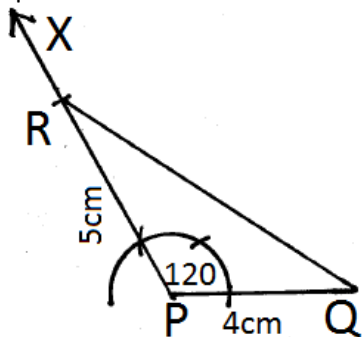# Chapter 17

Practical Geometry

Case-1: length of two sides and measure of the included angles are given

Example 1: Construct a triangle PQR given that $\overline{PQ}$ = 4cm, $\overline{PR}$ = 5cm and $m\angle P = 120^o$

Sol: Given $\overline{PQ}$ = 4cm, $\overline{PR}$ = 5cm & $m\angle P = 120^o$
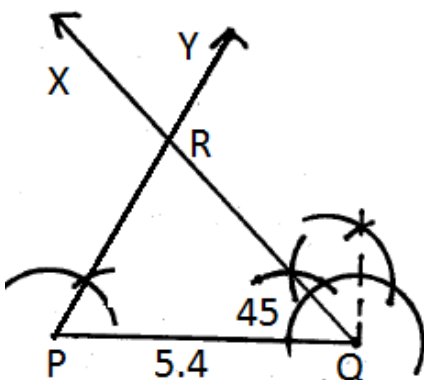
Required: Construct a $\triangle$ PQR

Steps of construction:

i). Draw a line segment $\overline{PQ}$ = 4cm

ii). At point P draw an angle $m\angle QPX = 120^o$

iii). At P draw an arc of radius 5cm which cuts the ray $\overrightarrow{PX}$ at R.

iv). Join Q to R

v). $\triangle PQR$ is required triangle

Case-2: Measure of two angle and included side are given

Example 2: Construct a triangle PQR given that $\overline{PQ}$ = 5.4cm, $m\angle PQR = 45^o$ & $m\angle RPQ = 60^o$

Sol: Given $\overline{PQ}$ = 5.4cm, $m\angle PQR = 45^o$ & $m\angle RPQ = 60^o$

Required: Construct a $\triangle$ PQR

Steps of construction:

i). Draw a line segment $\overline{PQ}$ = 5.4cm

ii). At point P draw an angle $m\angle QPY = 60^o$

iii). At point Q draw an angle $m\angle PQX = 45^o$ which intersect the ray $\overrightarrow{PY}$ at R.

iv). $\triangle PQR$ is required triangle

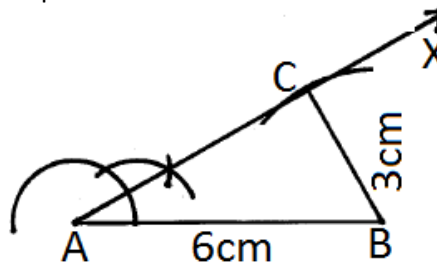**Case 3: Length of two sides & non-adjacent angle**

Example 3: Construct a triangle ABC given that $\overline{BC}$ = 3cm, $\overline{AB}$ = 6cm & $m\angle A = 30^o$

Sol: Given $\overline{BC}$ = 3cm, $\overline{AB}$ = 6cm & $m\angle A = 30^o$

Required: Construct a $\triangle$ ABC

Steps of construction:
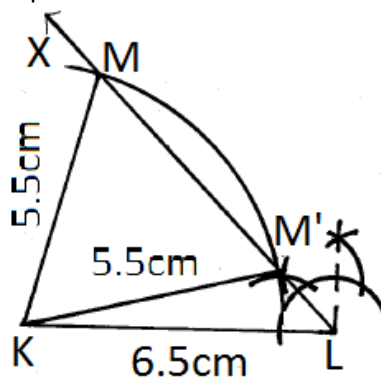
i). Draw a line segment $\overline{AB}$ = 6cm

ii). At point A draw an angle $m\angle BAX = 30^o$

iii). At point B draw an arc of radius 3cm which cut the ray $\overrightarrow{AX}$ at C.

iv). Join C to B

v). $\triangle ABC$ is required triangle

Example 4: Construct a triangle KLM given that $\overline{KL}$ = 6.5cm, $\overline{KM}$ = 5.5cm & $m\angle L = 45^o$

Sol: Given $\overline{KL}$ = 6.5cm, $\overline{KM}$ = 5.5cm & $m\angle L = 45^o$
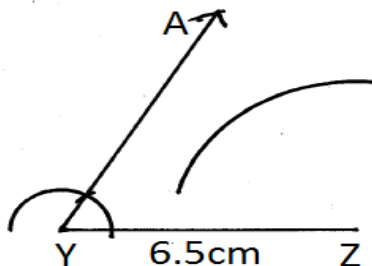
Required: Construct a $\triangle$ KLM

Steps of construction:

i). Draw a line segment $\overline{KL}$ = 6.5cm

ii). At point L draw an angle $m\angle KLX = 45^o$

iii). At point K draw an arc of radius 5.5cm which intersect the ray $\overrightarrow{LX}$ at M & M'

iv). Join K to M & M'

v). $\triangle KLM$ & $\triangle KLM'$ are the required triangles

Example 5: Construct a triangle XYZ given that $\overline{YZ}$ = 6.5cm, $\overline{ZX}$ = 4cm & $m\angle Y = 60^o$

Sol: Given $\overline{YZ}$ = 6.5cm, $\overline{ZX}$ = 4cm & $m\angle Y = 60^o$

Required: Construct a $\triangle$ XYZ

Steps of construction:
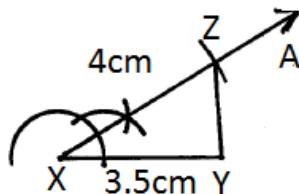
i). Draw a line segment $\overline{YZ}$ = 6.5cm

ii). At point Y draw an angle $m\angle ZYA = 60^o$

iii). At point Z draw an arc of radius 4cm which does not intersect the ray $\overrightarrow{YA}$

iv). Therefore no triangle constructed to satisfy the given data

Exercise 17.1

Q1: i). Construct a $\triangle XYZ$, when $m\angle X = 30^o$ $\overline{XY} = 3.5$cm, & $\overline{XZ} = 4$cm

Sol: Given $m\angle X = 30^o$ $\overline{XY} = 3.5$cm,& $\overline{XZ} = 4$cm

Required: Construct a $\triangle XYZ$

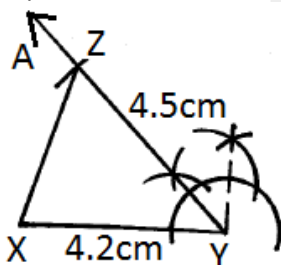**Steps of construction:**

i). Draw a line segment $\overline{XY} = 3.5$cm

ii). At point X draw an angle $m\angle YXA = 30^o$

iii). At X draw an arc of radius 4cm which cuts the ray $\overrightarrow{XA}$ at Z.

