Exercise 17.2

1.Construct the following Δ's ABC. Draw the bisectors of their angles and verify their concurrency.

(i) **$m\overline{AB} = 4.5cm$, $m\overline{BC} = 3.1cm$, $m\overline{CA} = 5.2cm$.**

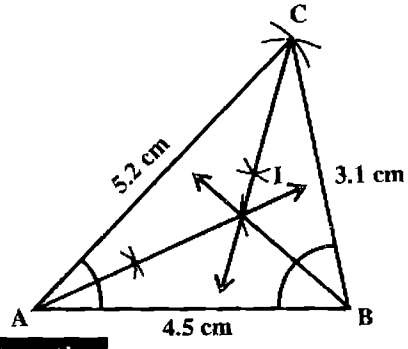
Given

The sides $m\overline{AB} = 4.5cm$, $m\overline{BC} = 3.1cm$, and $m\overline{CA} = 5.2cm$.

Required

(i) To construct ΔABC.

(ii) To draw its angle bisectors and verify their concurrency.



Construction

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

(ii) With A as centre and radius 5.2cm draw an arc.

(iii) With B as centre and radius 3.1cm draw another arc which intersect the first arc at C.

(iv) Join AC and BC to complete the ΔABC.

(v) Draw bisectors of $\angle A, \angle B$ and $\angle C$ meeting each other in the point I.

Hence angle bisectors of the ΔABC are concurrent at I which lies within the triangle.

(ii) $m\overline{AB} = 4.2cm, m\overline{BC} = 6cm,$ $mCA = 5.2cm$

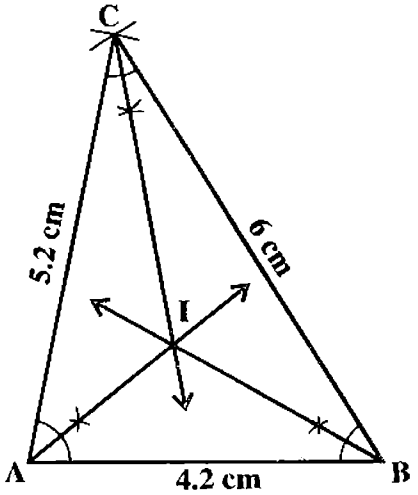
Given

The sides $m\overline{AB} = 4.2cm$, $m\overline{BC} = 6cm$, $m\overline{CA} = 5.2cm$ of a ΔABC.

Required

(i) To construct ΔABC.

(ii) To draw its angle bisectors and verify their concurrency.



Construction

(i) Take $m\overline{AB} = 4.2cm$.

(ii) With A as centre and radius 5.2cm draw an arc.

(iii) With B as centre and radius 6cm draw another arc which intersect the first arc at C.

(iv) Join BC and AC to complete the ΔABC.

(v) Draw bisectors of $\angle A, \angle B$ and $\angle C$ meeting each other in the point I . Hence angle bisectors of the ΔABC are concurrent at I which lies within the triangle.

(iii) $m\overline{AB} = 3.6cm$, $m\overline{BC} = 4.2cm$, $m\angle B = 75^\circ$.

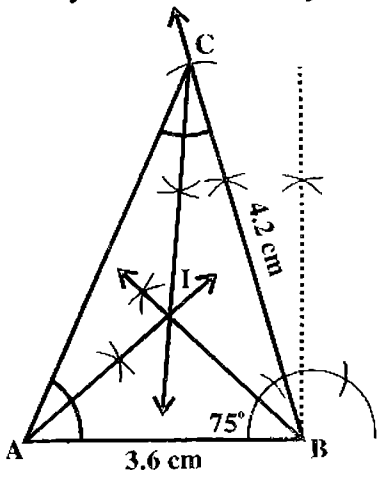
Given

The sides $m\overline{AB} = 3.6cm$, $m\overline{BC} = 4.2cm$ and $m\angle B = 75^\circ$ of ΔABC

Required

(i) To construct ΔABC.

(ii) To draw its angle bisectors and verify their concurrency.



Construction

(i) Take $m\overline{AB} = 3.6cm$.

(ii) At B draw angle of 75°

(iii) With B as centre and radius 4.2cm draw arc which intersect terminal arm of 75° in C.

(iv) Join AC to complete the ΔABC.

(v) Draw bisectors of $\angle A, \angle B$ and $\angle C$ meeting each other in the point I.

