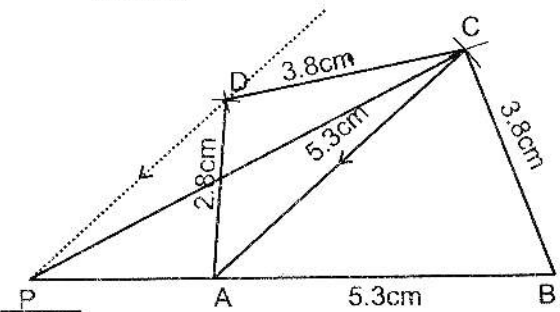
Exercise 17.3

1. (i) Construct a quadrilateral ABCD, having $m\overline{AB} = m\overline{AC} = 5.3cm$, $m\overline{BC} = m\overline{CD} = 3.8cm$ and $m\overline{AD} = 2.8cm$.

(ii) On the side BC construct a Δ equal in area to the quadrilateral ABCD.



Given

Sides of quadrilateral ABCD

$m\overline{AB} = m\overline{BC} = 5.3$ cm

$m\overline{BC} = m\overline{CD} = 3.8$ cm

$m\overline{AD} = 2.8$ cm

Required

i) To make the quadrilateral ABCD.

ii) On the side $\overline{BC}$ construct a Δ equal in area to the quadrilateral ABCD.

Construction

(i) Take $m\overline{AB} = 5.3$ cm.

(ii) With centre A and B draw arcs with radii 5.3 cm and 3.8 cm respectively cutting each other in C.

(iii) With C as centre draw an arc of radius 3.8cm, then with A as centre draw an arc of radius 2.8cm cutting the first in D.

(iv) Join AD, DC, BC

ABCD is the required quadrilateral.

(ii)

(i) Draw $\overline{AC}$

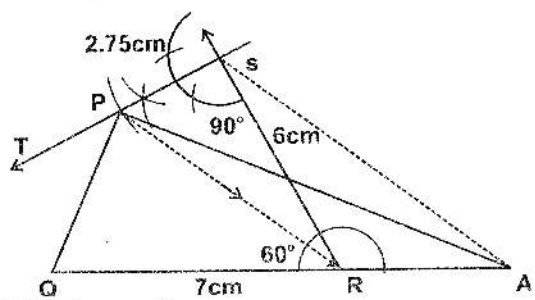
(ii) Through D draw a line $\parallel \overline{AC}$

(iii) Produce $\overline{AB}$ which meet parallel line in P.

(iv) Join P with C

PCB is the required triangle equal in area to quadrilateral ABCD.

2. Construct a Δ equal in area to the quadrilateral PQRS, having $m\overline{QR} = 7cm$, $m\overline{RS} = 6cm$, $m\overline{SP} = 2.75cm$, $m\angle QRS = 60°$ and $m\angle RSP = 90°$.



Given

Parts of the quadrilateral PQRS are given.

Required

(i) To make the quadrilateral PQRS.

(ii) To make a Δ equal in area to the quadrilateral PQRS.

Construction

(i) Take $m\overline{QR} = 7cm$

(ii) Make $\angle QRS = 60^\circ$

(iii) With R as centre draw an arc of 6 cm radius which cuts terminal arm of $\angle 60^\circ$ in S.

(iv) Make $\angle RSP = 90^\circ$

(v) With S as centre draw an arc of 2.75 cm radius which cuts terminal arm of 90° in P.

(vi) Join QP.

PQRS is required quadrilateral.

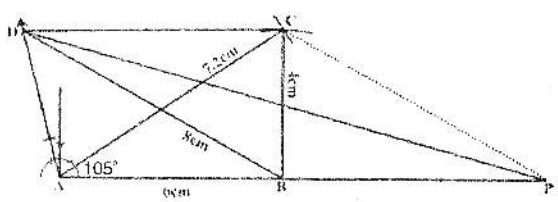
(vii) Join PR

(viii) Through S draw a line parallel to $\overline{PR}$ which meet $\overline{QR}$ produced in A.

(ix) Join AP.

ΔAPQ is the required triangle equal in area to quadrilateral PQRS

3. Construct a Δ equal in area to the quadrilateral ABCD, having $m\overline{AB} = 6cm$, $m\overline{BC} = 4cm$, $m\overline{AC} = 7.2cm$, $m\angle BAD = 105^\circ$ and $m\overline{BD} = 8cm$.



Given

Parts of the quadrilateral ABCD are given

Required

(i) To make the quadrilateral ABCD.

(ii) To make a Δ with area equal to that of quadrilateral ABCD.

Construction

(i) Take $m\overline{AB} = 6cm$.

(ii) Make $\angle A = 105^\circ$.

(iii) With B as centre draw an arc of radius 8cm, cutting the arm of $\angle A$ in D.

(iv) With A as centre draw an arc of radius 7.2cm, with B as centre draw an arc of radius 4cm, cutting the first in C. Join C with B and D.

ABCD is the required quadrilateral.

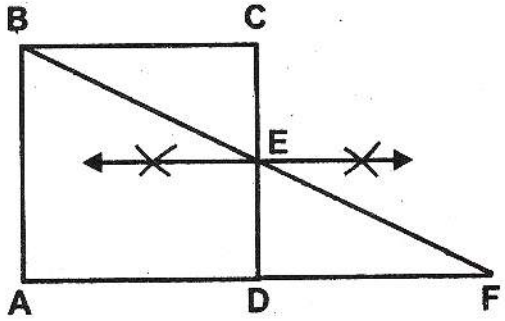
(v) Join AC.

(vi) Join DB. Draw a line parallel to $\overline{DB}$ which meet $\overline{AB}$ produced in P.

(vii) Join PD.

ΔADP is the required triangle equal in area to the quadrilateral ABCD.

4. Construct a right-angled triangle equal in area to a given square.



Given

Square ABCD

Required

To make a right-angle Δequal in area to the square.

Construction

(i) Bisect $\overline{CD}$ at E.

(ii) Join BE and produce it to meet $\overline{AD}$ produced in F.

ΔABF is the required triangle equal in area to square ABCD.