iv). Join Y to Z

v). $\triangle XYZ$ is required triangle

Q1: ii). Construct a $\triangle XYZ$, when $m\angle Y = 45^o$ $\overline{XY} = 4.2$cm, & $\overline{YZ} = 4.5$cm

Sol: Given $m\angle Y = 45^o$ $\overline{XY} = 4.2$cm,& $\overline{YZ} = 4.5$cm

Required: Construct a $\triangle XYZ$

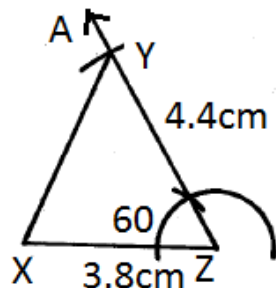**Steps of construction:**

i). Draw a line segment $\overline{XY} = 4.2$cm

ii). At point X draw an angle $m\angle XYA = 45^o$

iii). At Y draw an arc of radius 4.5cm which cuts the ray $\overrightarrow{YA}$ at Z.

iv). Join X to Z

v). $\triangle XYZ$ is required triangle

Q1: iii). Construct a $\triangle XYZ$, when $m\angle Z = 60^o$ $\overline{XZ} = 3.8$cm, & $\overline{YZ} = 4.4$cm

Sol: Given $m\angle Z = 60^o$ $\overline{XZ} = 3.8$cm,& $\overline{YZ} = 4.4$cm

Required: Construct a $\triangle XYZ$

Steps of construction:
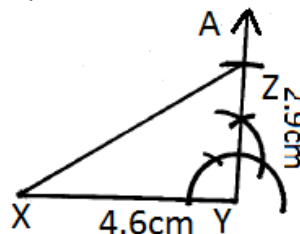
i). Draw a line segment $\overline{XZ} = 3.8$cm

ii). At point Z draw an angle $m\angle XZA = 60^o$

iii). At Z draw an arc of radius 4.4cm which cuts the ray $\overrightarrow{ZA}$ at Y.

iv). Join X to Y

v). $\triangle XYZ$ is required triangle

Q1: iv). Construct a $\triangle XYZ$, when $m\angle Y = 90^o$ $\overline{XY} = 4.6$cm, & $\overline{YZ} = 2.9$cm

Sol: Given $m\angle Y = 90^o$ $\overline{XY} = 4.6$cm,& $\overline{YZ} = 2.9$cm
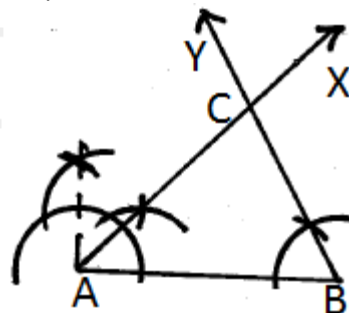
Required: Construct a $\triangle XYZ$

Steps of construction:

i). Draw a line segment $\overline{XY} = 4.6$cm

ii). At point Y draw an angle $m\angle XYA = 90^o$

iii). At Y draw an arc of radius 2.9cm which cuts the ray $\overrightarrow{YA}$ at Z.

iv). Join X to Z

v). $\triangle XYZ$ is required triangle

Q2: i). Construct a $\triangle ABC$, when $\overline{AB} = 4.5$cm, $m\angle A = 45^o$ & $m\angle B = 60^o$

Sol: Given $\overline{AB} = 4.5$cm, $m\angle A = 45^o$ & $m\angle B = 60^o$
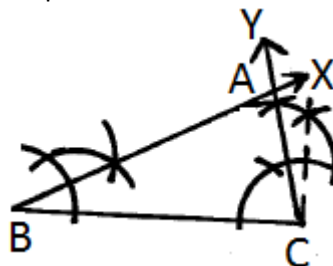
Required: Construct a $\triangle ABC$

Steps of construction:

i). Draw a line segment $\overline{AB} = 4.5$cm

ii). At point A draw an angle $m\angle BAX = 45^o$

iii). At point B draw an angle $m\angle ABY = 60^o$ which intersect the ray $\overrightarrow{AX}$ at C.

iv). $\triangle ABC$ is required triangle

Q2: ii). Construct a $\triangle ABC$, when $\overline{BC} = 5$cm, $m\angle B = 30^o$ & $m\angle C = 75^o$

Sol: Given $\overline{BC} = 5$cm, $m\angle B = 30^o$ & $m\angle C = 75^o$

Required: Construct a $\triangle ABC$

Steps of construction:

i). Draw a line segment $\overline{BC} = 5$cm

ii). At point B draw an angle $m\angle CBX = 30^o$

iii). At point C draw an angle $m\angle BCY = 75^o$ which intersect the ray $\overrightarrow{BX}$ at A.

iv). $\triangle ABC$ is required triangle

Chapter 17

Q2: iii). Construct a $\triangle ABC$, when $\overline{AC} = 4.8$cm, $m\angle A = 120^o$ & $m\angle C = 30^o$

Sol: Given $\overline{AC} = 4.8$cm, $m\angle A = 120^o$ & $m\angle C = 30^o$
Required: Construct a $\triangle ABC$

Steps of construction:

i). Draw a line segment $\overline{AC} = 4.8$cm

ii). At point A draw an angle $m\angle CAX = 120^o$

iii). At point C draw an angle $m\angle ACY = 30^o$

which intersect the ray $\overrightarrow{AX}$ at B.

iv). $\triangle ABC$ is required triangle

Q2: iv). Construct a $\triangle ABC$, when $\overline{AB} = 3.6$cm, $m\angle A = 75^o$ & $m\angle B = 45^o$

Sol: Given $\overline{AB} = 3.6$cm, $m\angle A = 75^o$ & $m\angle B = 45^o$
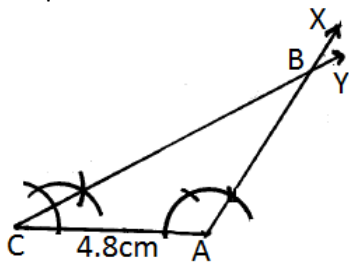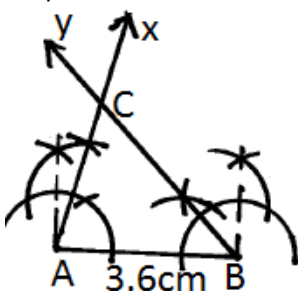Required: Construct a $\triangle ABC$

