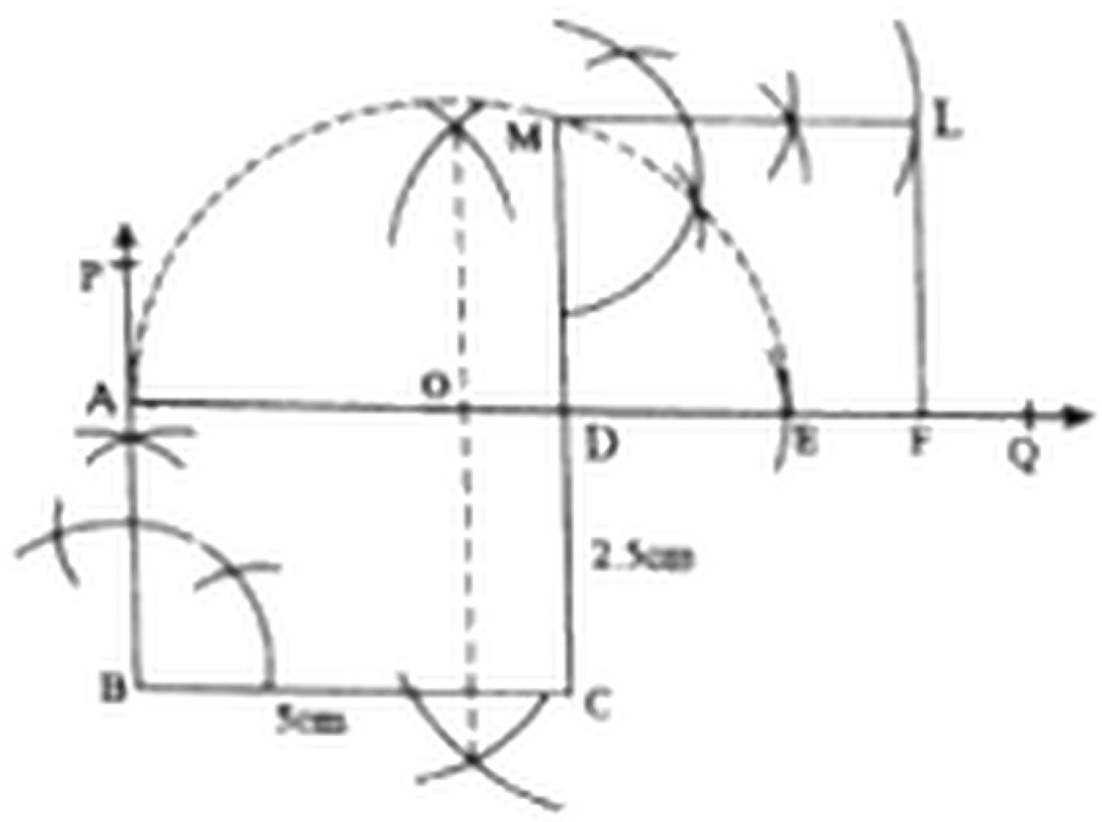
EXERCISE 17.5

Q1. Construct a rectangle whose adjacent sides are 2.5 cm and 5 cm respectively. Construct a square having area equal to the given rectangle.

Solution:



Construction:

(i) Draw the line segment m$\overline{BC}$ = 5cm.

(iii) Cut off m$\overline{BA}$ = 2.5 cm

(iv) Cut off m$\overline{DE}$ = m$\overline{DC}$.

(v) Produce $\overline{AD}$ to Q.

(vi) Cut off m$\overline{DE}$ = m$\overline{DC}$.

(vii) Bisect $\overline{AE}$ at the point O.

(viii) With O as the center and m$\overline{OA}$ as radius draw semi circle.