Hence angle bisectors of the ΔABC are concurrent at I which lies within the triangle.

Q.2. Construct Δs PQR. Draw their altitudes and show that they are concurrent.

(i) $m\overline{PQ} = 6cm, m\overline{QR} = 4.5cm,$ $m\overline{PR} = 5.5cm.$

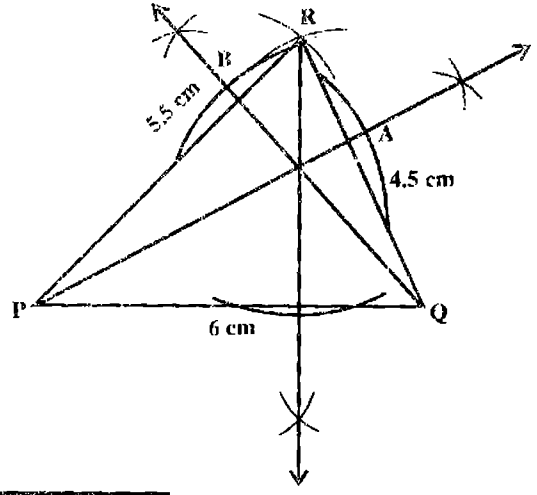
Given

The sides $m\overline{PQ} = 6cm$, $m\overline{QR} = 4.5cm$ and $m\overline{PR} = 5.5cm$ of a ΔPQR.

Required

(i) To construct Δ PQR.

(ii) To draw its altitudes and verify their concurrency.



Construction

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

(ii) With P as centre draw an arc of radius 5.5 cm.

(iii) With Q as centre draw an arc of radius 4.5cm, cutting the first in R.

(iv) Join R with P and Q.

(v) Draw the altitudes on, $\overline{PR}, \overline{QR}$ and $\overline{PQ}$ which cut each other in I.

(vi) All altitudes are concurrent.

(ii) $m\overline{PQ} = 4.5cm, m\overline{QR} = 3.9cm,$ $m\angle R = 45^\circ.$

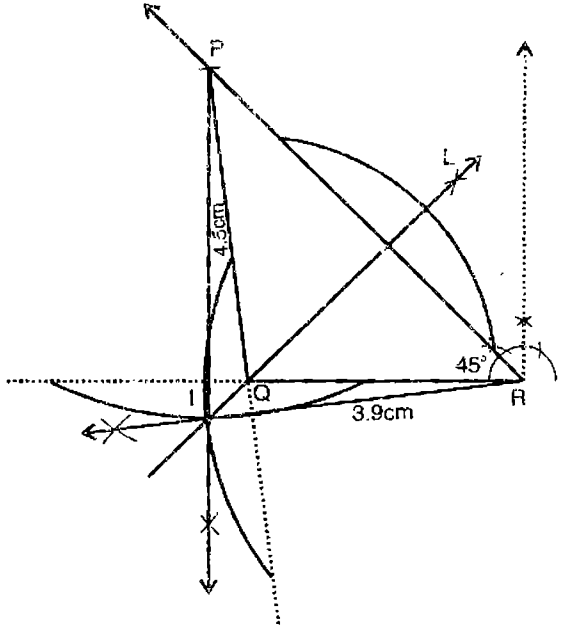
Given

The sides $m\overline{PQ} = 4.5cm$, $m\overline{QR} = 3.9cm$ and $m\angle R = 45^\circ$ of ΔPQR

Required

(i) To construct Δ PQR.

(ii) To draw its altitudes and verify their concurrency.



Construction

(i) Draw $\overline{QR} = 3.9cm$.

(ii) Make $\angle R = 45^\circ$

(iii) Cut $\overline{QP} = 4.5cm$ join PQ, ΔPQR is formed.

(iv) Draw altitudes on $\overline{PR}$, $\overline{QR}$ and $\overline{PQ}$ they cut each other in I.

The altitudes are concurrent.