Steps of construction:

i). Draw a line segment $\overline{AB} = 3.6$cm

ii). At point A draw an angle $m\angle BAX = 75^o$

iii). At point B draw an angle $m\angle ABY = 45^o$

which intersect the ray $\overrightarrow{AX}$ at C.

iv). $\triangle ABC$ is required triangle

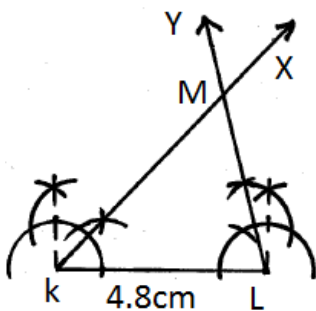**Q3: i). Construct a $\triangle KLM$, when $\overline{KL} = 4.8$cm, $m\angle K = 45^o$ & $m\angle M = 60^o$**

Sol: Given $\overline{KL} = 4.8$cm, $m\angle K = 45^o$ & $m\angle M = 60^o$
Required: Construct a $\triangle KLM$, First find

$$m\angle K + m\angle L + m\angle M = 180^o$$

$$45^o + m\angle L + 60^o = 180^o$$

$$m\angle L = 180^o - 60^o - 45^o = 75^o$$

Steps of construction:

i). Draw a line segment $\overline{KL} = 4.8$cm

ii). At point K draw an angle $m\angle LKX = 45^o$

iii). At point L draw an angle $m\angle KLY = 75^o$

which intersect the ray $\overrightarrow{KX}$ at M.

iv). $\triangle KLM$ is required triangle

Q3: ii). Construct a $\triangle KLM$, when $\overline{LM} = 3.8$cm, $m\angle K = 30^o$ & $m\angle M = 75^o$

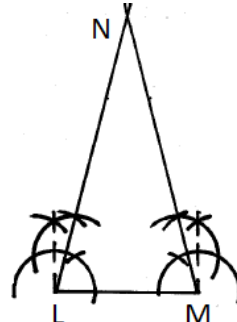Sol: Given $\overline{LM} = 3.8$cm, $m\angle K = 30^o$ $m\angle M = 75^o$
Required: Construct a $\triangle KLM$, First find

$$m\angle K + m\angle L + m\angle M = 180^o$$

$$30^o + m\angle L + 75^o = 180^o$$

$$m\angle L = 180^o - 30^o - 75^o = 75^o$$

Steps of construction:

i). Draw a line segment $\overline{LM} = 3.8$cm

ii). At point L draw an angle $m\angle L = 75^o$

iii). At point M draw an angle $m\angle M = 75^o$
both angles intersect at K

iv). $\triangle KLM$ is required triangle

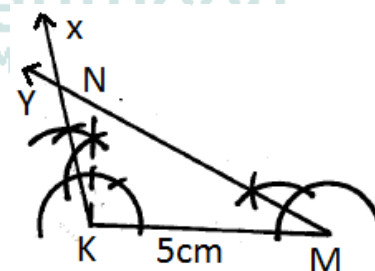**Q3: iii). Construct a $\triangle KLM$, when $\overline{KM} = 5$cm, $m\angle K = 105^o$ & $m\angle L = 45^o$**

Sol: Given $\overline{KM} = 5$cm, $m\angle K = 105^o$ & $m\angle L = 45^o$
Required: Construct a $\triangle KLM$, First find

$$m\angle K + m\angle L + m\angle M = 180^o$$

$$105^o + 45^o + m\angle L = 180^o$$

$$m\angle M = 180^o - 105^o - 45^o = 30^o$$

Steps of construction:

i). Draw a line segment $\overline{KM} = 5$cm

ii). At point K draw an angle $m\angle MKX = 105^o$

iii). At point M draw an angle $m\angle KMY = 30^o$

which intersect the ray $\overrightarrow{KX}$ at L.

iv). $\triangle KLM$ is required triangle

Q3: iv). Construct a $\triangle KLM$, when $\overline{KM} = 5.4$cm, $m\angle K = 75^o$ & $m\angle M = 45^o$

Sol: Given $\overline{KM} = 5.4$cm, $m\angle K = 75^o$ $m\angle M = 45^o$
Required: Construct a $\triangle KLM$

Y X

N

K 5.4cm M
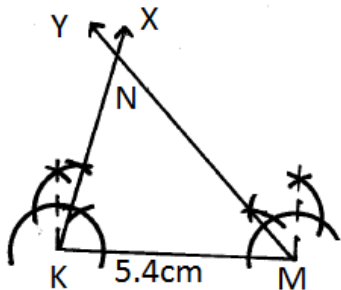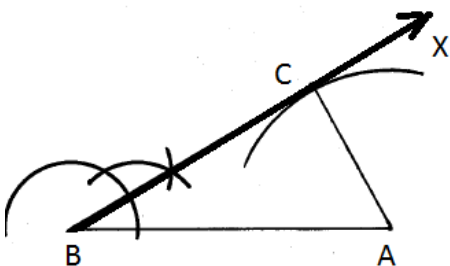
Steps of construction:

i). Draw a line segment $\overline{KM} = 5.4$cm

ii). At point K draw an angle $m\angle MKX = 75^o$

iii). At point M draw an angle $m\angle KMY = 45^o$

which intersect the ray $\overrightarrow{KX}$ at L.

iv). $\triangle$ KLM is required triangle

Q4: i). Construct a $\triangle$ ABC, when $\overline{AB} = 8$cm, $\overline{AC} = 4$cm & $m\angle B = 30^o$

Sol: Given $\overline{AB} = 8$cm, $\overline{AC} = 4$cm,& $m\angle B = 30^o$

Required: Construct a $\triangle$ ABC

X

C

B A

Steps of construction:

i). Draw a line segment $\overline{AB} = 8$cm

ii). At point B draw an angle $m\angle ABX = 30^o$

iii). At point A Draw an arc of radius 4cm which

intersect of ray $\overrightarrow{BX}$ at C.

iv). Join A to C.

v). $\triangle$ ABC is required triangle

Q4: ii). Construct a $\triangle$ ABC, when $\overline{AB} = 7$cm, $\overline{AC} = 5.5$cm & $m\angle B = 45^o$

Sol: Given $\overline{AB} = 7$cm, $\overline{AC} = 5.5$cm,& $m\angle B = 45^o$

Required: Construct a $\triangle$ ABC

X

C

5.5cm

5.5cm C'

A 7cm B

Steps of construction:

i). Draw a line segment $\overline{AB} = 7$cm

ii). At point B draw an angle $m\angle ABX = 45^o$

iii). At point A Draw an arc of radius 5.5cm which

intersect of ray $\overrightarrow{BX}$ at C & C'.

