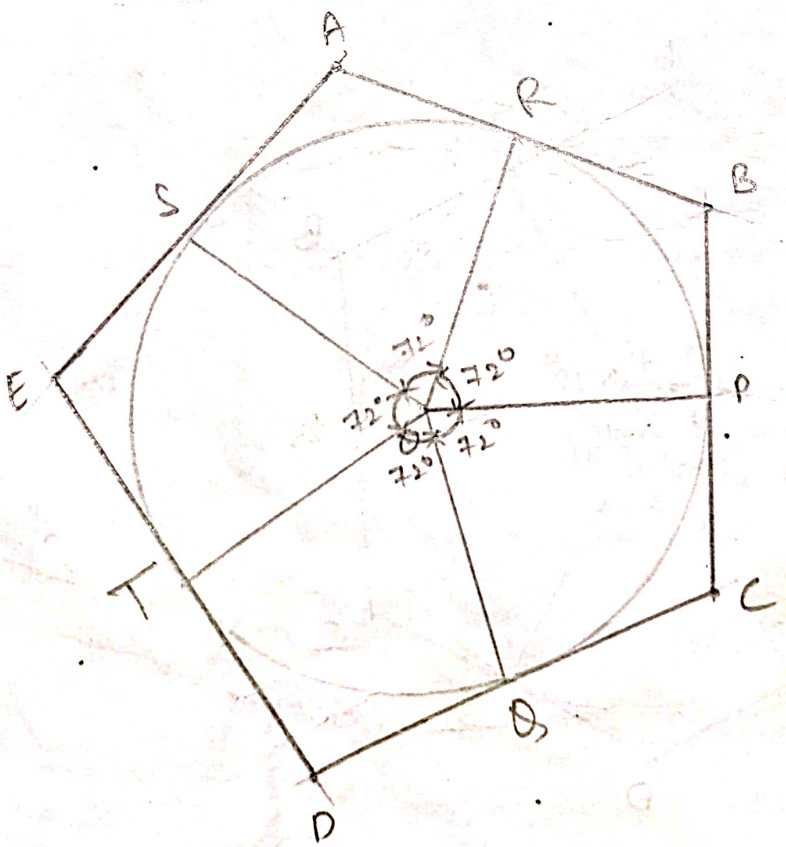
2) Superscribe of a circle of hexagon taking diameter = 70mm with one side is vertical.



3) Superscribe a pentagon of circle of diameter = 70mm with one side is horizontal.



4) Superscribe a circle pentagon taking diameter = 70mm with one side is vertical.



13/11/2013

ELLIPSE (Sheet-4)

There are three methods for drawing of ellipse.

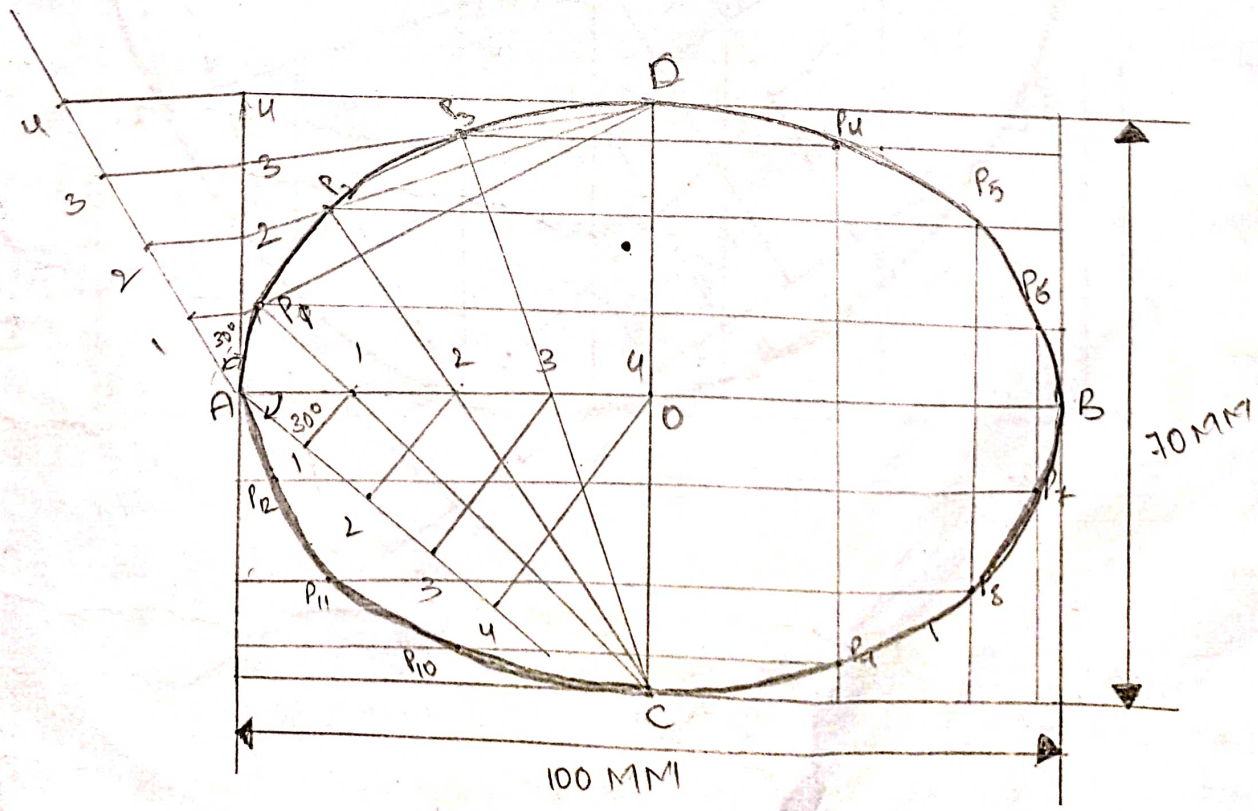
1) Rectangular method (or) Box method (or) oblong method.
2) Foci method (or) Arc method
3) Parallelogram method.

Conditions:-

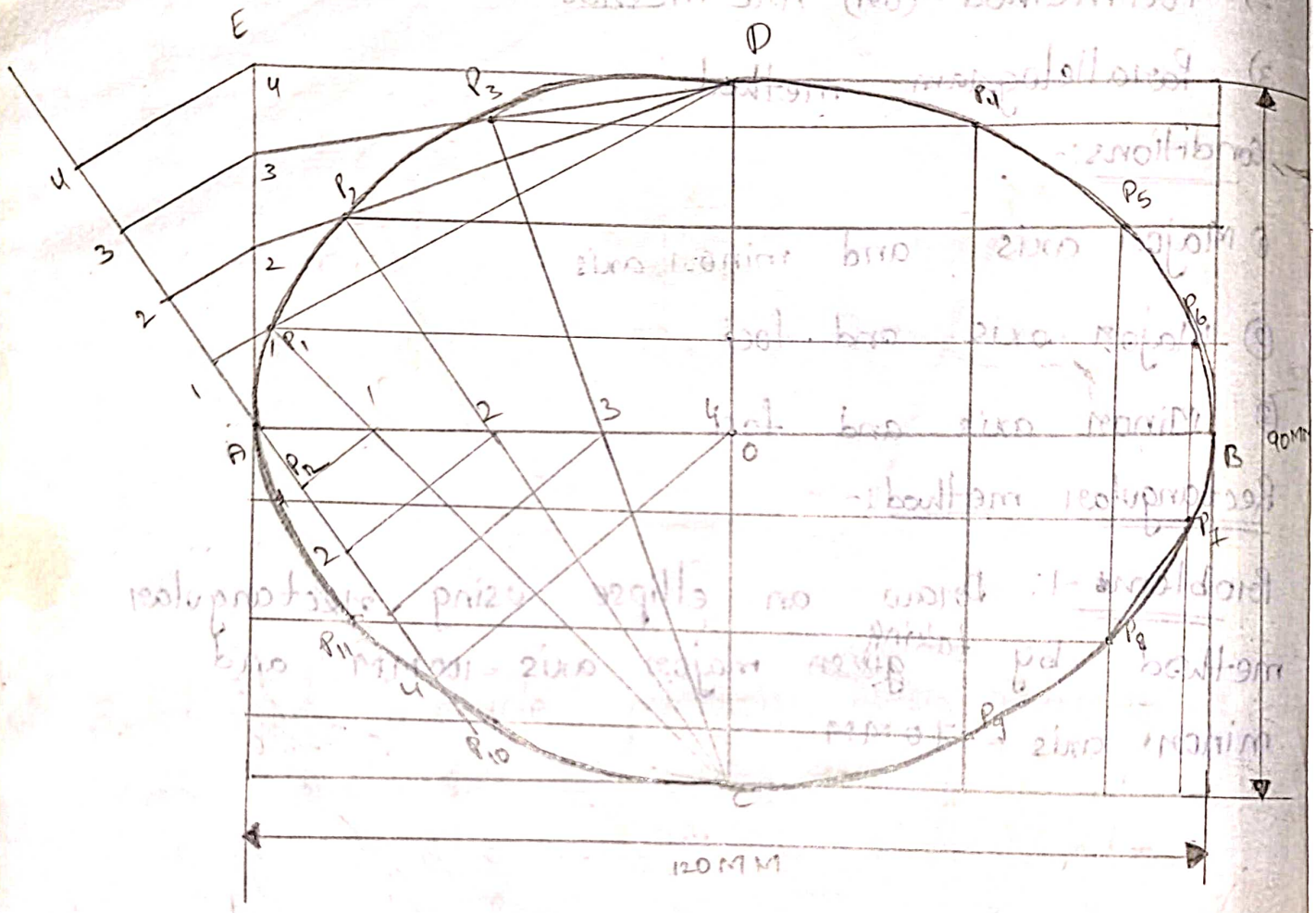
① Major axis and minor axis
② Major axis and foci
③ Minor axis and foci

