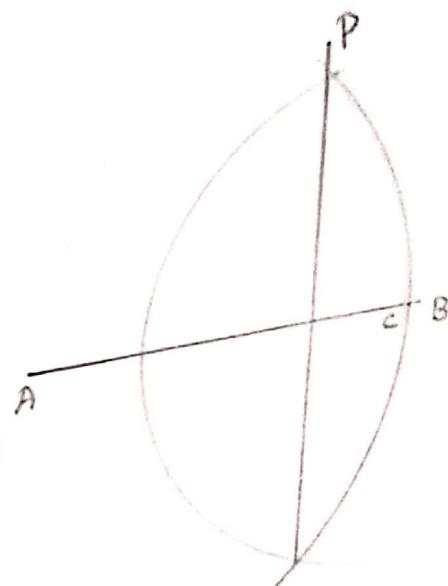
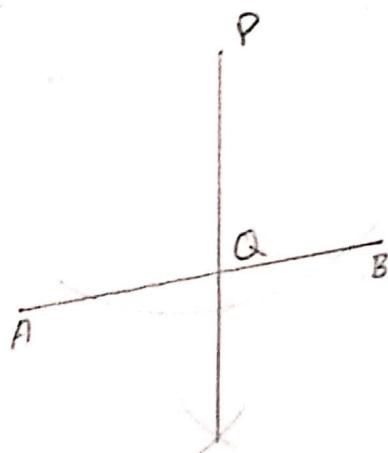


PROBLEM 5.4: TO DRAW A PERPENDICULAR TO A GIVEN LINE FROM A POINT OUTSIDE IT.



(When the point is nearer the center)

STEPS:-

- ① Let AB be the given line and P the point.
- ② With P centre and any convenient radius, draw an arc cutting AB at C and D.
- ③ With any radius greater than half CD and centres C and D, draw the arcs intersecting each other at E.
- ④ Draw a line joining P and E and cutting AB at Q.

the arc at Q. Draw a line joining P and Q
PQ is the required perpendicular.

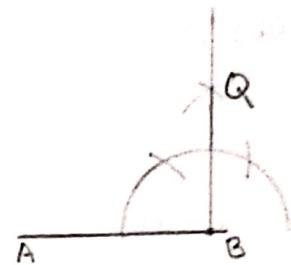
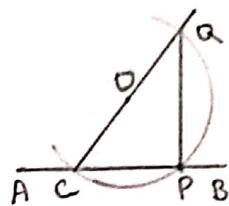
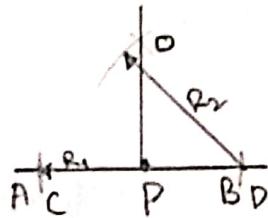
METHOD 3

STEPS:-

- ① With P as centre and any convenient radius, draw an arc cutting AB at C.
- ② With the same radius (from the arc) two equal divisions CD and DE are drawn.
- ③ Again with the same radius and centres D and E, draw arcs intersecting each other at Q. Draw a line joining P and Q.

TO DRAW PERPENDICULARS

PROBLEM 5.3:- TO DRAW A PERPENDICULAR TO A GIVEN LINE FROM A POINT WITHIN IT.



METHOD 1 (When the point is near the middle of the line.)

STEPS:-

- ① Let AB be the given line AND P the point in it.
- ② With P as centre and any convenient radius R_1 , draw an arc cutting AB at C and D.
- ③ With any radius R_2 greater than R_1 , and centres C and D, draw arcs intersecting each other at O.
- ④ Draw a line joining P and O.
- ⑤ Then PO is the required perpendicular.

METHOD 2 (When the point is near an end of the line)

STEPS:-

- ① With any point O as centre and radius equal to OP, draw an arc greater than the semi-circle, cutting AB at C.
- ② Draw a line joining C and O, and produce it to CQ.