iv). Join A to C & C'.

v). $\triangle$ ABC & $\triangle$ ABC' are required triangles

Q4: iii). Construct a $\triangle$ ABC, when $\overline{AB} = 6$cm, $\overline{AC} = 5.6$cm & $m\angle B = 60^o$

Sol: Given $\overline{AB} = 6$cm, $\overline{AC} = 5.6$cm,& $m\angle B = 60^o$

Required: Construct a $\triangle$ ABC

X

C

C'

A 6cm B
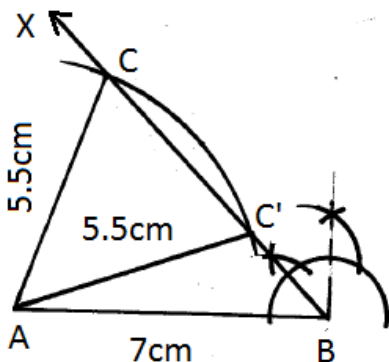
Steps of construction:

i). Draw a line segment $\overline{AB} = 6$cm

ii). At point B draw an angle $m\angle ABX = 60^o$

iii). At point A Draw an arc of radius 5.6cm which

intersect of ray $\overrightarrow{BX}$ at C & C'.

iv). Join A to C & C'.

v). $\triangle$ ABC & $\triangle$ ABC' are required triangles

Q4: iv). Construct a $\triangle$ ABC, when $\overline{AB} = 6$cm, $\overline{AC} = 2.5$cm & $m\angle A = 60^o$

Sol: Given $\overline{AB} = 6$cm, $\overline{AC} = 2.5$cm & $m\angle A = 60^o$

Required: Construct a $\triangle$ ABC

X

C

A 6cm B
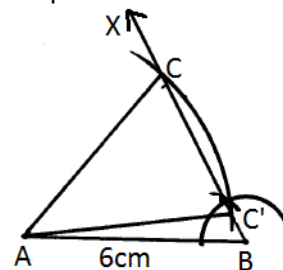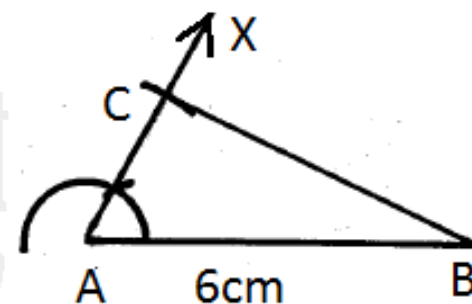
Steps of construction:

i). Draw a line segment $\overline{AB} = 6$cm

ii). At point A draw an angle $m\angle BAX = 60^o$

iii). At point A Draw an arc of radius 2.5cm which

intersect of ray $\overrightarrow{AX}$ at C.

iv). Join B to C.

v). $\triangle$ ABC is required triangle

Q4: v). Construct a $\triangle$ ABC, when $\overline{AC} = 5$cm, $m\angle A = 75^o$ & $m\angle C = 60^o$

Sol: Given $\overline{AC} = 5$cm, $m\angle A = 75^o$ & $m\angle C = 60^o$

Required: Construct a $\triangle$ ABC

Y X

B

A 5cm C

Steps of construction:

i). Draw a line segment $\overline{AC} = 5$cm

ii). At point A draw an angle $m\angle CAX = 75^o$

iii). At point A Draw an angle $m\angle ACY = 60^o$ which intersect of ray $\overrightarrow{AX}$ at B.

iv). $\triangle$ ABC is required triangle

Q5: Construct a $\triangle$ LMN, when $\overline{LM} = 5.4$cm, $m\angle L = 75^o$ & $m\angle M = 45^o$

Sol: Given $\overline{LM} = 5.4$cm, $m\angle L = 75^o$, $m\angle M = 45^o$

Required: Construct a $\triangle$ LMN

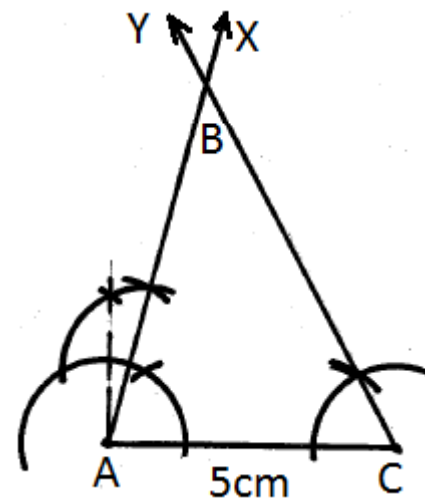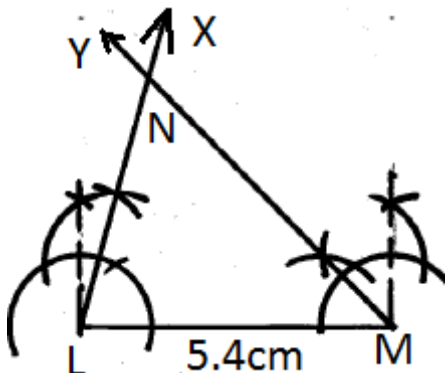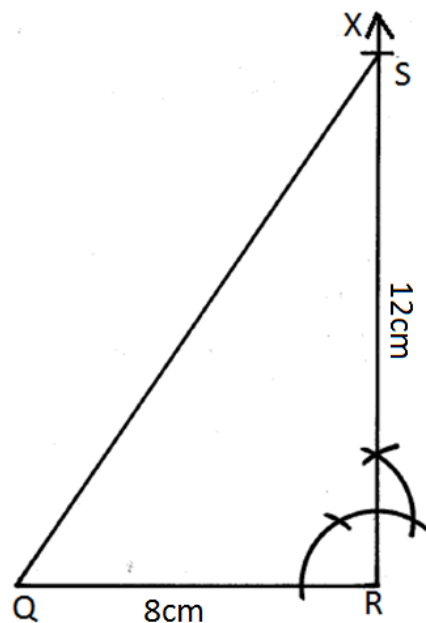**Steps of construction:**

i). Draw a line segment $\overline{LM} = 5.4$cm

ii). At point L draw an angle $m\angle MLX = 75^o$

iii). At point M Draw an angle $m\angle LMY = 45^o$ which intersect of ray $\overrightarrow{LX}$ at N.

iv). $\triangle$ LMN is required triangle

Q6: Construct a $\triangle$ QRS, when $\overline{QR} = 8$cm, $\overline{RS} = 12$cm & $m\angle R = 90^o$