(iii) $m\overline{RP} = 3.6cm, m\angle Q = 30^\circ,$

$m\angle P = 105^\circ.$

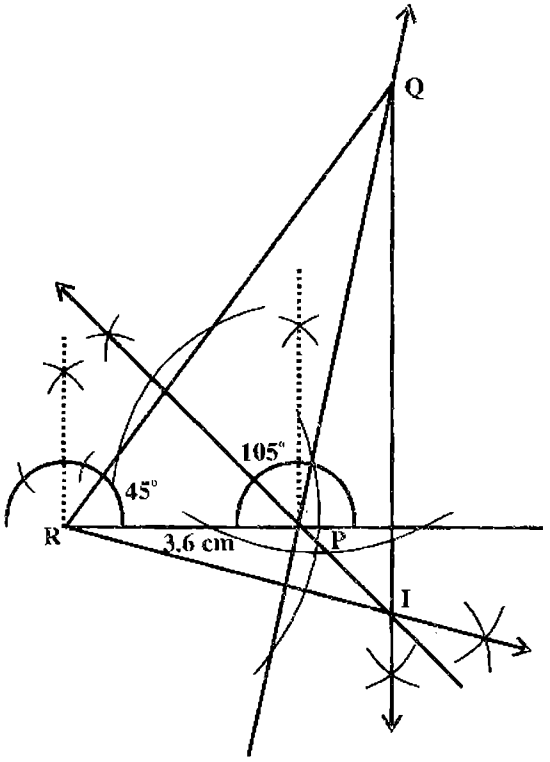
Given

$m\overline{RP} = 3.6cm, m\angle Q = 30^\circ, m\angle P = 105^\circ.$

Required

(i) To construct Δ PQR.

(ii) To draw its altitudes and verify their concurrency.



Construction

$m\angle P + m\angle Q + m\angle R = 180^\circ$

$105^\circ + 30^\circ + m\angle R = 180^\circ$

$135^\circ + m\angle R = 180^\circ$

$m\angle R = 180^\circ - 135^\circ = 45^\circ$

(i) Take $m\overline{RP} = 3.6cm$.

(ii) At P draw an angle of 105°.

(iii) At R draw an angle of 45°.

(iv) Terminal arms of both angles meet in point Q. It form Δ PQR.

(v) Draw the altitudes, of $\overline{PQ}$ and $\overline{QR}$ and $\overline{RP}$ cutting each other in I.

The altitudes are concurrent.

Q.3. Construct the following triangles ABC. Draw the perpendicular bisectors of their sides and verify their concurrency. Do they meet inside the triangle.

(i) $m\overline{AB} = 5.3cm$, $m\angle A = 45^\circ$, $m\angle B = 30^\circ$

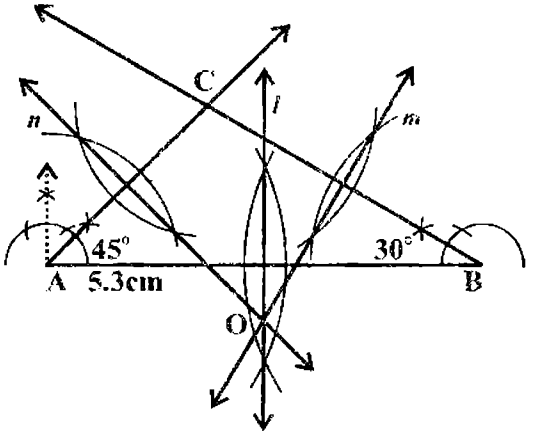
Given

Side $m\overline{AB} = 5.3cm$ and $m\angle A = 45^\circ$, $m\angle B = 30^\circ$ of a ΔABC.

Required

(i) To construct the ΔABC.

(ii) To draw perpendicular bisectors of its sides and to verify that they are concurrent.



Construction

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

(ii) At the end point A of $\overline{AB}$ make $m\angle A = 45^\circ$.

(iii) At the end point B of $\overline{AB}$ make $m\angle B = 30^o$.

(iv) The terminal sides of these two angles meet at C.

Then ABC is required Δ.

(v) Draw perpendicular bisectors of $\overline{AB}, \overline{BC}$ and $\overline{CA}$ meeting each other in the point O.

Hence the three perpendicular bisectors of sides of ΔABC are concurrent at O.

(ii) $m\overline{BC} = 2.9cm$, $m\angle A = 30^o$, $m\angle B = 60^o$

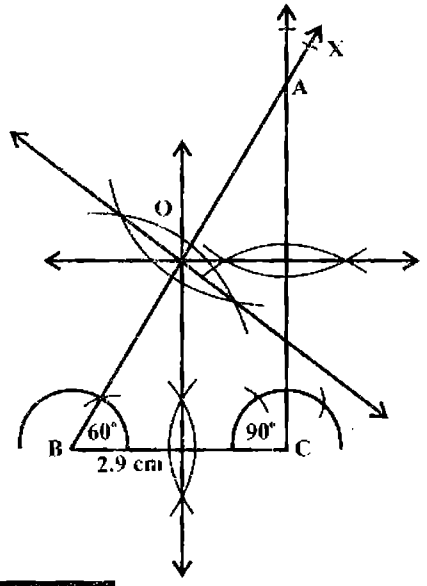
Given

The side $m\overline{BC} = 2.9cm$, $m\angle A = 30^o$ and $m\angle B = 60^o$ of ΔABC.