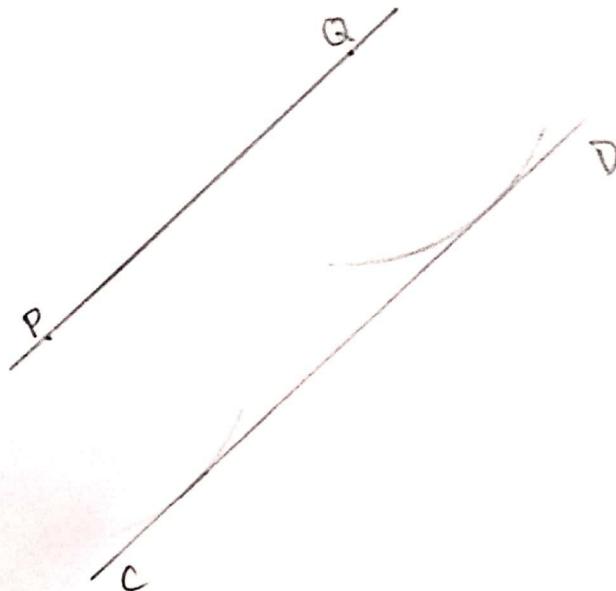
METHOD 2

(WHEN the point is nearer the end than the centre)

STEPS:-

- ① Let AB be the given line and P the point.
- ② With centre A and radius equal to AP, draw an arc EF cutting AB or AB-Produced at C.
- ③ With centre C and radius equal to CP, draw an arc cutting EF at D.
- ④ Draw a line joining P and D and intersecting AB at Q. Then PQ is the required perpendicular.

PROBLEM 5.7: TO DRAW A LINE PARALLEL TO AND AT A
GIVEN DISTANCE FROM A GIVEN STRAIGHT LINE

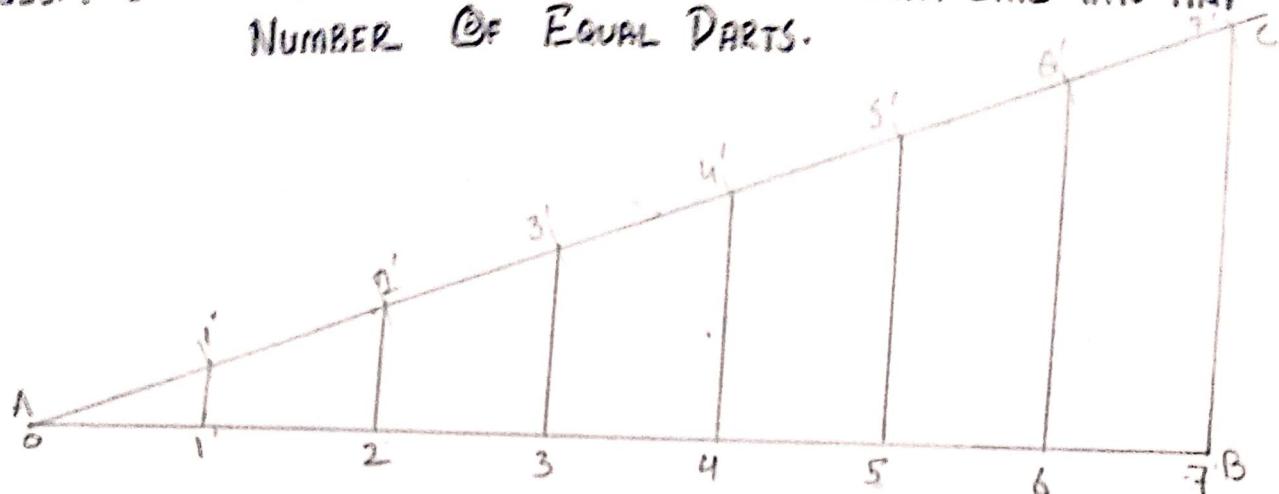


STEPS:-

- ① Let AB be the given line and P be the point.
- ② Mark points P and Q on AB, as far apart as convenient.
- ③ With P and Q as centres and radius equal to R, draw arcs on the same side of AB.
- ④ Draw the line CD, just touching the two arcs.
CD is the required line.

To Divide A Line

PROBLEM 5.8:- To Divide A Given STRAIGHT LINE INTO ANY NUMBER OF EQUAL PARTS.