Sol: Given $\overline{QR} = 8$cm, $\overline{RS} = 12$cm & $m\angle R = 90^o$

Required: Construct a $\triangle$ QRS

Steps of construction:

i). Draw a line segment $\overline{QR} = 8$cm

ii). At point R draw an angle $m\angle QRX = 90^o$

iii). At point R draw an arc of radius 12cm which intersect of ray $\overrightarrow{RX}$ at S.

iv). $\triangle$ QRS is required triangle

Q7: Construct a $\triangle$ KLM, when $\overline{KL} = 4.8$cm, $\overline{LM} = 3.9$cm & $m\angle L = 30^o$

Sol: Given $\overline{KL} = 4.8$cm, $\overline{LM} = 3.9$cm & $m\angle L = 30^o$

Required: Construct a $\triangle$ KLM

Steps of construction:

i). Draw a line segment $\overline{KL} = 4.8$cm

ii). At point L draw an angle $m\angle KLX = 30^o$

iii). At point L draw an arc of radius 3.9cm which intersect of ray $\overrightarrow{LX}$ at M.

iv). $\triangle$ KLM is required triangle

Q8: Construct a $\triangle$ PQR, when $\overline{QR} = 6.5$cm, $m\angle P = 30^o$ & $m\angle Q = 60^o$

Sol: Given $\overline{QR} = 6.5$cm, $m\angle P = 30^o$ & $m\angle Q = 60^o$

Required: Construct a $\triangle$ PQR, First find

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

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

$m\angle R = 180^o - 60^o - 30^o = 90^o$

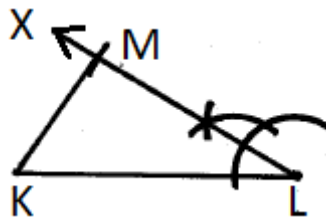**Steps of construction:**

i). Draw a line segment $\overline{QR} = 6.5$cm

ii). At point R draw an angle $m\angle QRX = 90^o$

iii). At point Q Draw an angle $m\angle RQY = 60^o$ which intersect of ray $\overrightarrow{RX}$ at P.

iv). $\triangle$ PQR is required triangle

Example 6: Construct $\triangle$ ABC whose $\overline{AB}$ =4.6cm, $\overline{BC}$ =5cm and $\overline{CA}$ =5.1cm. Draw angle bisectors of the triangle & verify that these are concurrent.

Sol: Given $\overline{AB}$ =4.6cm, $\overline{BC}$ =5cm & $\overline{CA}$ =5.1cm

Required: Angle bisectors of a $\triangle$ ABC are concurrent.

Steps of construction:

i). Draw a line segment $\overline{AB} = 4.6$ cm

ii). At point A draw an arc of radius 5.1cm

iii). At point B Draw an arc of radius 5cm which intersect at C.

iv). Join C to A & B. $\triangle ABC$ is constructed

v). Draw bisectors of angles A,B & C. these bisectors passes through the same point I. thus angle bisectors of a triangle are concurrent.

Example 7: Construct $\triangle ABC$ whose $\overline{AB}$ =5.6cm, $\overline{BC}$ =6cm and $\overline{CA}$ =5cm. Draw its altitudes of the triangle & verify that these are concurrent.

Sol: Given $\overline{AB}$ =5.6cm, $\overline{BC}$ =6cm and $\overline{CA}$ =5cm

Required: Altitudes of a $\triangle ABC$ are concurrent.

Steps of construction:

i). Draw a line segment $\overline{BC} = 6$ cm

ii). At point B draw an arc of radius 5.6cm

iii). At point C Draw an arc of radius 5cm which intersect at A.

iv). $\triangle ABC$ is constructed

v). Draw perpendiculars from A to $\overline{BC}$, B to $\overline{CA}$ & C to $\overline{AB}$

vi). $\overline{AD}$, $\overline{BE}$ & $\overline{CF}$ are altitudes. These altitudes passes through the same point. thus altitudes of a triangle are concurrent.

Example 8: Construct $\triangle KLM$ whose $\overline{KL}$ =5.8cm, $\overline{LM}$ =6cm & $m\angle L = 60^o$. Draw its Right bisectors and verify their concurrency.

Sol: Given $\overline{KL}$ =5.8cm, $\overline{LM}$ =6cm & $m\angle L = 60^o$

Required: Right bisectors of a $\triangle ABC$ are concurrent.
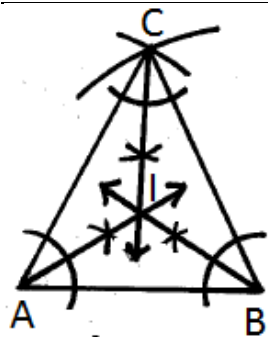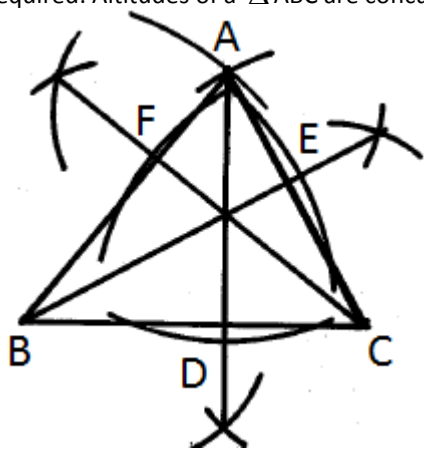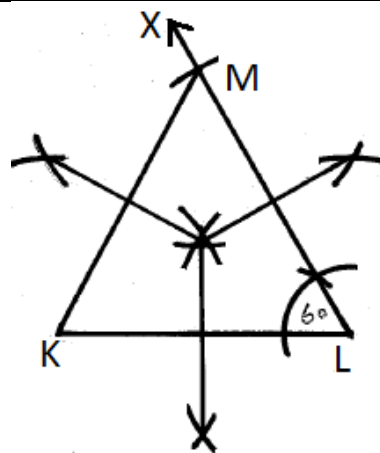

Steps of construction:

i). Draw a line segment $\overline{KL}$ =5.8cm

ii). At point L draw an angle $m\angle KLX = 60^o$

iii). At point L Draw an arc of radius 6cm which intersect the ray $\overrightarrow{LX}$ at M.

iv). Join K to M. $\triangle KLM$ is constructed

v). Draw perpendiculars Bisectors of the sides $\overline{KL}, \overline{LM}$ & $\overline{MK}$ These right bisectors passes through the same point. thus right bisectors of a triangle are concurrent.
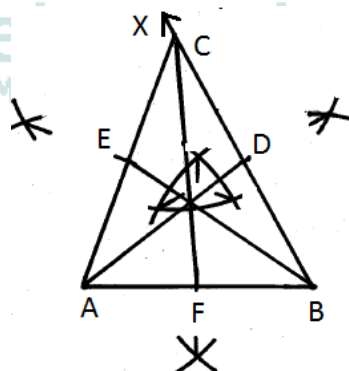
Example 9: Construct $\triangle ABC$ whose $\overline{AB}$ =6cm, $m\angle A = 70^o$ & $m\angle C = 50^o$. Draw its medians and verify their concurrency.