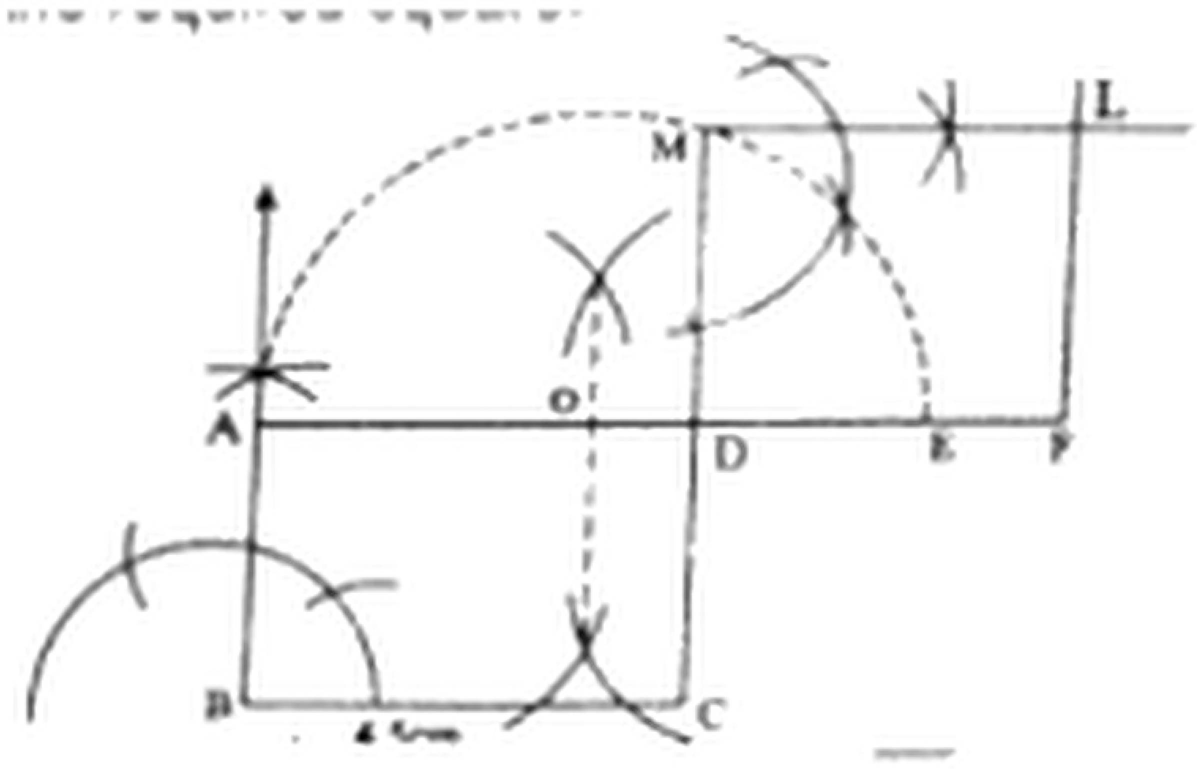
(ix) Produce $\overline{CD}$ to meet the semicircle at M.

(x) With m$\overline{DM}$ as a side complete the square DFLM.

(ix) Then DFLM is the required square.

Q2. Construct a square equal in area to a rectangle whose adjacent sides are 4.5 cm and 2.2 cm respectively. Measure the sides of the square and find

Solution:



Construction:

(i) Take m$\overline{BC}$ = 4.5 cm

(ii) At the end point B draw $\overline{BP} \perp \overline{BC}$.

(iii) Cut off m$\overline{BA}$ = 2.2 cm

(iv) Complete the rectangle ABCD.

(v) Produce $\overline{AD}$ to E making m$\overline{DE}$ = mCD.

(vi) Bisect $\overline{AE}$ at O.

(vii) With center O and radius m$\overline{OA}$ describe a semi-circle in M.

(viii) Produce $\overline{CD}$ to meet the semi-circle in M.

(ix) On DM as a side construct a square DFLM. this shall be the required square.

(x) Measure the side of the square m$\overline{DF}$ = 3.2cm

Area of the square = 3.2 x 3.2 = 10.24 cm^2 (approx.).

Area of rectangle = 4.5 x 2.2 = 9.90 cm^2 (approx.).

Q3. In Q2 above verify by measurement that the perimeter of the square is less than that of the rectangle.