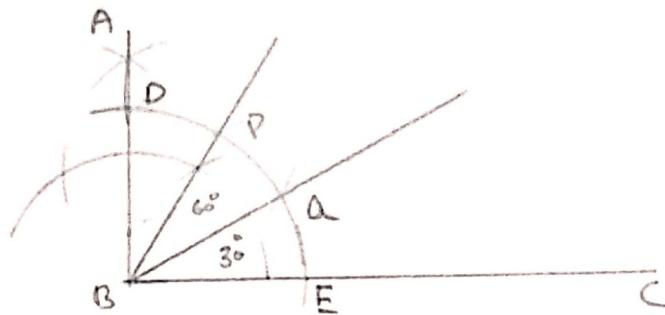


STEPS:-

- ① Draw the line AB of given length. (16 cm in this case).
- ② Draw another line AC making an angle of less than 30° with AB.
- ③ With the help of compass/divider mark 7 equal parts of any suitable length on line AC and then mark them by points 1', 2', 3', 4', 5', 6' and 7'.
- ④ Join the last 7' point with point B of the line AB.
- ⑤ Now from each of the other marked points 6', 5', 4', 3', 2' and 1' draw lines parallel to 7'B cutting the line AB at 6, 5, 4, 3, 2, and 1 respectively.
- ⑥ Now the line AB is divided into 7 equal parts

To TRISECT An ANGLE

PROBLEM 5.13:- To TRISECT A GIVEN RIGHT ANGLE

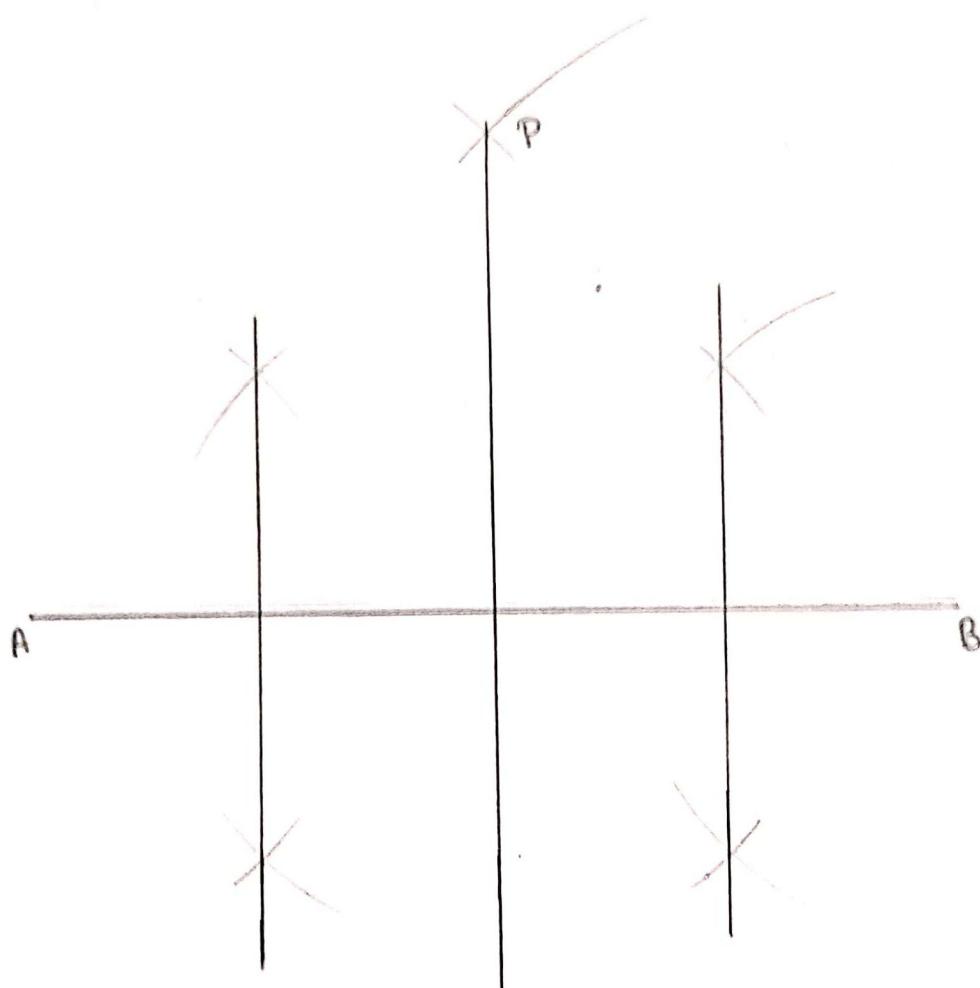


STEPS:-

- ① First of all, draw a right angle ABC.
- ② With centre B and any radius, draw an arc cutting AB at D and BC at E.
- ③ With the same radius and centres D and E, draw arcs cutting the arc DE at points Q and P.
- ④ Draw lines joining B with P and Q. BP and BQ trisect the right angle ABC.