Rectangular method:-

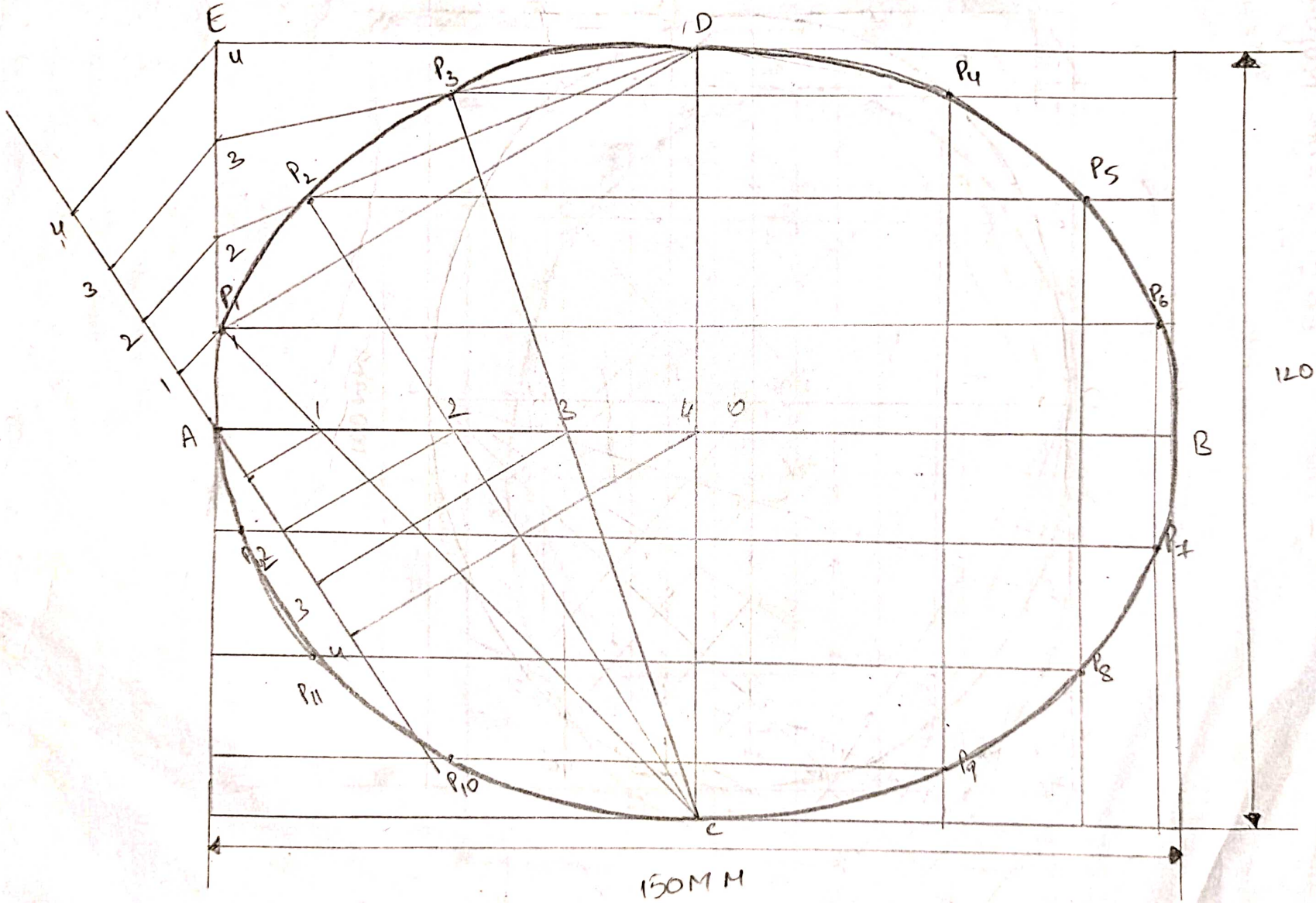
Problem-1: Draw an ellipse using rectangular method by taking major axis = 100 MM and minor axis = 70 MM



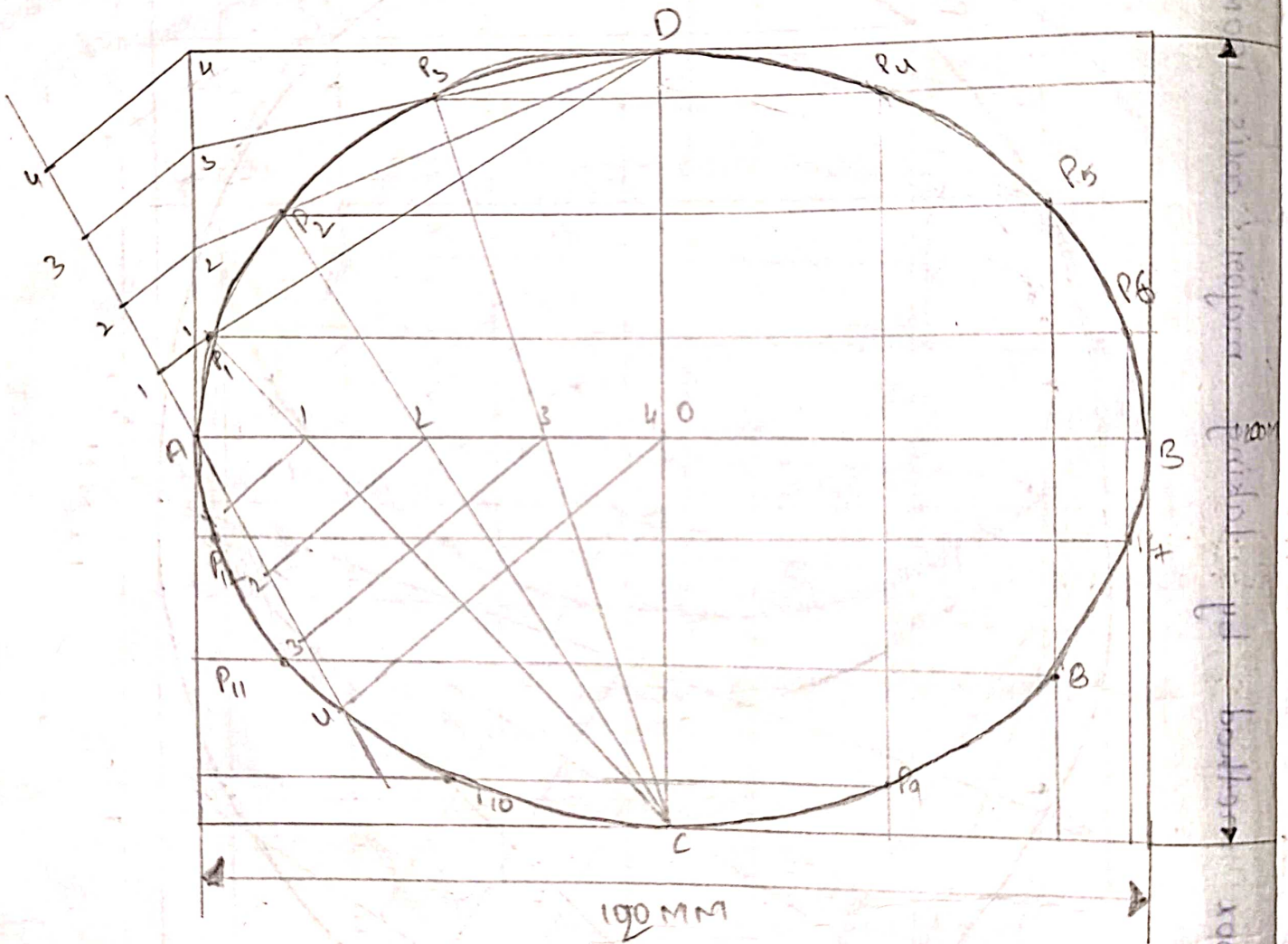
2) Draw an ellipse using oblong method by taking major axis = 120MM, minor axis = 90MM.



3) Draw an ellipse using box method by taking major axis = 150MM, minor axis = 120MM



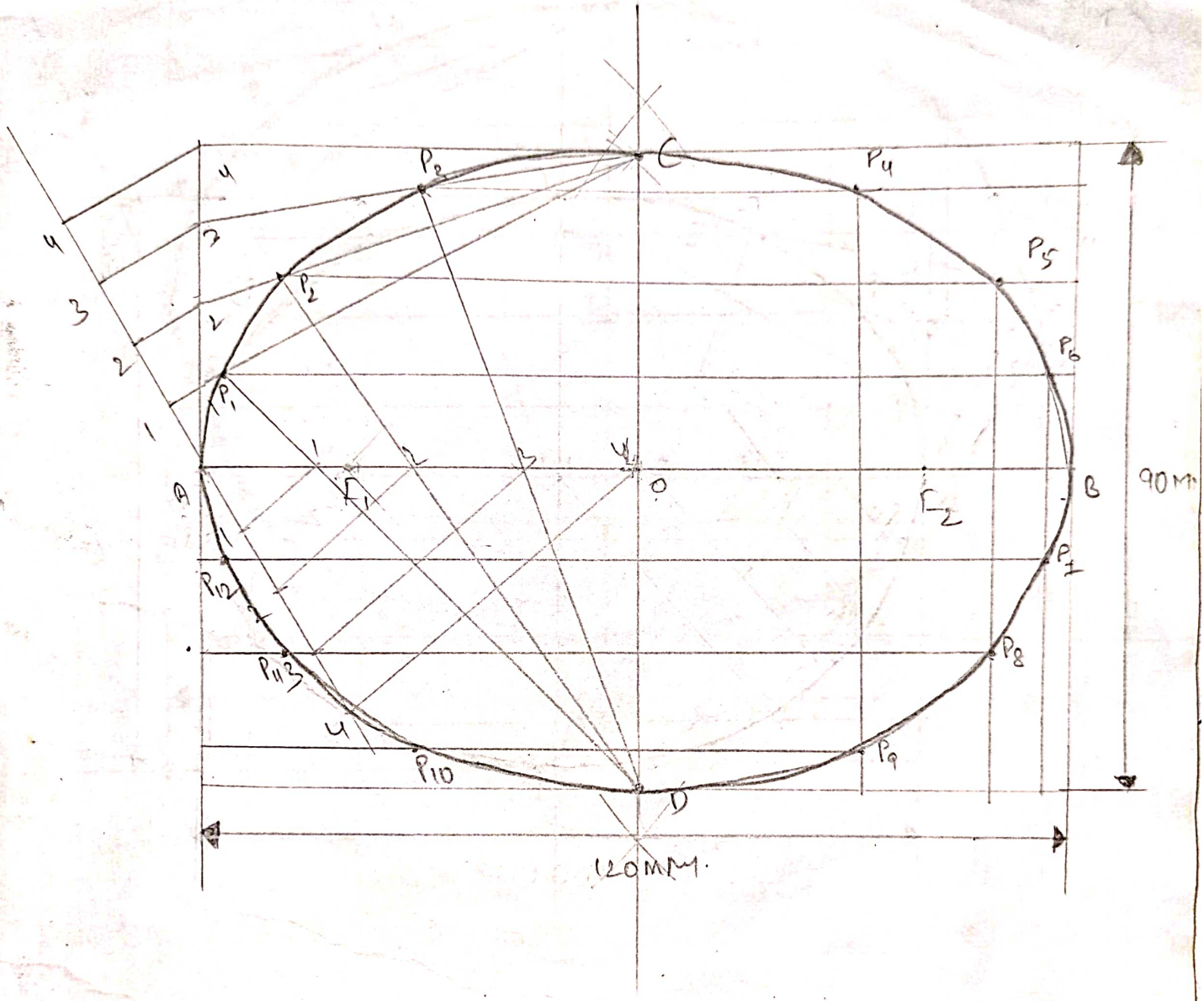
4) Draw an ellipse using rectangle method given minor axis = 100 mm, major axis = 120 mm.