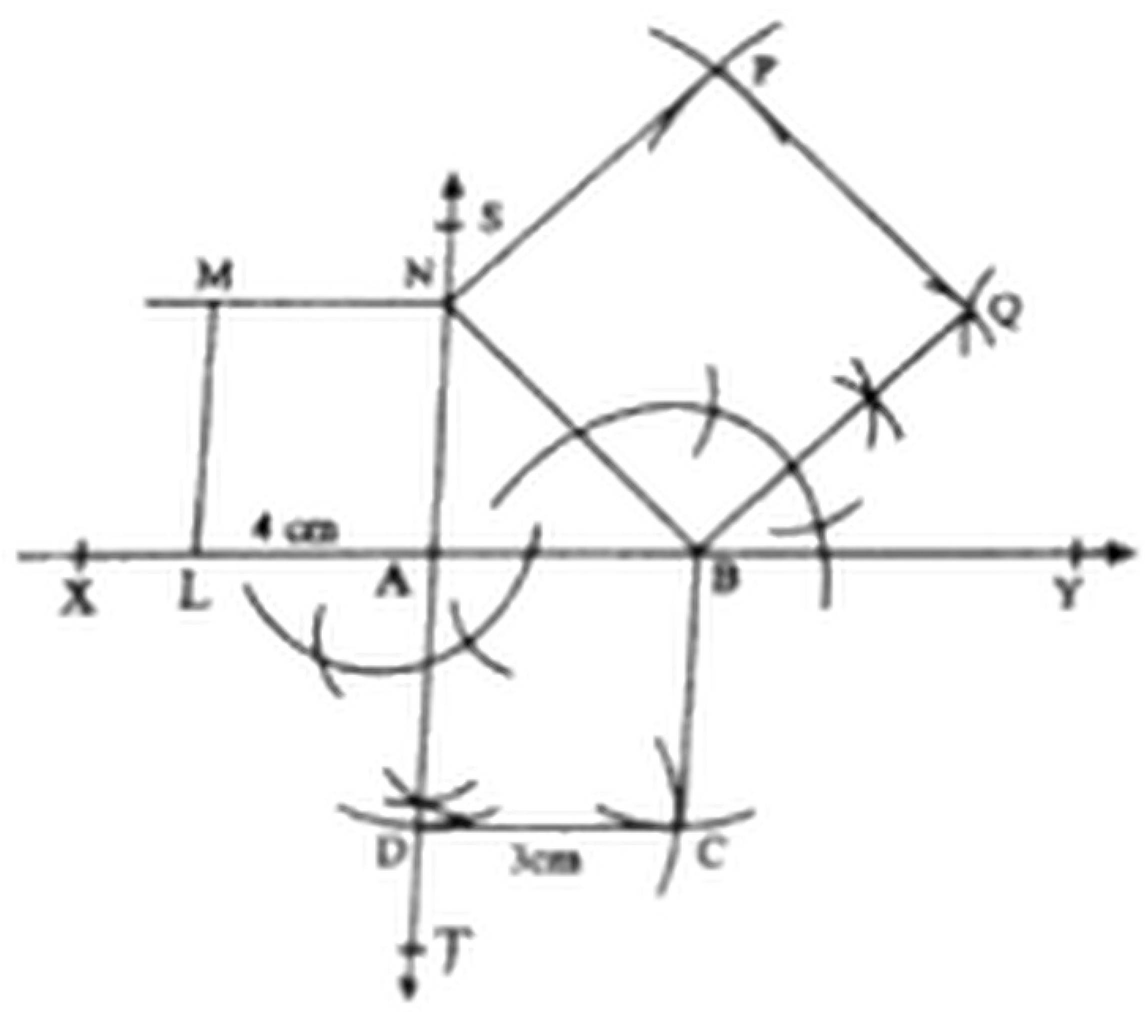
Solution:

Perimeter of square = 4 x 3.2 = 12.8 cm^2

So, perimeter of square is less than that of rectangle.

Q4. Construct a square equal in area to the sum of two squares having sides 3 cm and 4 cm respectively.

Solution



Construction:

(i) Through a point A, draw two lines $\vec{XY}$ and $\vec{ST}$ perpendicular to each other.

(ii) Cut off m$\overline{AB}$ = 3cm and m$\overline{AL}$ = 4cm.

(iii)$\overline{AB}$ as a side of square complete the square ALMN.