EXERCISES 5

PROBLEM 5.1 :- DRAW A LINE 125 mm LONG AND QUADRILATERAL

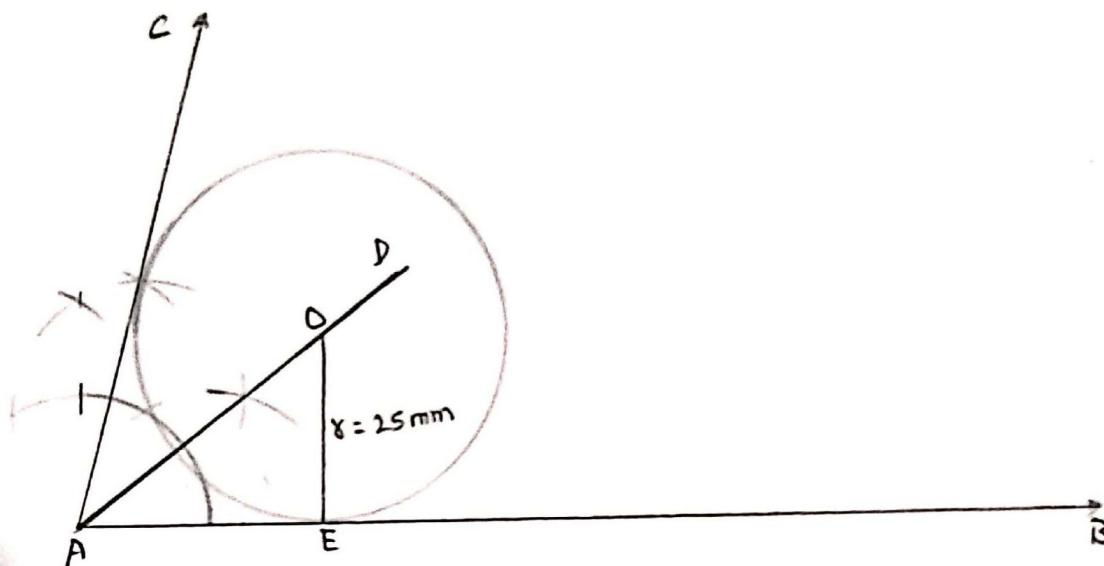


STEPS:-

- ① First of all, I drew a line AB 125mm (12.5cm).
- ② With A and B as centre, I drew arcs of radius greater than half length of AB, which intersect each other at P and Q. The given line is now divided into two equal parts.
- ③ I repeated the same process for these two equal parts. The line is now divided into four equal parts.

EXERCISES 5

PROBLEM 5.11:- DRAW TWO LINES AB AND AC MAKING AN ANGLE OF 75° . DRAW A CIRCLE OF 25mm RADIUS TOUCHING THEM.