Sheet-5

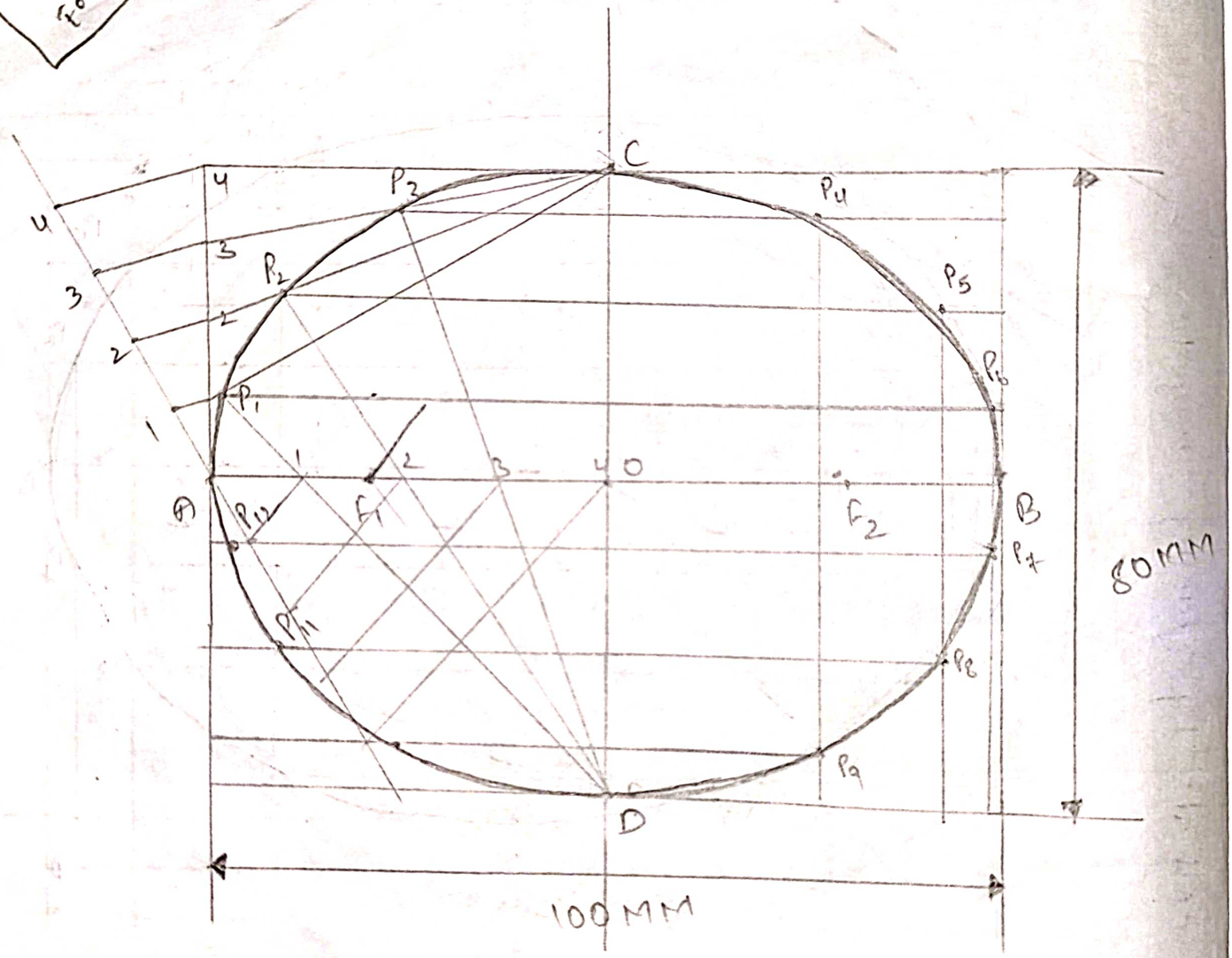
1) Draw an ellipse using oblong method using given major axis = 120 mm, foci = 80 mm.

OA = 60mm

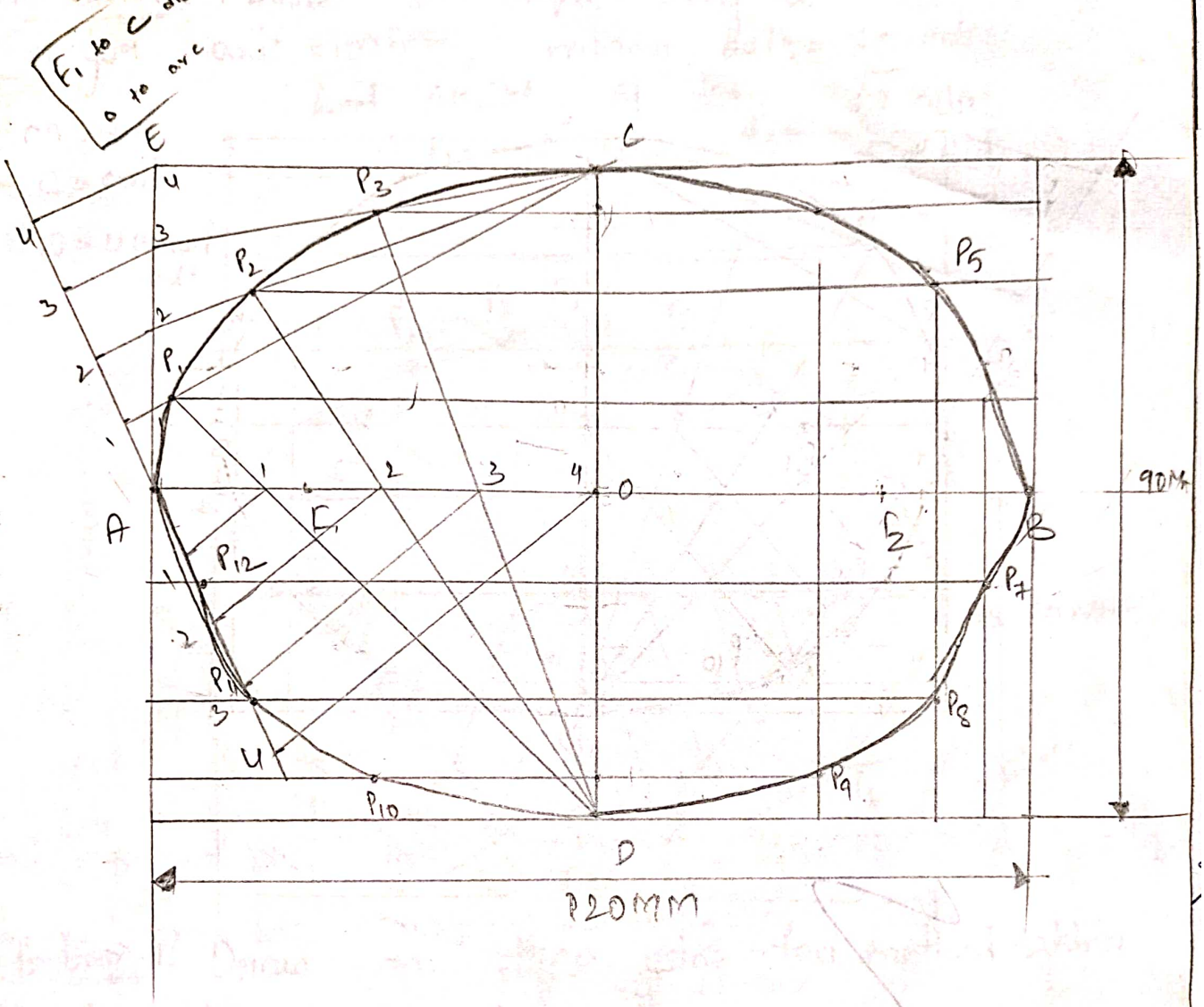


2) Draw an ellipse using rectangle method given major axis = 100mm and foci (F_1 F_2) = 60 mm

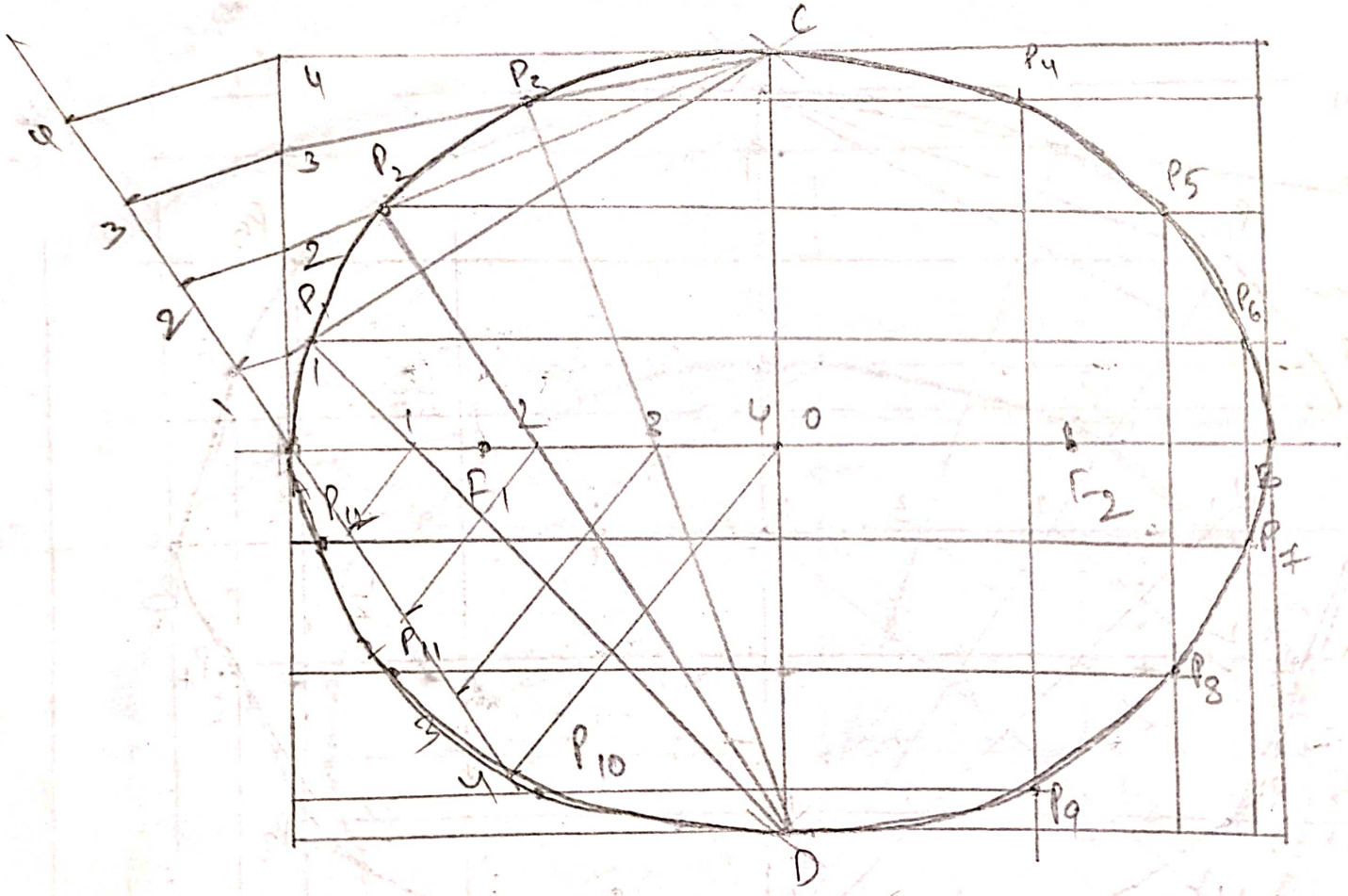
A to O distance = Foci to arc



3) Draw an ellipse using box method by given minor axis = 90 mm and foci (F_1 F_2) = 80mm.



