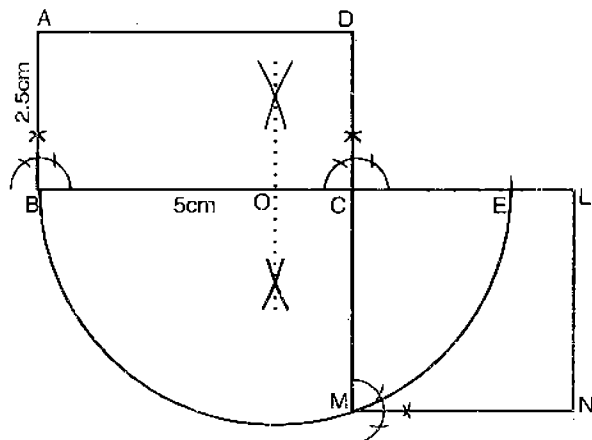1. Construct a rectangle whose adjacent sides are 2.5 cm and 5cm respectively. Construct a square having area equal to the given rectangle.

Construction

(i) Make the rectangle ABCD with given lengths of sides.

(ii) Produce $\overline{BC}$ and cut $m\overline{CE} = m\overline{CD}$

(iii) Bisect $\overline{BE}$ at O.

(iv) With O as centre and $\overline{OB}$ radius draw a semicircle cutting $\overline{DC}$ produced in M.

(v) With $\overline{CM}$ as side complete the square CMNL.

2. **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 its area and compare with the area of the rectangle.**
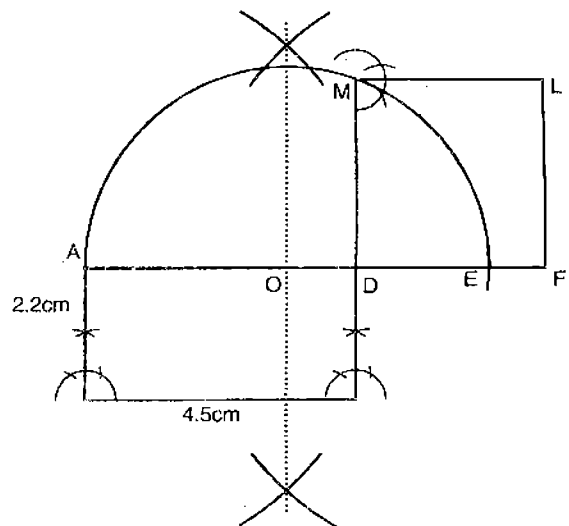
Construction

(i) Make the rectangle ABCD with given sides.

(ii) Produce $\overline{AD}$ and cut $m\overline{DE} = m\overline{DC}$.

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

(iv) With O as centre and $\overline{OA}$ radius draw a semicircle cutting $\overline{CD}$ produced in M.

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

(vi) Side of the square (average) = 3.15cm

Area = $3.15 \times 3.15 = 9.9 cm^2$

Area of the rectangle = 2.2×4.5

= $9.9 cm^2$ (equal to area of square)

3. **In Q.2 above verify by measurement that the perimeter of the square is less than that of the rectangle.**

Solution

(i) Side of the square = 3.15cm

Perimeter P_1 = 4×3.15

= 12.60 cm

Sides of the rectangle are 4.5cm, 2.2cm

Perimeter $P_2 = 2(4.5 + 2.2)$

= 2(6.7)

= 13.4cm

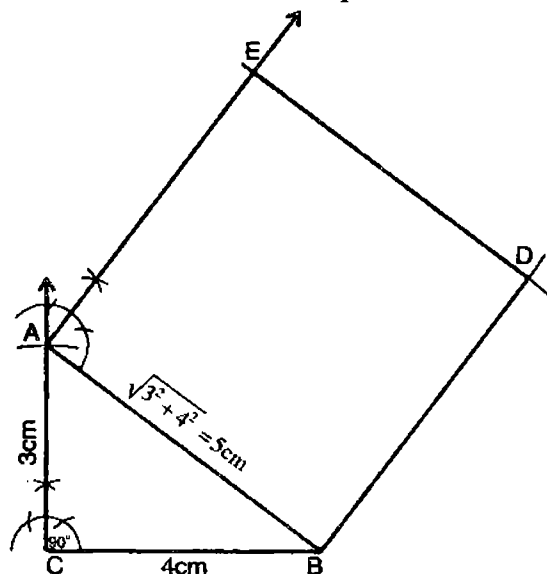**4. Construct a square equal in area to the sum of two squares having sides 3 cm and 4 cm respectively.**

Construction

(i) Make a right angled $\triangle ABC$ with $\overline{AC} = 3cm$, $\overline{BC} = 4cm$.