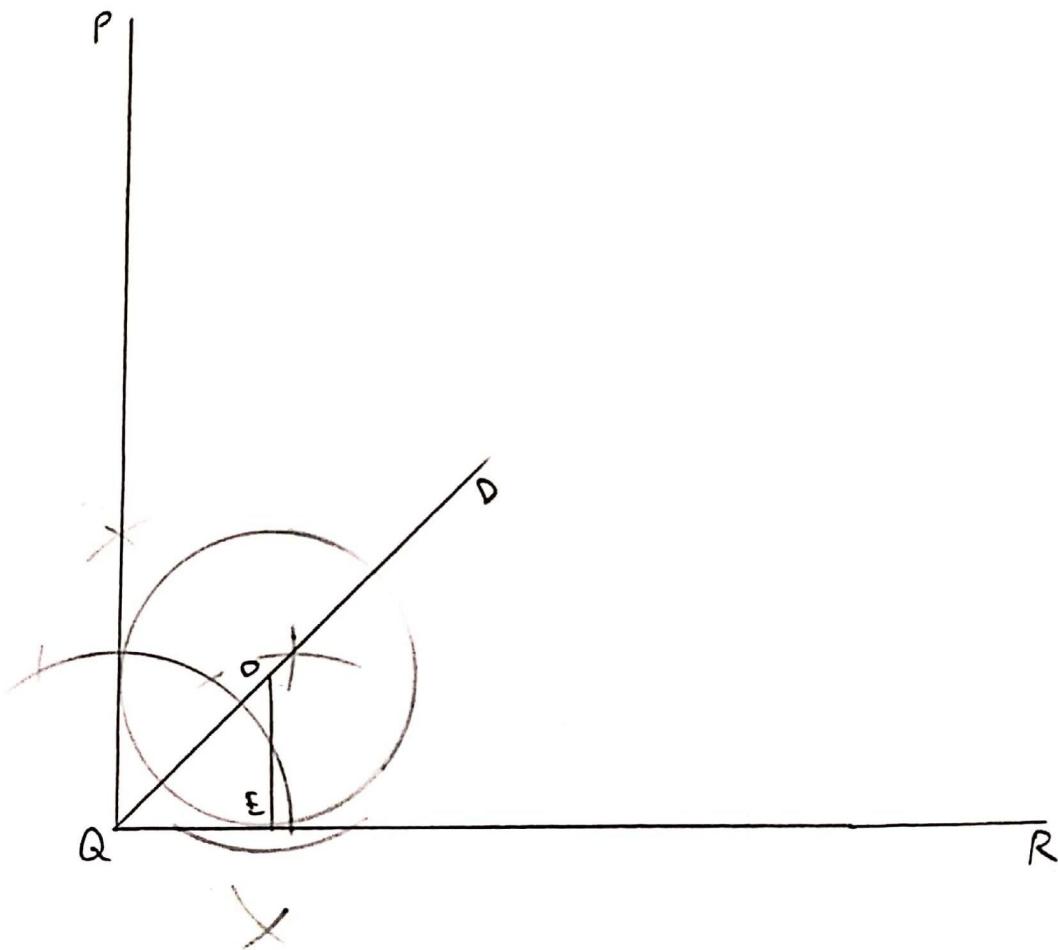


STEPS:-

- ① First of all, I constructed angle $\angle CAB = 75^\circ$ with the help of compass.
- ② Then I bisected $\angle CAB$ and draw a line^(AD) dividing $\angle CAB$ into two equal parts.
- ③ Then I drew a perpendicular from AD on AB at E. The length of the perpendicular is equal to radius of the required circle which is 25mm.
- ④ The perpendicular intersect AD at O.
- ⑤ With O as center and radius OE, I drew a circle using compass.
- ⑥ The constructed circle touches all the two other sides which is the required circle.