4) Draw an ellipse using oblong method by given minor axis = 80 mm and foci (F_1 F_2) = 60mm



20/11/2012

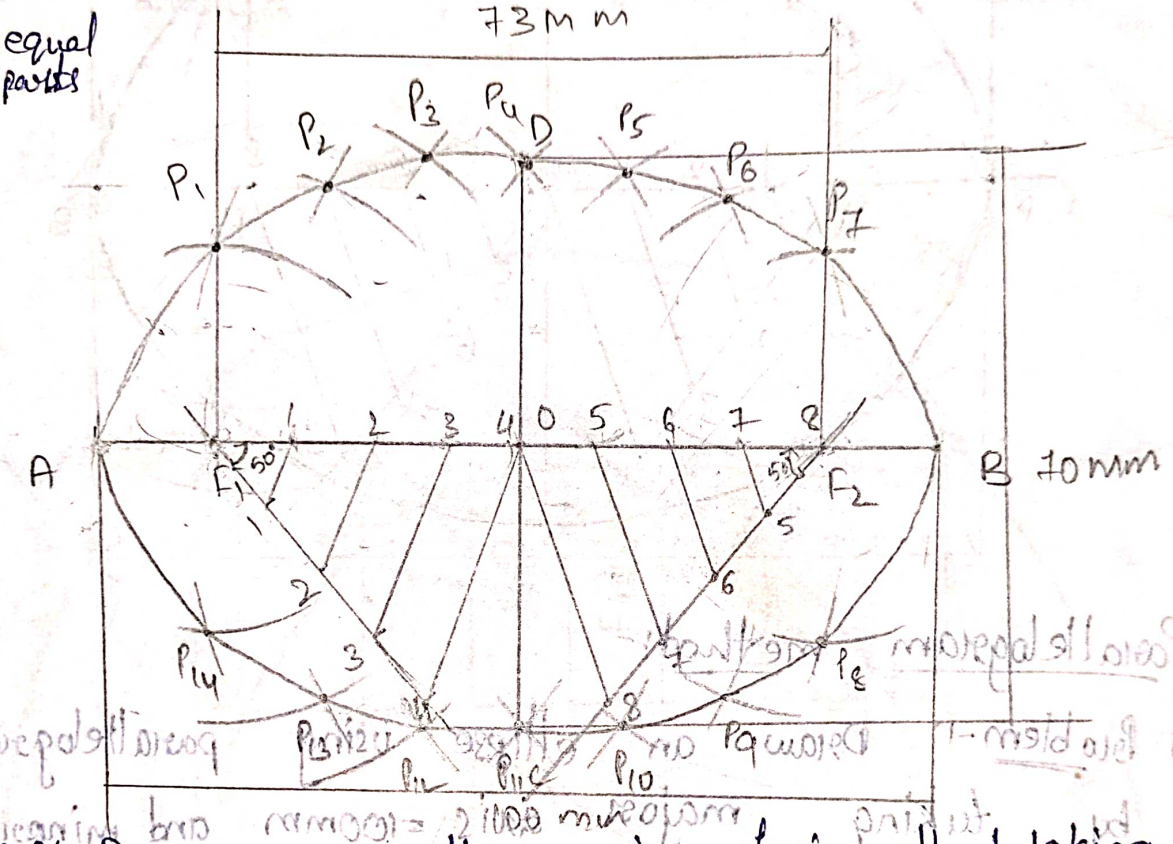
SHEET-6

ARC Method

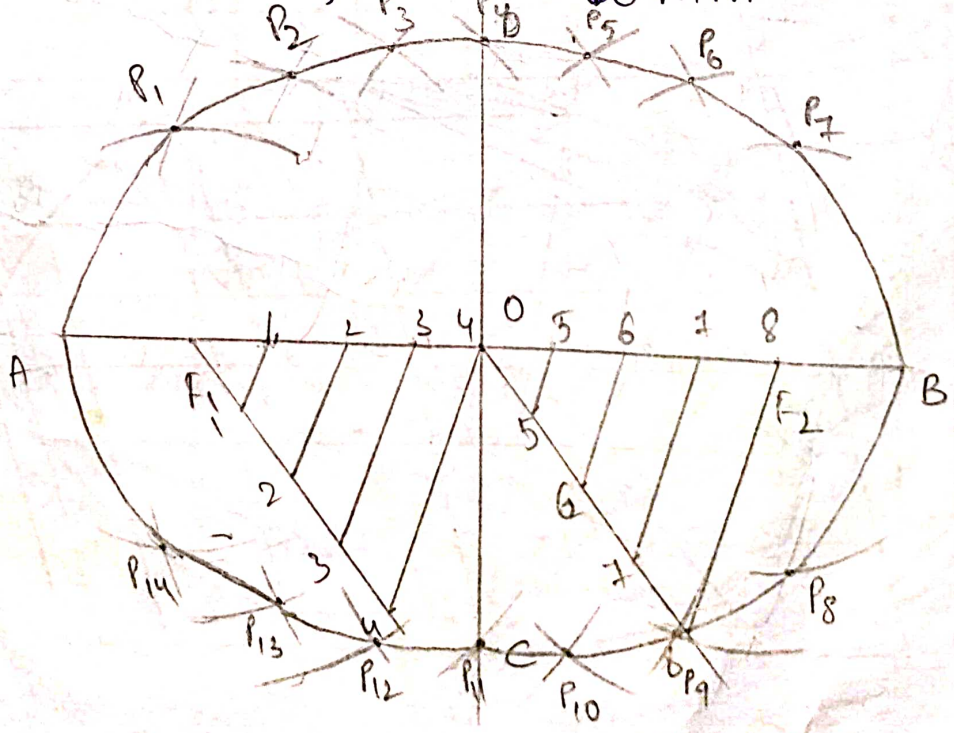
Problem-1: Draw an ellipse using arc method, given major axis = 100 mm, minor axis = 70 mm.

OA = dist.
C = cent
F1O = 4 equal parts

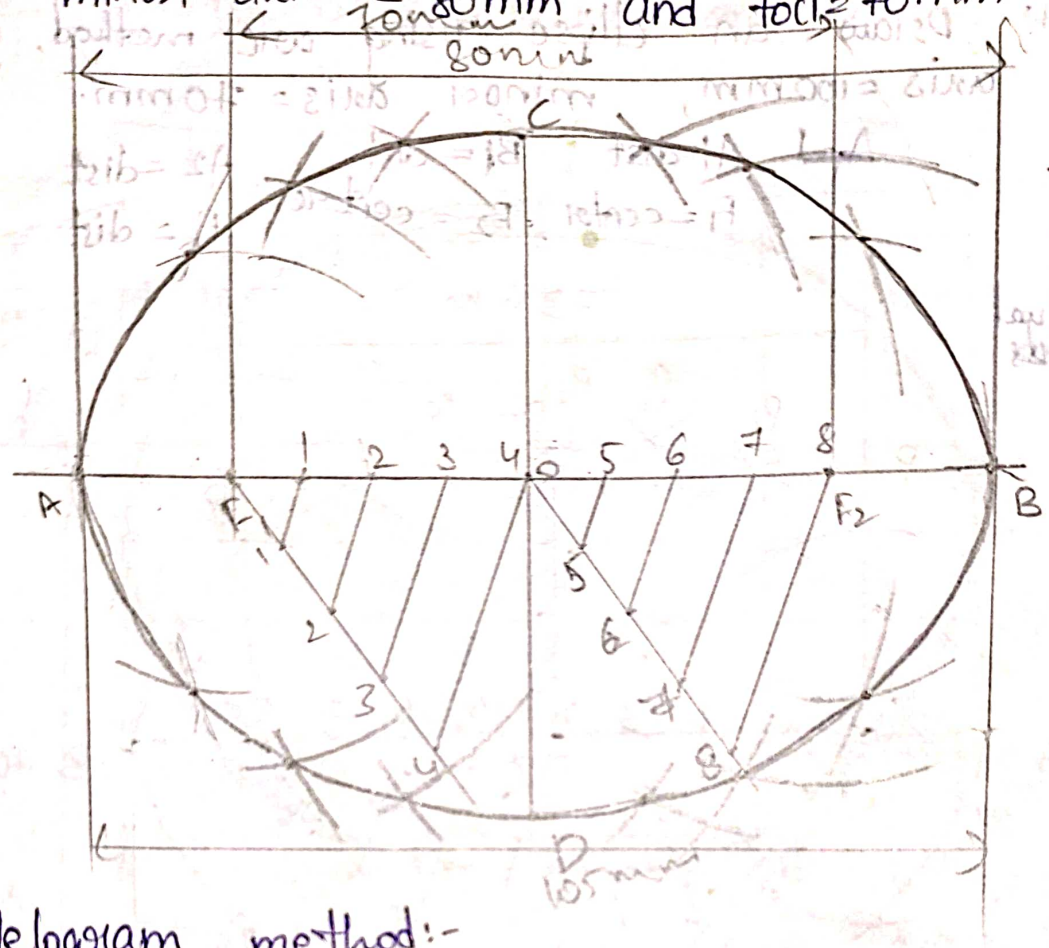
A1 = dist B1 = dist A2 = dist
F1 = centre F2 = centre F1 = dist.



Problem-2: Draw an ellipse using foci method taking major axis = 100 mm, foci = 60 mm

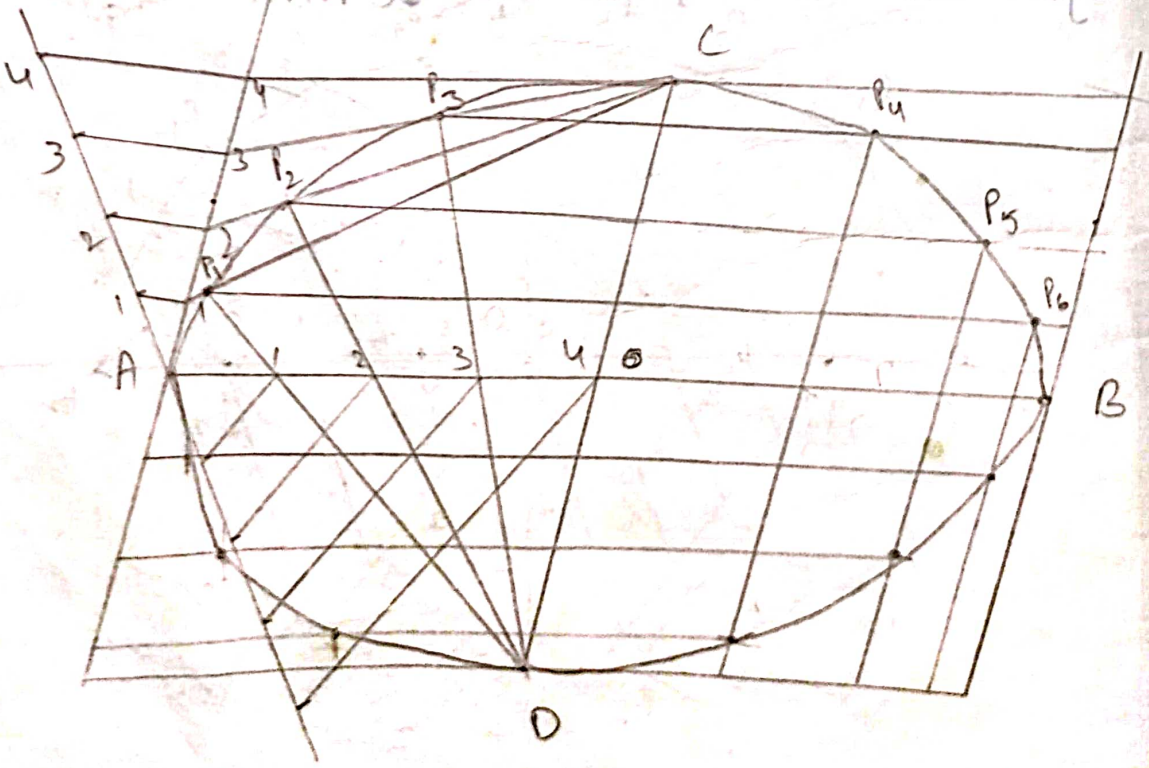


Problem-3: Draw an ellipse using arc method take minor axis = 80mm and foci = 70mm