Sol: Given $\overline{AB}$ =6cm, $m\angle A = 70^o$ & $m\angle C = 50^o$

Required: medians of $\triangle ABC$ are concurrent. First find

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

$$70^o + m\angle B + 50^o = 180^o$$

$$m\angle B = 180^o - 70^o - 40^o = 60^o$$

Steps of construction:

i). Draw a line segment $\overline{AB}$ =6cm

ii). At point B draw an angle $m\angle ABX = 60^o$

iii). At point A Draw an angle $m\angle A = 70^o$

iv). $\triangle ABC$ is constructed

v). By method of right bisectors of the side we find the mid points D,E & F of the sides of triangle

vi). By joining A to D, B to E & C to F medians are constructed these medians passes through the same point. thus medians of a triangle are concurrent.

Exercise 17.2

Q1: i). Construct $\triangle ABC$ whose $\overline{AB}$ =4.5cm, $\overline{BC}$ =3.1cm & $\overline{CA}$ =5.2cm. Draw angle bisectors of the triangle & verify their concurrency.

Sol: Given $\overline{AB}$ =4.5cm, $\overline{BC}$ =3.1cm & $\overline{CA}$ =5.2cm

Required: Angle bisectors of a $\triangle$ ABC are concurrent.

Steps of construction:

i). Draw a line segment $\overline{AB} = 4.5$ cm

ii). At point A draw an arc of radius 5.2cm

iii). At point B Draw an arc of radius 3.1cm which intersect at C.

iv). Join C to A & B. $\triangle$ABC is constructed

v). Draw bisectors of angles A,B & C. these bisectors passes through the same point I. thus angle bisectors of a triangle are concurrent.

Q1: ii). Construct $\triangle$ whose $\overline{AB} = \overline{BC} = \overline{CA}$ =12cm. Draw angle bisectors of the triangle & verify their concurrency.

Sol: Given $\overline{AB} = \overline{BC} = \overline{CA}$ =12cm

Required: Angle bisectors of a $\triangle$ ABC are concurrent.

Steps of construction:

i). Draw a line segment $\overline{AB} = 12$ cm

ii). At point A draw an arc of radius 12cm

iii). At point B Draw an arc of radius 12cm which intersect at C.

iv). Join C to A and B, $\triangle$ABC is constructed

v). Draw bisectors of angles A,B & C. these bisectors passes through the same point I. thus angle bisectors of a triangle are concurrent.

Q1: iii) Construct $\triangle$ABC whose $m\angle A = 45^o$, $m\angle C = 75^o$ & $\overline{CA}$ =5.8cm. Draw angle bisectors of the triangle & verify their concurrency.

Sol: Given $m\angle A = 45^o$, $m\angle C = 75^o$ & $\overline{CA}$ =5.8cm

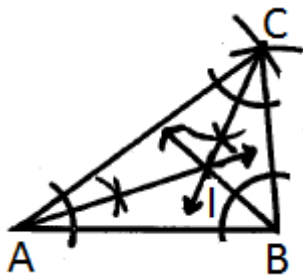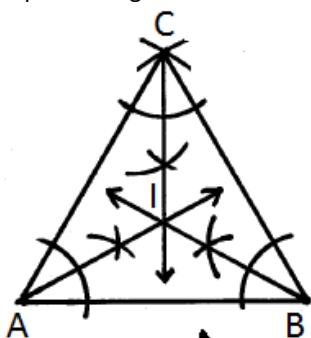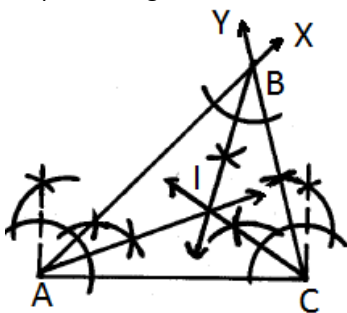Required: Angle bisectors of a $\triangle$ ABC are concurrent.

Steps of construction:

i). Draw a line segment $\overline{CA} = 5.8$ cm

ii). At point A draw an angle $m\angle CAX = 45^o$

iii). At point C Draw an angle $m\angle ACY = 75^o$ which intersect the ray $\overrightarrow{AX}$ at B

iv). $\triangle$ABC is constructed

v). Draw bisectors of angles A,B & C. these bisectors passes through the same point I. thus angle bisectors of a triangle are concurrent.

Q2: i). Construct $\triangle$PQR whose $\overline{PQ}$ =6cm, $\overline{QR}$ =4.5cm and $\overline{PR}$ =5.5cm. Draw its altitudes of the triangle & verify their concurrency.

Sol: Given $\overline{PQ}$ =6cm, $\overline{QR}$ =4.5cm & $\overline{PR}$ =5.5cm

Required: Altitudes of a $\triangle$ PQR are concurrent.
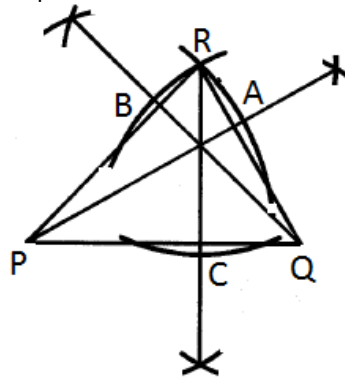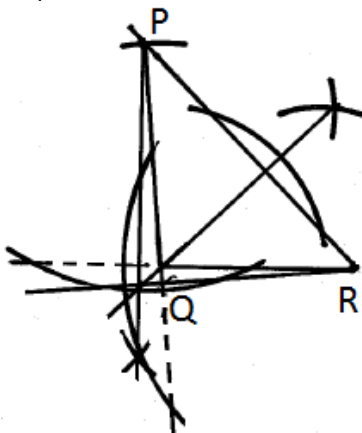

Steps of construction:

i). Draw a line segment $\overline{PQ} = 6$ cm

ii). At point P draw an arc of radius 5.5cm

iii). At point Q Draw an arc of radius 4.5cm which intersect at R.

iv). Join R to P and Q. $\triangle$PQR is constructed

v). Draw perpendiculars from P to $\overline{QR}$, Q to $\overline{PR}$ & R to $\overline{PQ}$ these altitudes $\overline{PA}$, $\overline{QB}$ & $\overline{RC}$ passes through the same point. thus altitudes of a triangle concurrent.