Required

(i) To construct the ΔABC.

(ii) To draw perpendicular bisectors of its sides and to verify that they are concurrent.



Construction

$m\angle A + m\angle B + m\angle C = 180^o$

$30^o + 60^o + m\angle C = 180^o$

$90^o + m\angle C = 180^o$

$m\angle C = 90^o$.

(i) Take $m\overline{BC} = 2.9cm$

(ii) At the end point B of $\overline{BC}$ make $m\angle B = 60^o$.

(iii) At the end point C of $\overline{BC}$ make $m\angle C = 90^o$.

(iv) The terminal sides of these two angles meet in A.

Then ABC is required Δ.

(v) Draw perpendicular bisectors of $\overline{AB}, \overline{BC}$ and $\overline{CA}$ meeting each other in the point O.

Hence the three perpendicular bisectors of sides of ΔABC are concurrent at O.

(iii) $m\overline{AB} = 2.4cm$, $m\overline{AC} = 3.2cm$, $m\angle A = 120^o$

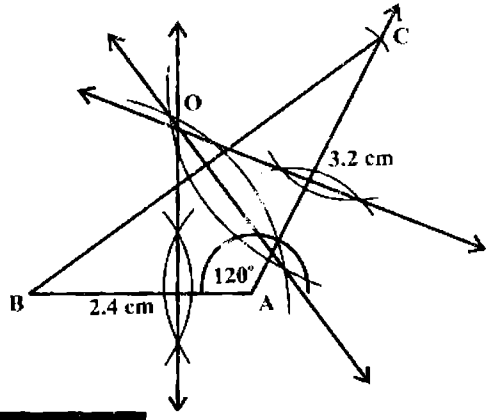
Given

The sides $m\overline{AB} = 2.4cm$, $m\overline{AC} = 3.2cm$ $m\angle A = 120^o$ of a ΔABC

Required

(i) To construct the ΔABC.

(ii) To draw perpendicular bisectors of its sides and to verify that they are concurrent.



Construction

(i) Take $m\overline{AB} = 2.4cm$

(ii) At the end point A of $\overline{AB}$ make $m\angle A = 120^\circ$.

(iii) With centre A, draw an arc of radius 3.2cm which cut terminal arm of $\angle A$ at C.

(iv) Join B to C

Then ABC is required Δ.

(v) Draw perpendicular bisectors of $\overline{AB}, \overline{BC}$ and $\overline{CA}$ meeting each other at the point O.

Hence the three perpendicular bisectors of sides of ΔABC are concurrent at O.

Q.4. Construct following Δ's XYZ. Draw their three medians and show that they are concurrent.

(i) **$m\overline{YZ} = 4.1cm$, $m\angle Y = 60^\circ$ and $m\angle X = 75^\circ$**

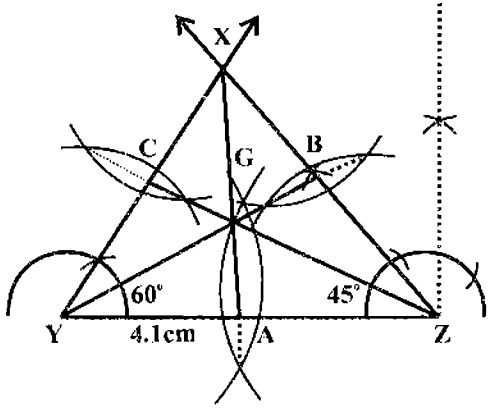
Given

The side $m\overline{YZ} = 4.1cm$, $m\angle Y = 60^\circ$ and $m\angle X = 75^\circ$

Required

(i) Construct the ΔXYZ.

(ii) Draw its medians and verify their concurrency.



Construction

$m\angle X + m\angle Y + m\angle Z = 180^\circ$

$75^\circ + 60^\circ + m\angle Z = 180^\circ$

$135^\circ + m\angle Z = 180^\circ$

$m\angle Z = 180^\circ - 135^\circ$

$m\angle Z = 45^\circ$.