Parallelogram method:-

A) Problem-1: Draw an ellipse using parallelogram meth by taking major axis = 100mm and minor = 70mm and given angle = 105°



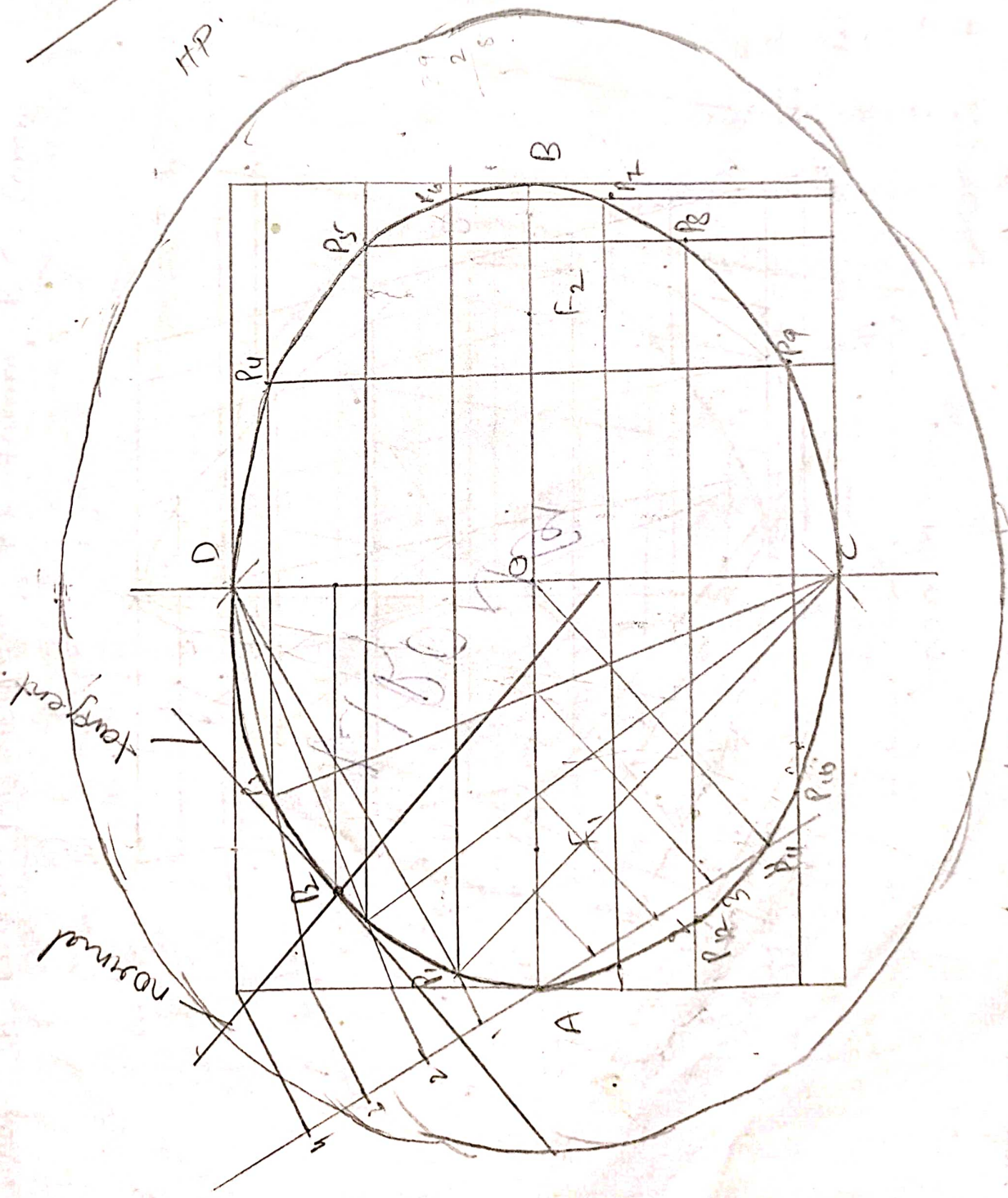
22/11/2013

Sheet – 7

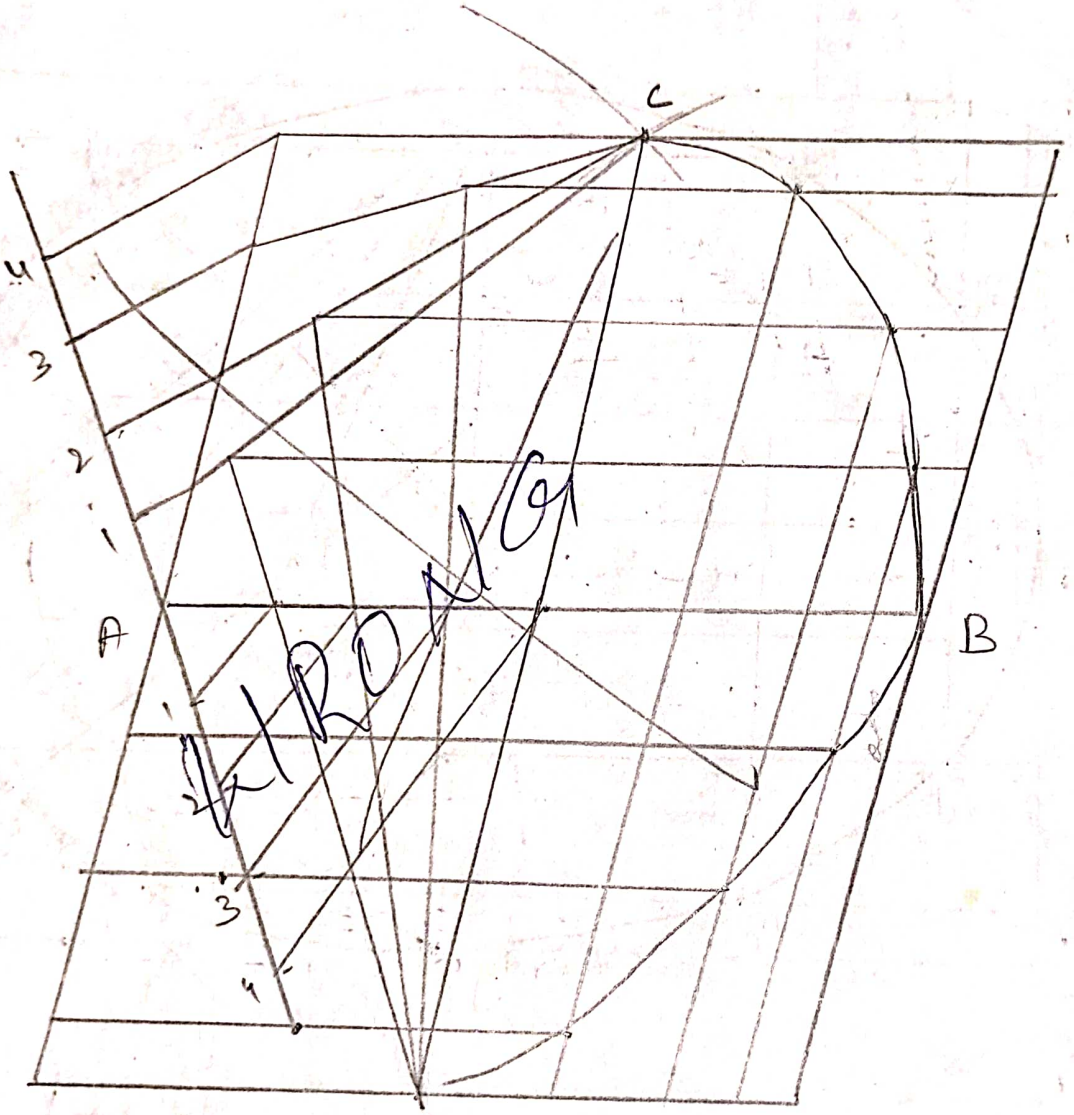
i) Draw an ellipse using oblong method given major axis = 120 mm and foci = 80 mm. and also indicate the tangent and normal from centre to 30 mm. and also draw the another ellipse with 25 mm distance.