Q2: ii). Construct $\triangle$PQR whose $\overline{PQ}$ =4.5cm, $\overline{QR}$ =3.9cm & $m\angle R = 45^o$. Draw its altitudes of the triangle & verify their concurrency.

Sol: Given $\overline{PQ}$ =4.5cm, $\overline{QR}$ =3.9cm & $m\angle R = 45^o$

Required: Altitudes of a $\triangle$ PQR are concurrent.

Steps of construction:

i). Draw a line segment $\overline{QR} = 3.9$ cm

ii). At point R draw an angle $m\angle R = 45^o$

iii). At point Q Draw an arc of radius 4.5cm which intersect at P.

iv). Join P to Q. $\triangle$PQR is constructed

v). Draw perpendiculars from P to $\overline{QR}$, Q to $\overline{PR}$ & R to $\overline{PQ}$ these altitudes same point. thus altitudes of a triangle are concurrent.

Q2: iii). Construct $\triangle$ PQR whose $\overline{PQ}$ =6cm, $m\angle P = 70^o$ & $m\angle Q = 65^o$. Draw its altitudes of the triangle & verify that these are concurrent.

Sol: Given $\overline{PQ}$ =6cm, $m\angle P = 70^o$ & $m\angle Q = 65^o$

Required: Altitudes of a $\triangle$ PQR are concurrent.
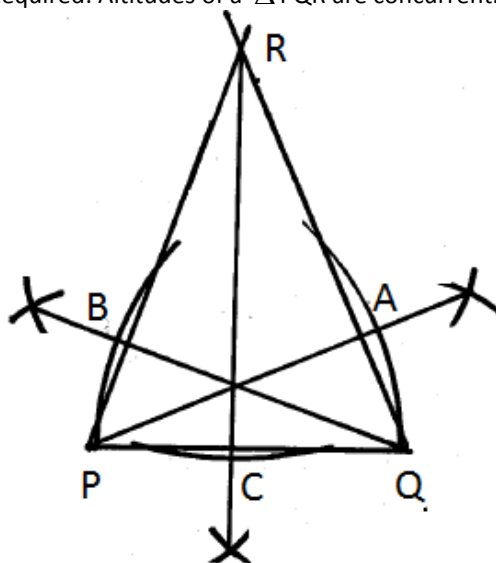
Steps of construction:

i). Draw a line segment $\overline{PQ}$ = 6 cm

ii). At point P draw an angle $m\angle P = 70^o$

iii). At point Q Draw an angle $m\angle Q = 65^o$ which intersect at R.

iv). $\triangle$ PQR is constructed

v). Draw perpendiculars from P to $\overline{QR}$, Q to $\overline{PR}$ & R to $\overline{PQ}$ these altitudes $\overline{PA}$, $\overline{QB}$ & $\overline{RC}$ passes through the same point. thus altitudes of a triangle are concurrent.

Q3: i). Construct $\triangle$ UVW whose $\overline{UV}$ =7cm, $\overline{VW}$ =6.5cm & $\overline{WU}$ =5.8cm. Draw its perpendicular bisectors and & verify their concurrency.

Sol: Given $\overline{UV}$ =7cm, $\overline{VW}$ =6.5cm & $\overline{WU}$ =5.8cm
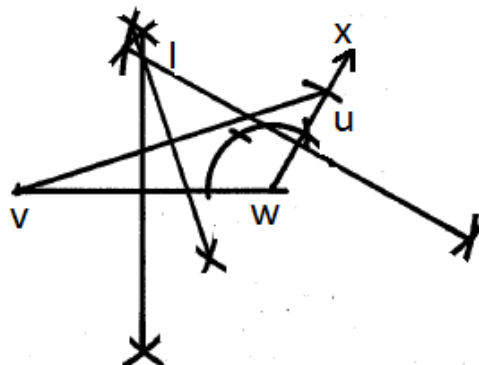
Required: Perpendicular bisectors are concurrent
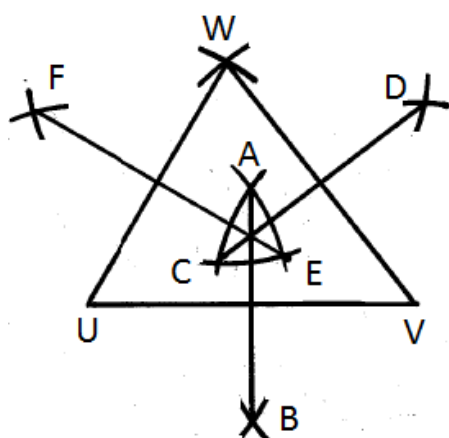
Steps of construction:

i). Draw a line segment $\overline{UV}$ =7cm

ii). At point V draw an arc of radius $\overline{VW}$ =6.5cm

iii). At point U Draw an arc of radius $\overline{WU}$ =5.8cm

iv). Join W to U & V. $\triangle$ UVW is constructed

v). Draw perpendiculars Bisectors of the sides $\overline{UV}$, $\overline{VW}$ & $\overline{UW}$ These right bisectors passes through the same point. Thus right bisectors of a triangle are concurrent.

Q3: ii). Construct $\triangle$ UVW whose $\overline{VW}$ =10cm, $\overline{WU}$ =4.2cm & $m\angle W = 120^o$. Draw its Right bisectors & verify their concurrency.

Sol: Given $\overline{VW}$ =10cm, $\overline{WU}$ =4.2cm & $m\angle W = 120^o$

Required: Perpendicular bisectors are concurrent

Steps of construction:

i). Draw a line segment $\overline{VW}$ =10cm

ii). At point W draw an angle $m\angle W = 120^o$

iii). At point W Draw an arc of radius 4.2cm

iv). Join V to U. $\triangle$ UVW is constructed

v). Draw perpendiculars Bisectors of the sides $\overline{UV}$, $\overline{VW}$ & $\overline{UW}$ These right bisectors passes through the same point. Thus right bisectors of a triangle are concurrent.

Q3: iii). Construct $\triangle$ UVW whose $\overline{UV} = \overline{VW} = \overline{WU}$ =0.8dm. Draw its perpendicular bisectors and & verify their concurrency.