(i) Take $m\overline{YZ} = 4.1cm$.

(ii) At the end point y of $\overline{YZ}$ make $m\angle Y = 60^\circ$.

(iii) At the end point Zof $\overline{ZY}$ make $m\angle Z = 45^\circ$

(iv) The terminal sides of these angles meet at X. Then XYZ is required Δ.

(v) Draw perpendicular bisectors of the sides $\overline{YZ}$, $\overline{ZX}$ and $\overline{XY}$ of ΔXYZ and make their midpoints A, B and C respectively.

(vi) Join Y to midpoint B to get median $\overline{YB}$.

(vii) Join Z to midpoint C to get median $\overline{ZC}$.

(viii) Join X to mid point A to get median $\overline{AX}$.The medians of ΔXYZ pass through the same point G.

All medians intersect at point G.

Hence medians are concurrent at G.

(ii) $m\overline{XY} = 4.5cm$, $m\overline{YZ} = 3.4cm$, $m\overline{ZX} = 5.6cm$

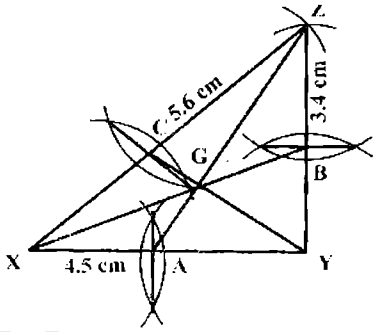
Given

The sides $m\overline{XY} = 4.5cm$, $m\overline{YZ} = 3.4cm$ and $m\overline{ZX} = 5.6cm$ of a ΔXYZ.

Required

(i) Construct the ΔXYZ.

(ii) Draw its medians and verify their concurrency.



Construction

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

(ii) With Y as centre and radius 3.4 cm draw an arc.

(iii) With X as centre and radius 5.6cm draw another arc cutting first in Z join Z to Y and X to Z.

(iv) Draw perpendicular bisectors of the sides $\overline{XY}$, $\overline{YZ}$ and $\overline{XZ}$ of ΔXYZ and make their midpoints A,B and C respectively.

(v) Join X to mid point B to get median $\overline{XB}$.

(vi) Join Y to midpoint C to get medians $\overline{YC}$.

(vii) Join Z to midpoint A to get median $\overline{ZA}$.

All medians intersect at point G.

Hence medians are concurrent at G.

(iii) $m\overline{ZX} = 4.3cm, m\angle X = 75^\circ$ and $m\angle Y = 45^\circ$.

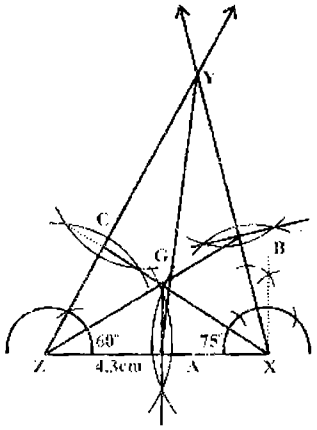
Given

The side $m\overline{ZX} = 4.3cm$, $m\angle X = 75^\circ$ and $m\angle = 45^\circ$ of ΔXYZ.

Required

(i) Construct the ΔXYZ.

(ii) Draw its medians and verify their concurrency.



Construction

$m\angle X + m\angle Y + m\angle Z = 180^\circ$

$75^\circ + 45^\circ + m\angle Z = 180^\circ$

$m\angle Z + 120^\circ = 180^\circ$

$m\angle Z = 180^\circ - 120^\circ$

$m\angle Z = 60^\circ$

(i) Take $m\overline{ZX} = 4.3cm$.

(ii) At the end point Z of $\overline{ZX}$ make $m\angle Z = 60^\circ$.

(iii) At the end point X of $\overline{XY}$ make $m\angle X = 75^\circ$

(iv) The terminal sides of these angles meet at Y. Then XYZ is required Δ.

(v) Draw perpendicular bisectors of the sides $\overline{ZX}$, $\overline{XY}$ and $\overline{YZ}$ of ΔXYZ and make their midpoints A,B and C respectively.

(vi) Join Y to midpoint A to get median $\overline{YA}$.

(vii) Join Z to the midpoint B to get median $\overline{ZB}$.