VP / HP

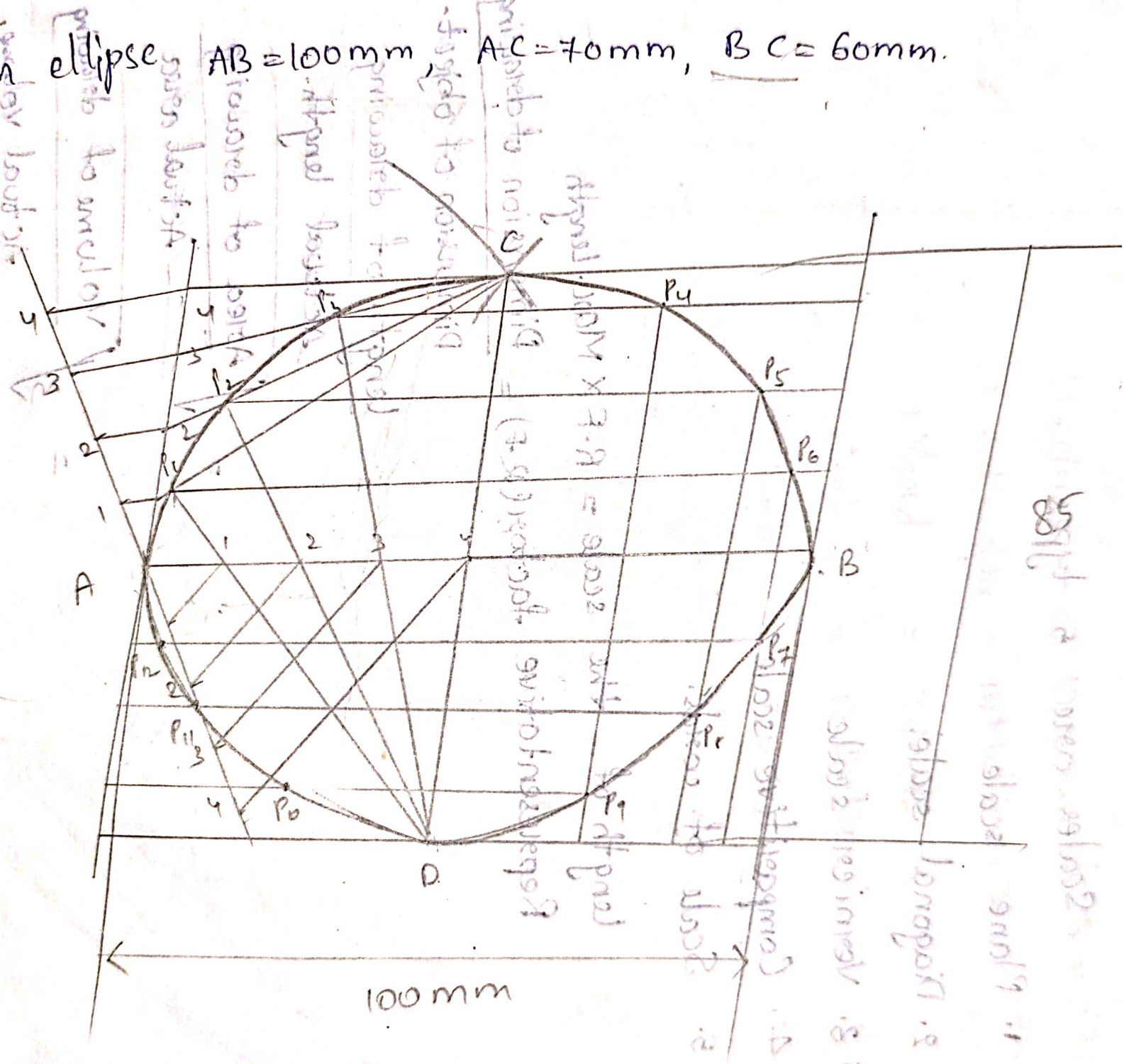
HP / VP



② Draw an ellipse AB = 80mm, AC = 70mm, BC = 60mm.



2) Draw an ellipse AB = 100mm, AC = 70mm, BC = 60mm.



27/11/2018

SCALES

Scale: Dimension of the large object must be reduced to accommodate on a standard size drawing sheet. This reduction create a scale of the reduction ratio. Such scale is called a reduced scale.

Scales are 5 types

1. Plane scale
* 2. Diagonal scale.
* 3. Vernier scale
4. Comparitive scale.
5. Scale of cords.

Length of the scale = R.F X Max. Length

Representative factor (R.F) = $\frac{\text{Dimension of drawing}}{\text{Dimension of object.}}$

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

$= \sqrt{\frac{\text{Area of drawing}}{\text{Actual area}}}$

$= \sqrt[3]{\frac{\text{Volume of drawing}}{\text{Actual volume}}}$

1 Kilometer = 10 Hectometres $= 10^5$ cm

1 Hectometre = 10 Decametres $= 10^4$ cm

1 Decametres = 10 Metres $= 10^3$ cm

~~1 Metre = 10 centimetres~~

~~1 centimetre = 10 Millimetres.~~

1 Metre = 10 Decimetres $= 10^2$ cm

1 Decimetre = 10 centimetres = 10 cm

1 centimetre = 10 Millimetre = 10 mm

1 Yard = 3 feets

1 feet = 12 Inches

1 Inch = 2.5 cm

SHEET-8

Problem-1: Construct a diagonal scale of 1:4 to show decimetres, centimetres and millimetres. Measure upto 5 decimetres

R.F = 1/4

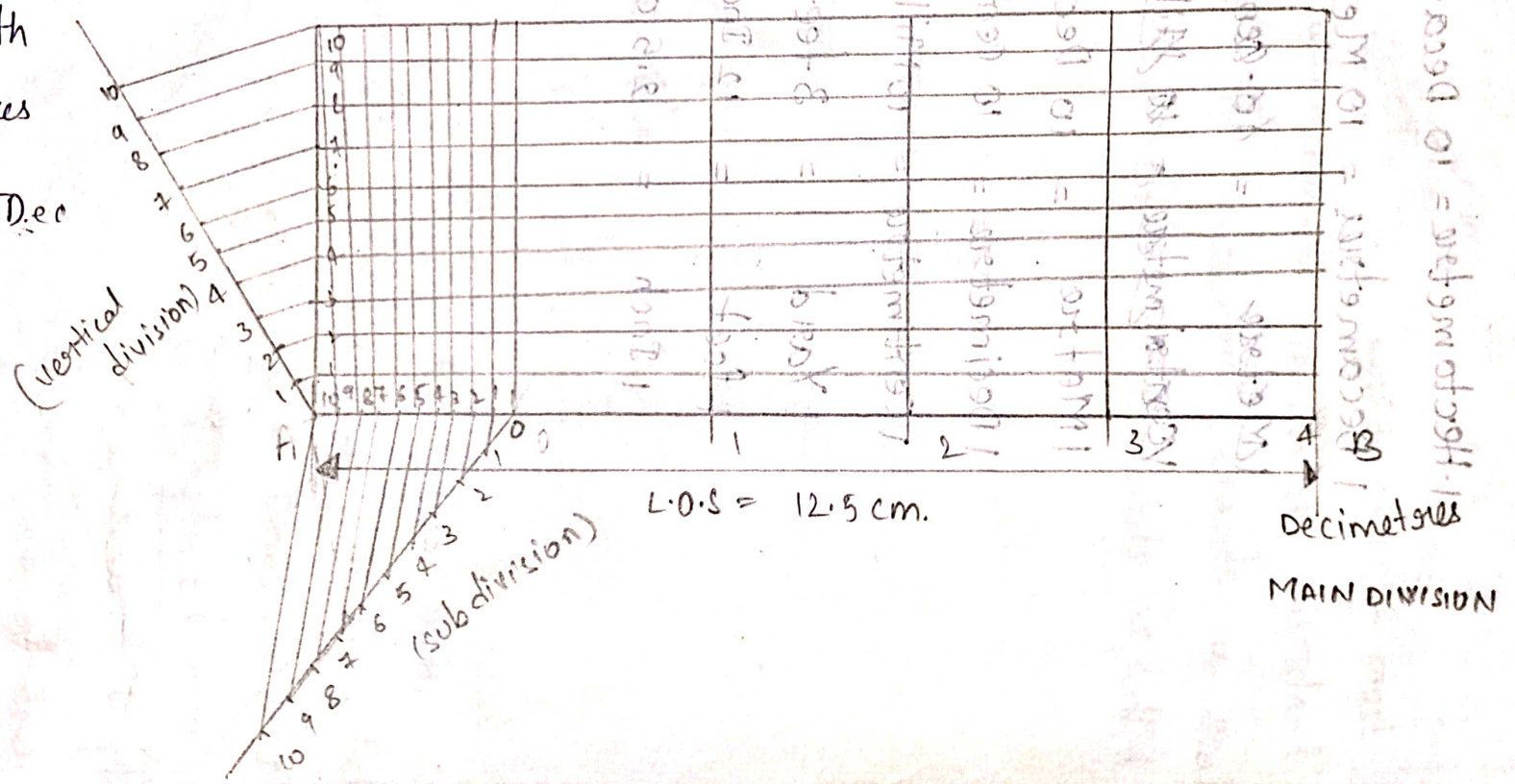
Length of the scale

= R.F × Max. length

= $\frac{1}{4}$ × 5 Decimetres

= $\frac{1}{4}$ × 10 cm × 5 Dec

= 12.5 cm.



Problem-1: Construct a diagonal scale of 1:60 to show metres, decimetres, centimetres. Measure upto 6 metres.

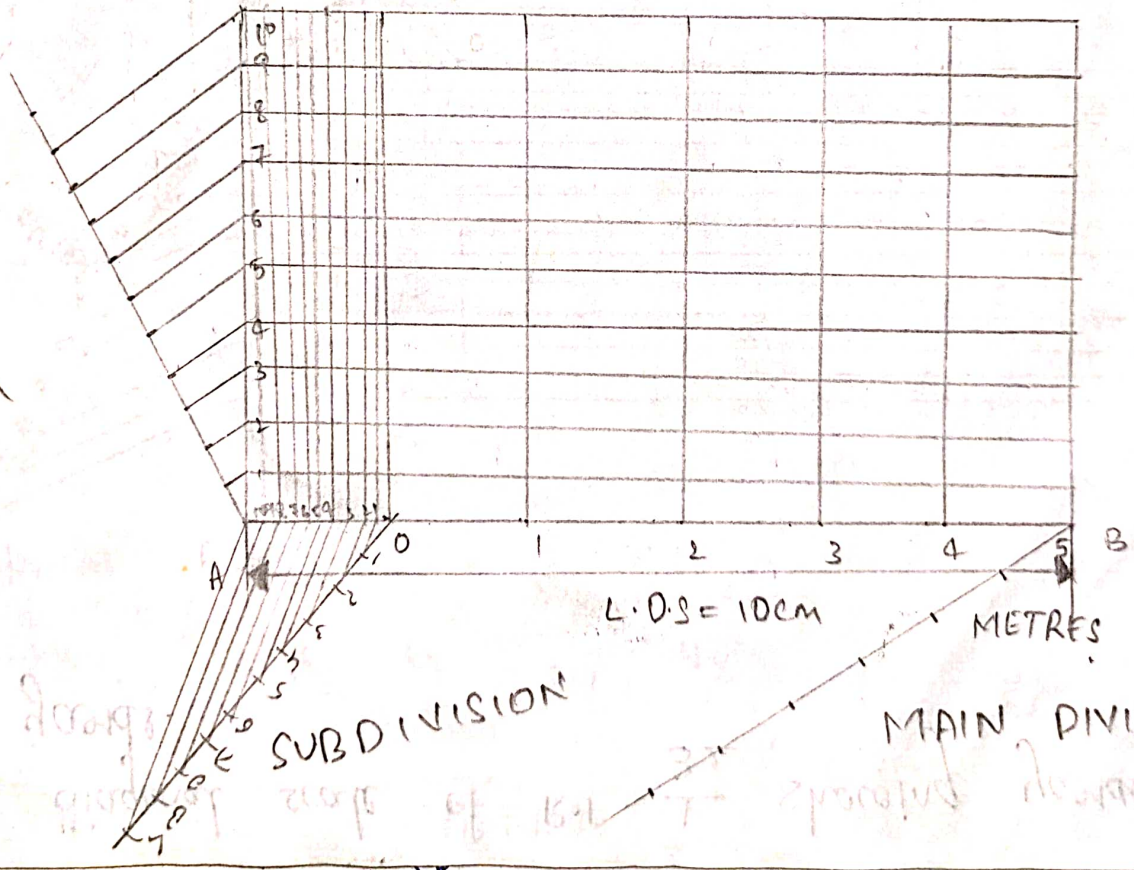
$R.F = \frac{1}{60}$

Length of the scale

$= \frac{1}{60} \times 6$ Metres

$= \frac{1}{60} \times 6 \times 10^2$ cm

$= 10$ cm.



Problem-3: construct a diagonal scale of R.F = $\frac{1}{32}$ showing yards, feet, inches, to measure upto 4 yards.