(ii) Using Pythagoras theorem

$$\sqrt{|AC|^2 + |BC|^2} = \sqrt{|AB|^2}$$

$$\sqrt{(3)^2 + (4)^2} = \sqrt{|AB|^2}$$
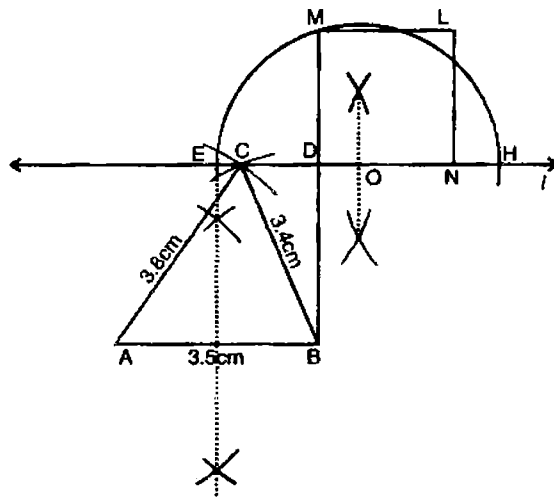
$$5cm = |AB|$$

(ii) With $\overline{AB}$ as side make square ABDE.

(iii) ABDE is the required area of square equal in area to the sum of the areas of two squares.

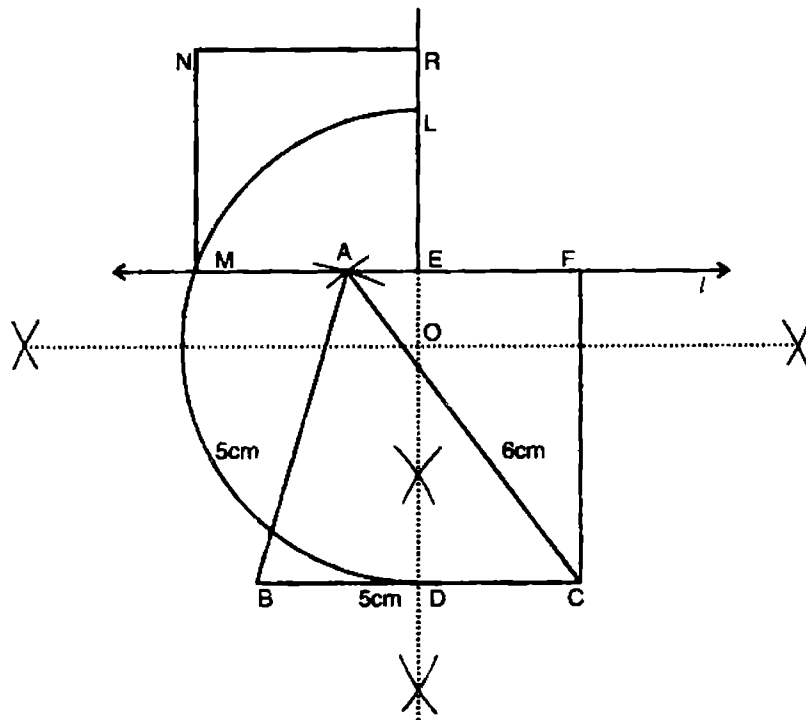**5. Construct a Δ having base 3.5 cm and other two sides equal to 3.4 cm and 3.8 cm respectively. Transform it into a square of equal area.**

Construction

(i) Make the $\triangle ABC$ with the given sides.

(ii) Draw the $\perp$ bisector of $\overline{AB}$ and a line ℓ through C $\parallel$ $\overline{AB}$ cutting each other in E.

(iii) Draw $\overline{BD} \perp \ell$.

(iv) BDEF is a rectangle.

(v) Produce $\overline{ED}$, cut $\overline{DH} = \overline{DB}$.

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

(vii) With O as centre and $\overline{OE}$ radius draw a semicircle cutting $\overline{BD}$ produced in M.

(viii) With $\overline{DM}$ as side, complete the square DNLM.

This is the required square equal in area to $\triangle ABC$.

6. 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.

Construction

(i) Draw $\overline{BC}$ = 5cm.

(ii) Draw an arc of radius 6cm with centre C and another arc of radius 5cm with centre B cutting first in A.

(iii) Through A draw a line $\ell \parallel BC$.

(iv) Draw the ⊥bisector of BC cutting the line ℓ in E.

(v) Draw CF ⊥ on ℓ. CDEF is the rectangle.

(vi) Produce $\overline{DE}$ and cut $\overline{EL} = \overline{EF}$, bisect $\overline{DL}$ at O.

(vii) Draw a semicircle with centre O and radius $\overline{OL} = \overline{OD}$, cutting l in M.

(viii) Draw a square EMNR with side EM.

This is the required square equal in area to $\triangle ABC$.