EXERCISES 5

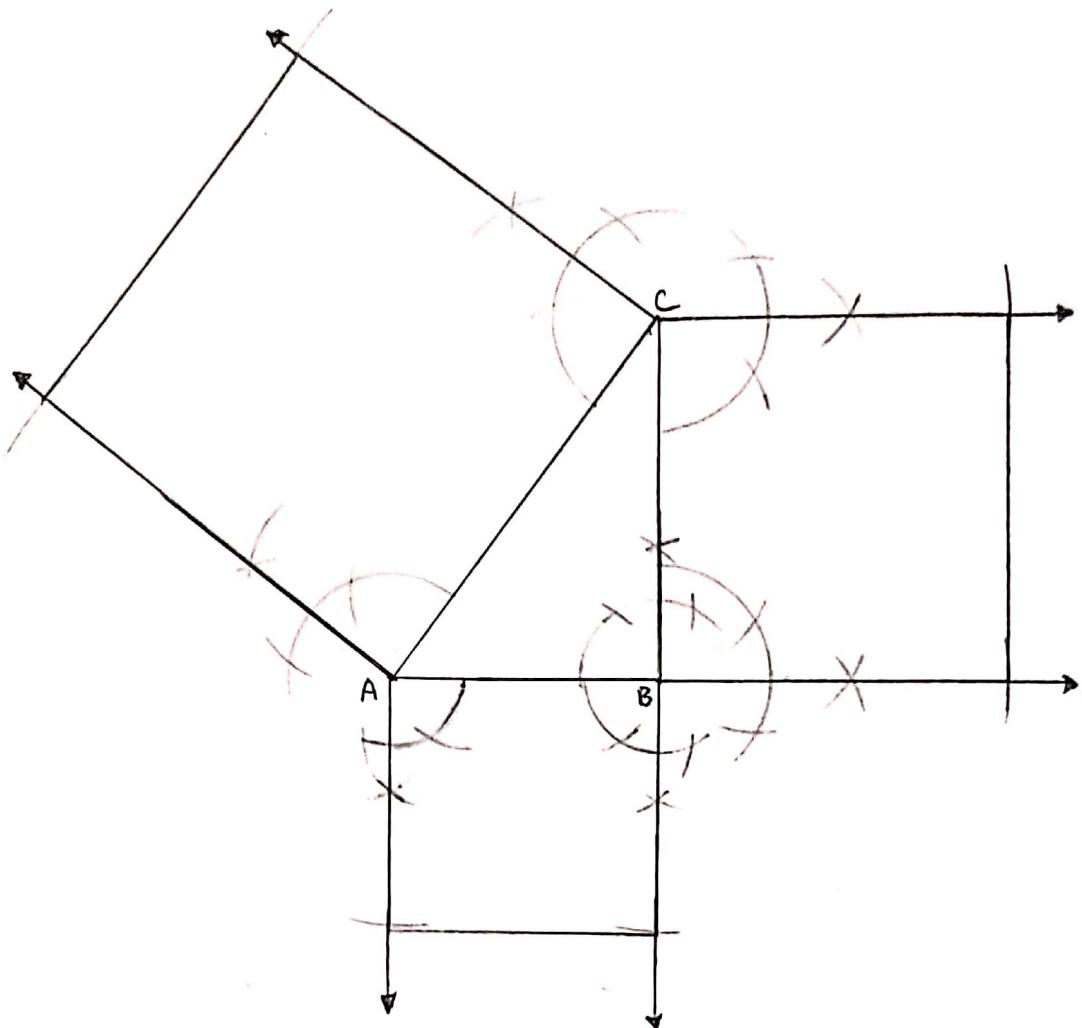
PROBLEM 5.12:- CONSTRUCT A RIGHT ANGLE PQR. DESCRIBE A CIRCLE OF 20mm RADIUS TOUCHING THE SIDES PQ AND QR.



STEPS:-

- ① First of all, I constructed angle $\angle PQR = 90^\circ$ with the help of compass.
- ② Then I bisected $\angle PQR$ and draw a line QD which divides $\angle PQR$ into two equal parts.
- ③ Then I drew a perpendicular from QD on PR at E . The length of the perpendicular is equal to radius of the required circle. which is 20mm.
- ④ The perpendicular intersect QD at O .

- (5) With O as center and Radius OB + A draw a circle using compass.
- (6) The constructed circle fulfills the two short sides which is the required circle.



EXERCISES 5

PROBLEM 5.4: DRAW A LINE AB. AT B, ERECT A PERPENDICULAR BC 100mm LONG. DRAW A LINE JOINING A AND C, AND MEASURE IT'S LENGTH. CONSTRUCT A SQUARE ON EACH SIDE AS A SIDE.

STEPS:-

- ① First of all, I choose a scale for drawing this figure in small area of A4 page i-e
Let $1\text{ mm} = \frac{1}{20}\text{ cm}$

So according to this scale, I drew $\overline{AB} = 3.75\text{cm}$ and Perpendicular $\overline{BC} = 5\text{cm}$ (with the help of compass).

② Then I joined A and C

③ After that I theoretically calculated \overline{AC} length using Pythagora's theorem i-e

$$\sqrt{(\overline{AB})^2 + (\overline{BC})^2} = \overline{AC}$$

$$\overline{AC} = 6.25\text{ cm}$$

④ Then I measured \overline{AC} with the help of scale and it was approximately equal to 6.25cm.

⑤ On each side, I drew Perpendiculars (6) and extended them.

⑥ Then I took the radius of compass equal to each side and cut the Perpendiculars using arcs drawn by compass.

⑦ Then I joined them with each other and the required squares were drawn