R.F = $\frac{1}{32}$

L.O.S = $\frac{1}{32} \times 4$ yards

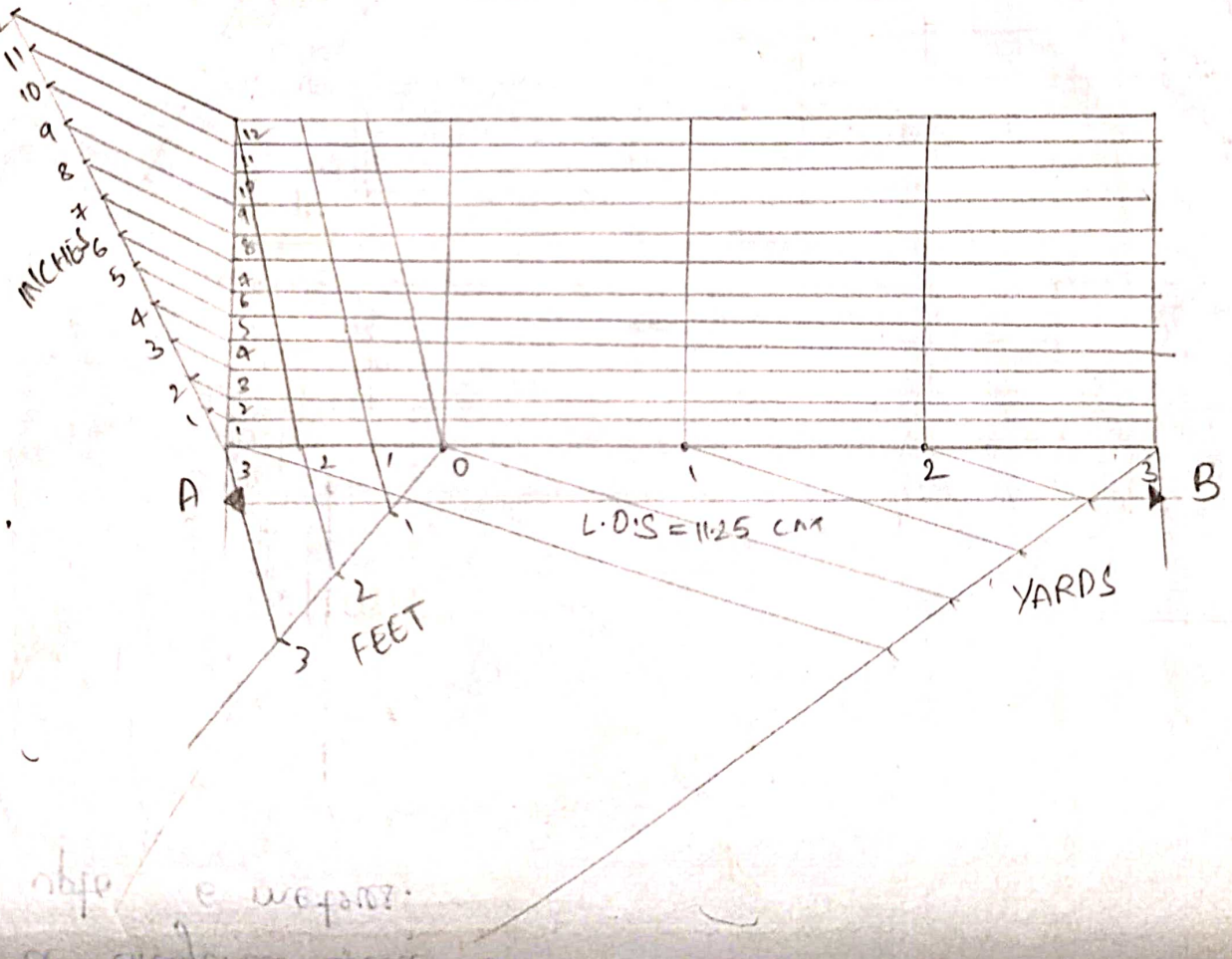
$= \frac{1}{8}$ yards

$= 3 \times \frac{1}{8}$ feets

$= 3 \times \frac{1}{8} \times 12$ Inches

$= \frac{3 \times 12 \times 2.5}{8}$ cm.

$= 11.25$ cm.



Problem-4: On the plan of shoping complex a line 10 cm long represents a distance of 5 metres. Draw a diagonal scale of to read upto 6 metres. Showing metres, decimetres and centimetres. And also mark the length of 3.24 metres and 5.57 metres.

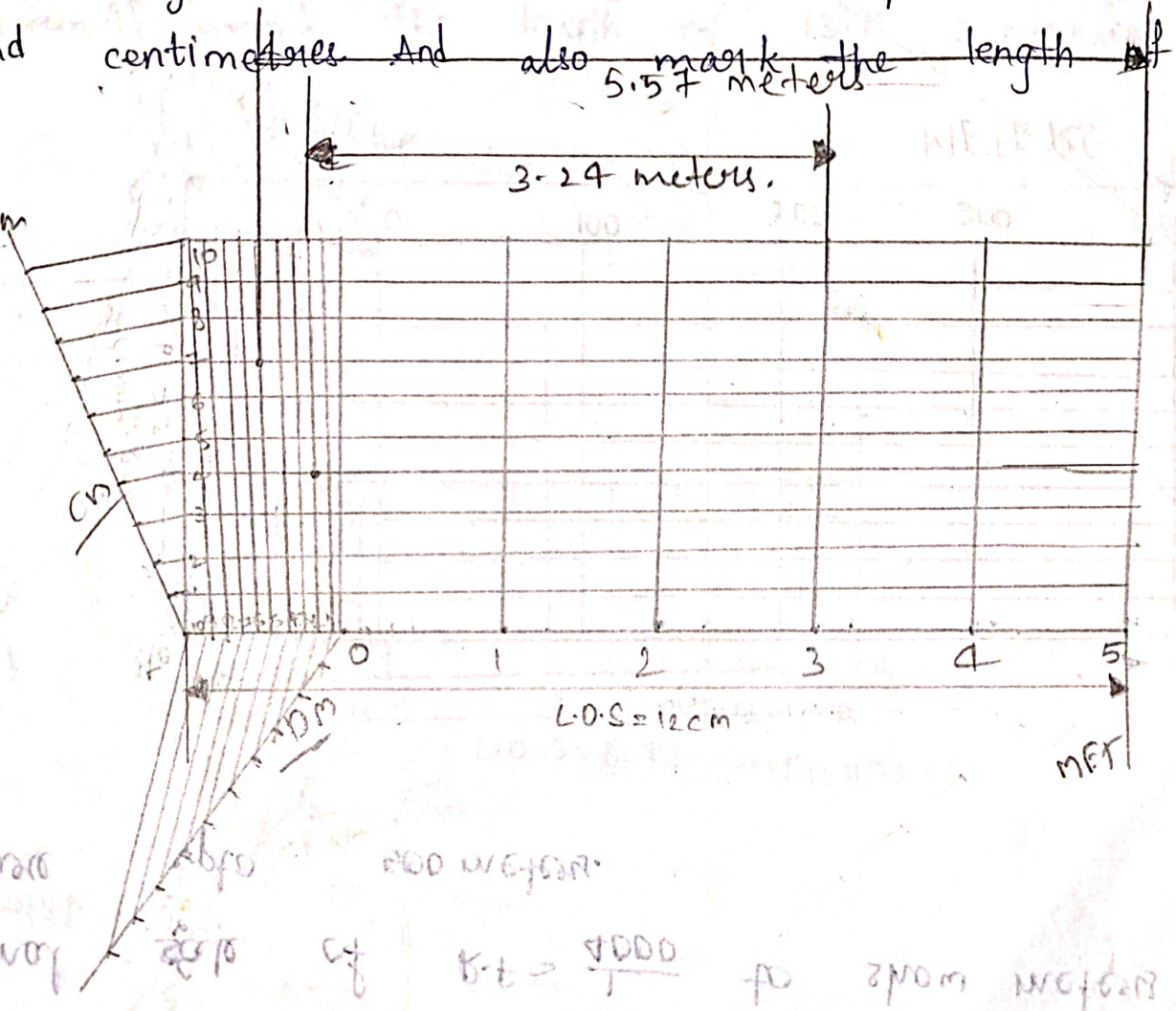
$R.F = \frac{10\,cm}{5 \times 10^2\,cm} = \frac{1}{50} = 0.02\,cm$

$L.O.S = \frac{1}{50} \times 6$ metres

$= 0.12$ metre

$= 0.12 \times 10^2$ centi metres

$= 12$



29/11/2013

SHEET-9

1) Construct a diagonal scale of R.F = $\frac{1}{4000}$ to show meters and long enough to measure upto 500 meters.