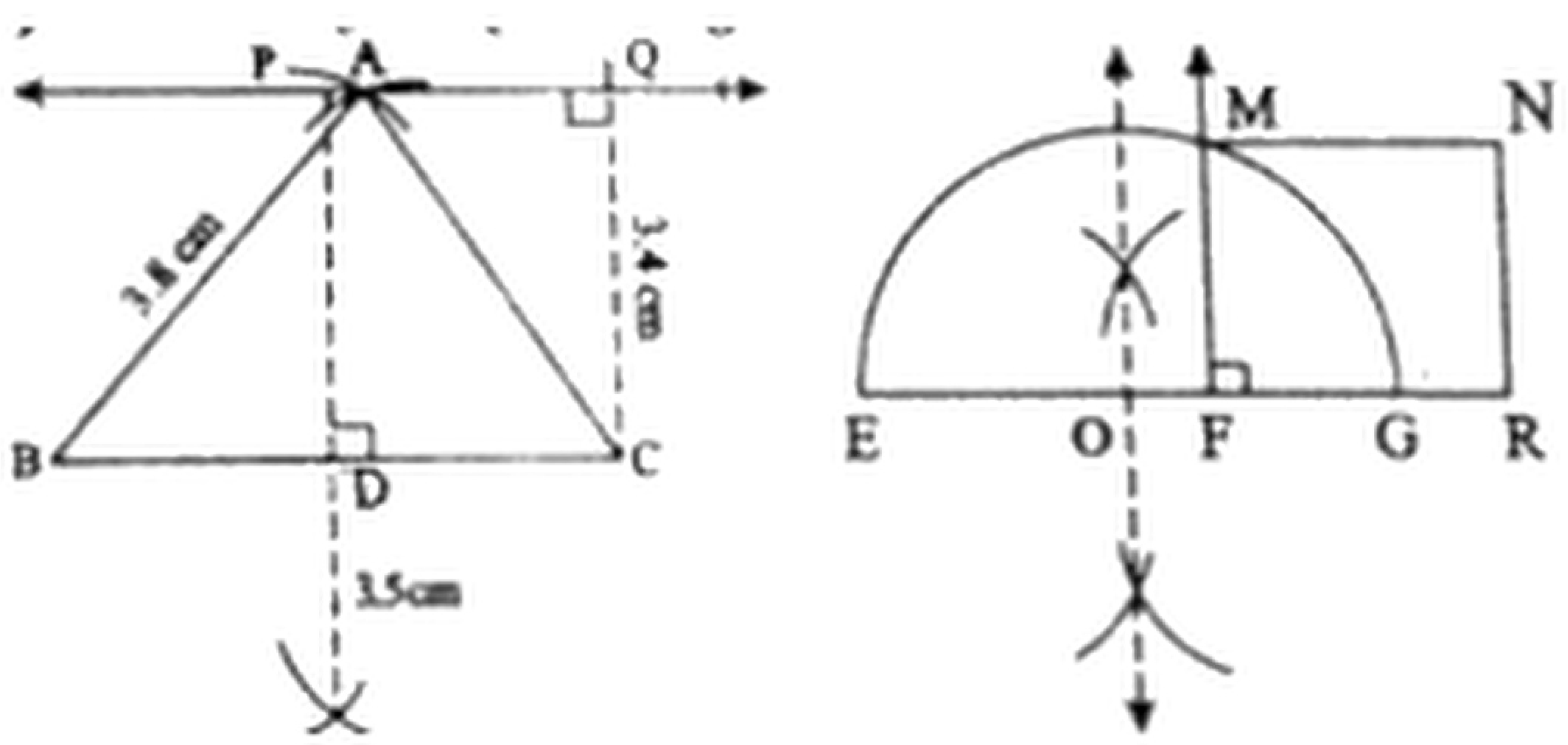
(iv)$\overline{AL}$ as a side of square complete the square ALMN.

(v) Join $\overline{BN}$

(vi) With $\overline{BN}$ as a side, complete the square BQPN. BQPN is the required square.

Q5. Construct a Δ having base 3.5 cm and other two sides equal to 3.4 cm and 3.8 cm respectively. Transform it into an equal square.

Solution:



Construction:

(i) Take m$\overline{BC}$ = 3.5 cm.

(ii) With B as center draw an arc of radius 3.8 cm and with C as center and radius 3.4 cm draw another arc to meet the first are at C.

(iii) Join A to B and A to C to complete the ΔABC.

(iv) Draw PAQ ∥ $\overline{BC}$.

(v) Draw $\overline{CQ}$ ⊥ PQ meeting it in Q.

(vi) Draw $\overline{CQ}$ ⊥ PQ meeting it in Q.