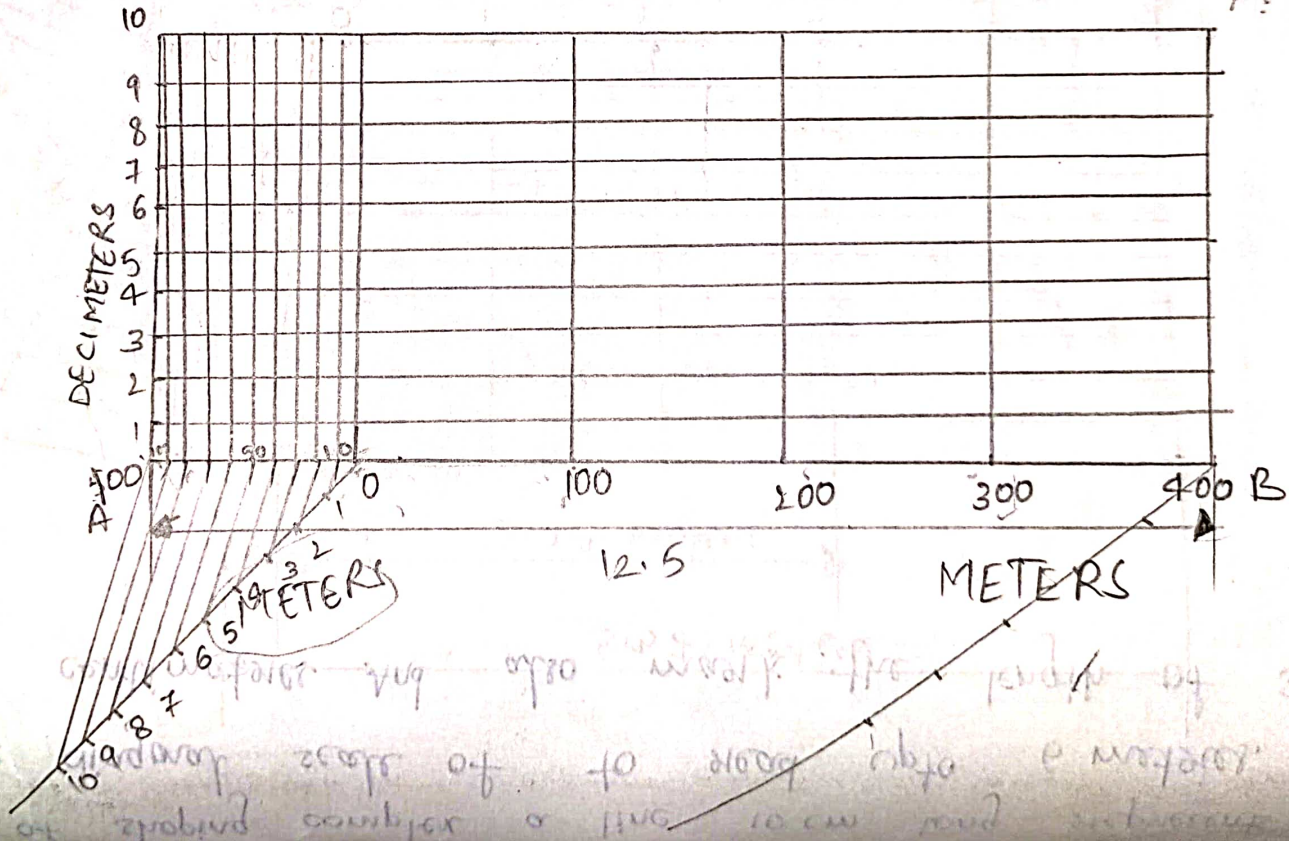
R.F = $\frac{1}{4000}$

L.O.S = R.F × Max. length

= $\frac{1}{4000} \times 500$ meter

= $\frac{1}{8} \times 10^2$

$\frac{1}{4000} \times 500 \times 100$



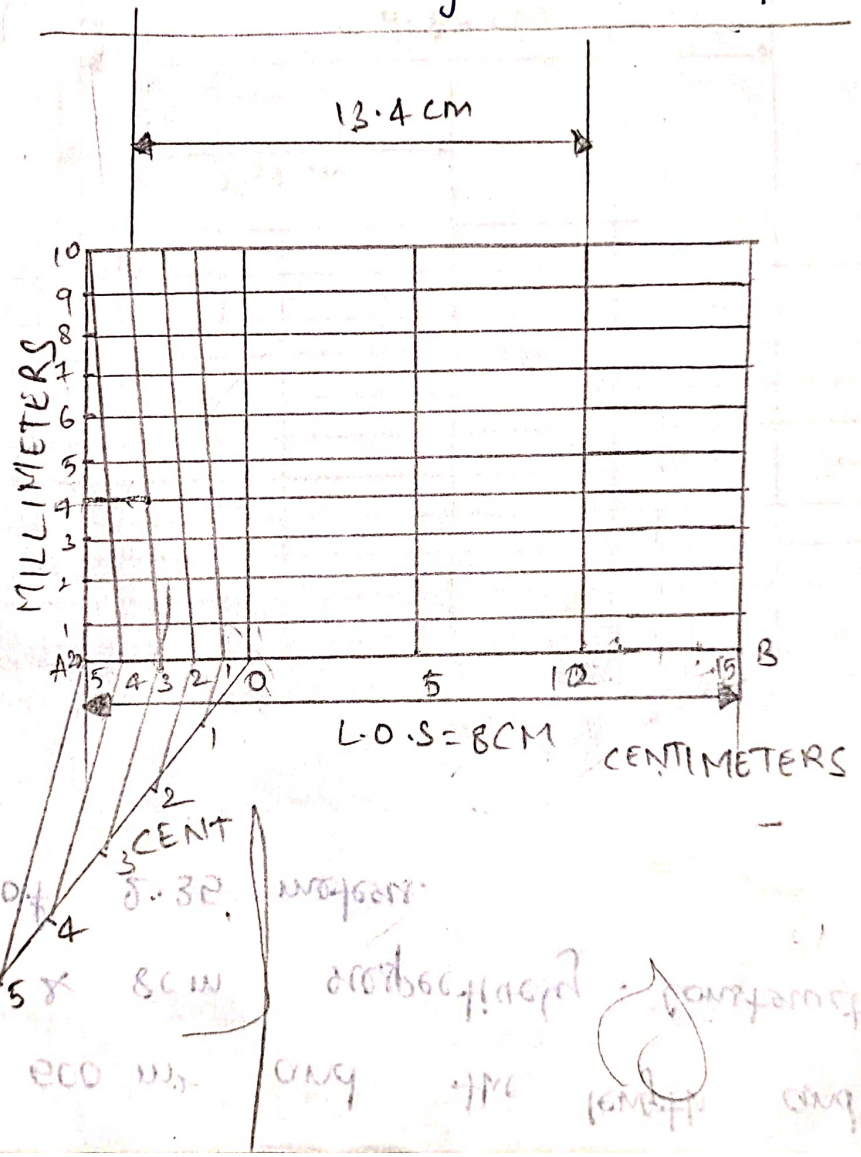
2) Draw a diagonal scale of R.F = 1:2.5, showing centimeters and millimeters measure upto 20 centimeters, and mark the length of 13.4 centimeters.

$R.F = \frac{1}{2.5}$

$L.O.S = R.F \times \text{max. length}$

$= \frac{1}{2.5} \times 20$

$= 8$



8.944
107.106
0.01264

3) The area of field is 500 m^2 and the length and breadth of the field on the map is 10cm & 8cm respectively. Construct a diagonal scale and mark the length of 2.35 meters.

R.F =

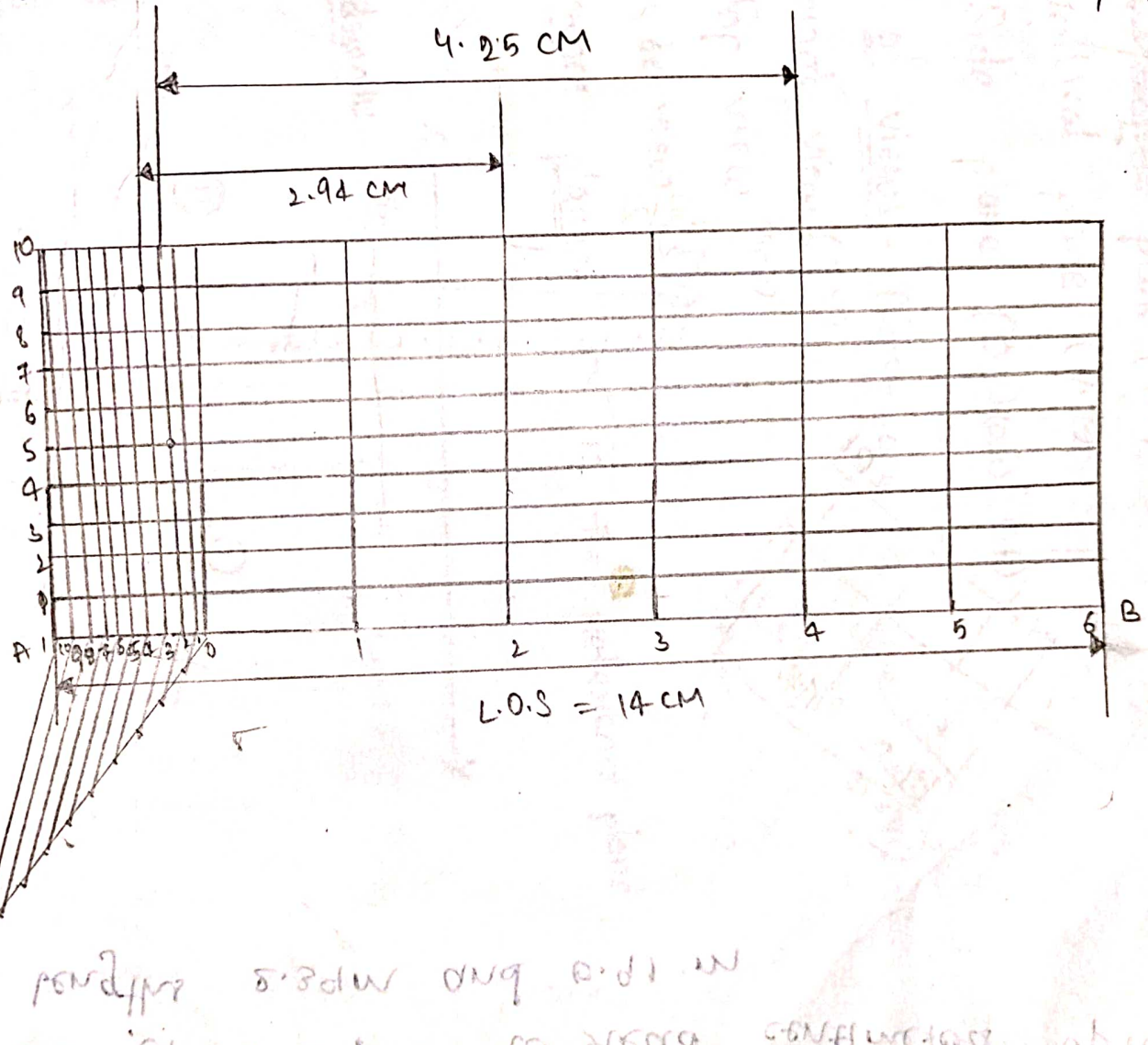
4) Construct a diagonal scale R.F = 2:1 showing centimeters, millimeters and measure upto 7 centimeters. and also indicate the 2.39 cm, 4.25 cm

R.F = 2:1 = 2

L.O.S = R.F X max. len

= 2 X 7

= 14 cm



Draw a vernier scale of RF = 1/25 to read centimeters upto 4 meters and on it show lengths 2.39m and 0.91 m

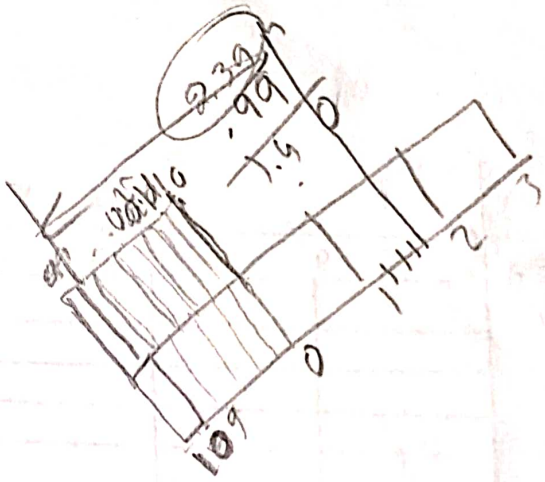
$R.F = \frac{1}{25}$

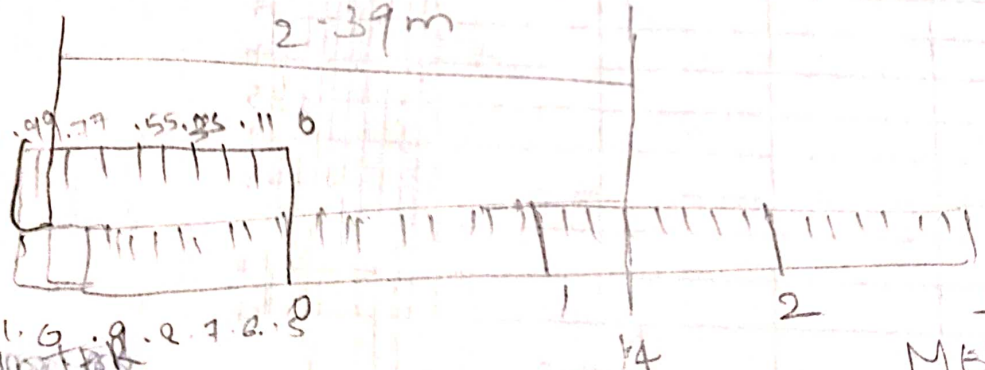
L.O.S = R.F × max. length

$= \frac{1}{25} \times 4 \times 100$ CM

$= \frac{1}{25} \times 4 \times 100$

$= 16$ CM





2.39
.99
1.40