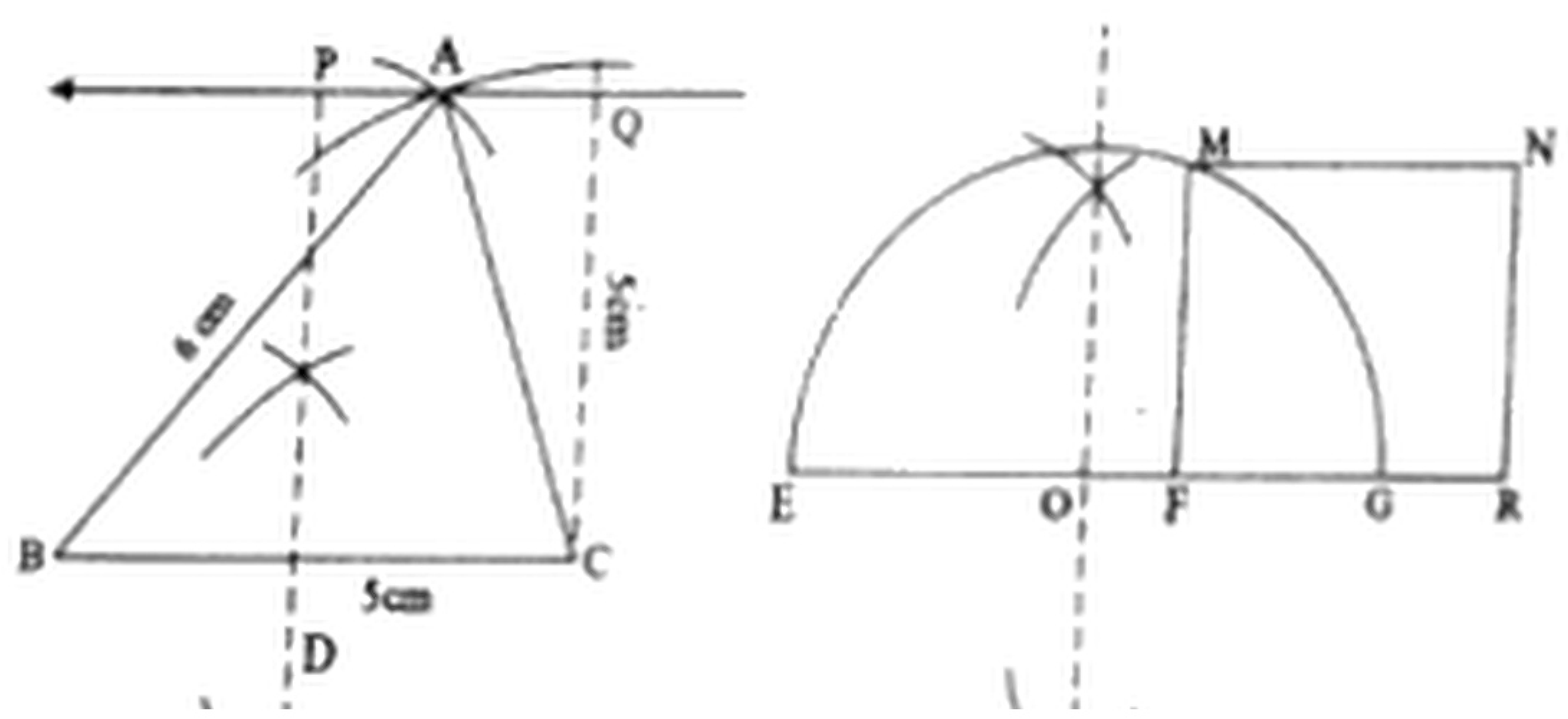
(vii) Take the line EFG and cut off $\overline{EF}$ = $\overline{DP}$ and $\overline{FG}$ = $\overline{DC}$

(ix) With $\overline{MF}$ as side complete the square FMNR.

Then FMNR is required square.

Q6. Construct a Δ having base 5 cm and other sides equal to 5 cm and 6 cm. Construct a square equal in area to given Δ.

Solution:



Construction:

(i) Take m$\overline{BC}$ = 5cm

(ii) With B is center and radius 6 cm, draw an arc. With center at C and radius 5 cm draw another arc to cut the first at A.

(iii) Join $\overline{AB}$ and $\overline{AC}$ to get the ΔABC.

(v) Draw perpendicular bisector of $\overline{BC}$, bisecting it at D and meeting PAQ at P.

(vi) Draw $\overline{CQ} \perp \overline{PQ}$ meeting in Q.

(viii) Take a line EFG and cut off $\overline{EF} = \overline{DP}$ and $\overline{FG} = \overline{DC}$.

(ix) With O as center and radius m$\overline{OE}$ draw a semi-circle.

(x) At F draw $\overline{FM} \perp \overline{EG}$, meeting the semi-circle at M.

(xi) With $\overline{MF}$ as a side complete required square FMNR.