Sol: Given $\overline{UV} = \overline{VW} = \overline{WU}$ =0.8dm=8cm

Required: Perpendicular bisectors are concurrent
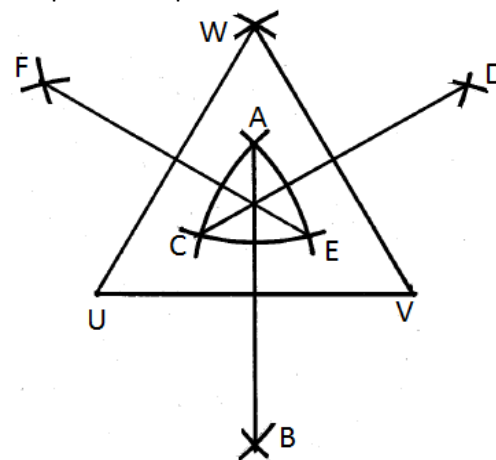
Steps of construction:

i). Draw a line segment $\overline{UV}$ =8cm

ii). At point U Draw an arc of radius 8cm

iii). At point V Draw an arc of radius 8cm which intersect at W

iv). Join W to V & U. $\triangle$ UVW is constructed

v). Draw perpendiculars Bisectors of the sides $\overline{UV}$, $\overline{VW}$ & $\overline{UW}$ These right bisectors passes through the same point. Thus right bisectors of a triangle are concurrent.
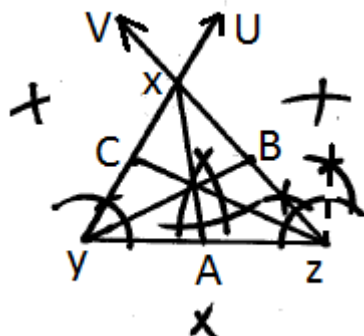
Q4: i). Construct $\triangle$ XYZ whose $\overline{YZ}$ =4.1cm, $m\angle Y=60^{o}$ & $m\angle X=75^{o}$. Draw their medians and & verify their concurrency.

Sol: Given $\overline{YZ}$ =4.1cm, $m\angle Y=60^{o}$ & $m\angle X=75^{o}$

Required: Medians are concurrent

$$m\angle X + m\angle Y + m\angle Z = 180^{o}$$

$$75^{o} + 60^{o} + m\angle Z = 180^{o}$$

$$m\angle Z = 180^{o} - 75^{o} - 60^{o} = 45^{o}$$

Steps of construction:

i). Draw a line segment $\overline{YZ}$ = 4.1cm

ii). At point Y draw an angle $m\angle ZYU = 60^{o}$

iii). At point Z Draw an angle $m\angle YZV = 45^{o}$

iv). $\triangle$ XYZ is constructed

v). By method of right bisectors of the side we find the mid points A,B & C of the sides of triangle

vi). By joining A to X, B to Y & C to Z medians are constructed these medians passes through the same point. thus medians of a triangle are concurrent.

Q4: ii). Construct $\triangle$ XYZ whose $\overline{ZX}$ =4.3cm, $m\angle Y=45^{o}$ & $m\angle X=75^{o}$. Draw their medians and & verify their concurrency.

Sol: Given $\overline{ZX}$ =4.3cm, $m\angle Y=45^{o}$, $m\angle X=75^{o}$

Required: Medians are concurrent, First find

$$m\angle X + m\angle Y + m\angle Z = 180^{o}$$

$$75^{o} + 45^{o} + m\angle Z = 180^{o}$$

$$m\angle Z = 180^{o} - 75^{o} - 45^{o} = 60^{o}$$

Steps of construction:

i). Draw a line segment $\overline{ZX}$ = 4.3cm

ii). At point X draw an angle $m\angle X=75^{o}$

iii). At point Z Draw an angle $m\angle Z=60^{o}$

iv). $\triangle$ XYZ is constructed

v). By method of right bisectors of the side we find the mid points A,B & C of the sides of triangle

vi). By joining A to X, B to Y & C to Z medians are constructed these medians passes through the same point. thus medians of a triangle are concurrent.
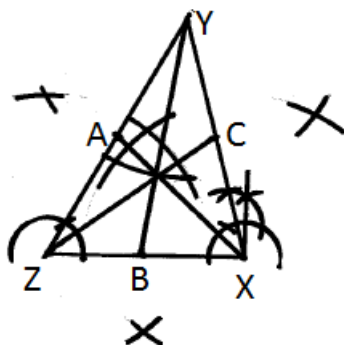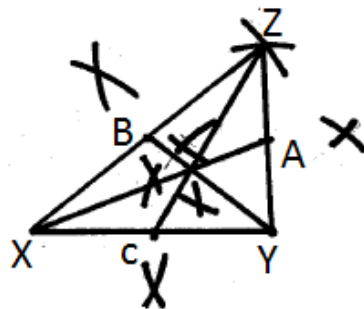
Q4: iii). Construct $\triangle$ XYZ whose $\overline{XY}$ =4.5cm, $\overline{YZ}$ =3.4cm & $\overline{ZX}$ =5.6cm. Draw their medians and & verify their concurrency.

Sol: Given $\overline{XY}$ =4.5cm, $\overline{YZ}$ =3.4cm & $\overline{ZX}$ =5.6cm

Required: Medians are concurrent

Steps of construction:
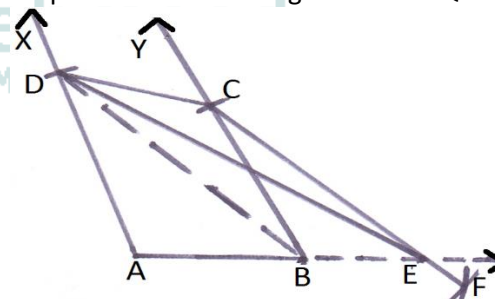
i). Draw a line segment $\overline{XY}$ = 4.5cm

ii). At point X draw an arc of radius 5.6cm

iii). At point Y Draw an arc of radius 3.4cm which intersect at Z.

iv). Join Z to X & Y. $\triangle$ XYZ is constructed

v). By method of right bisectors of the side we find the mid points A,B & C of the sides of triangle

vi). By joining A to X, B to Y & C to Z medians are constructed these medians passes through the same point. thus medians of a triangle are concurrent.

Exercise 17.3

Q1:Draw a quadrilateral ABCD, such that $m\overline{AB}=3cm$ $m\overline{BC}=3.5cm, m\overline{AD}=4cm$ $m\angle B=60^{o}, m\angle A=110^{o}$ Construct a triangle equal in area to quadrilateral.

Sol: Given $m\overline{AB}=3cm$, $m\angle B=60^{o}, m\angle A=110^{o}$

$m\overline{BC}=3.5cm, m\overline{AD}=4cm$

Required: Area of Triangle= Area of Quadrilateral

Steps of construction:

i). Draw a line segment $m\overline{AB}=3cm$

ii). At point B construct an angle $m\angle ABY=60^{o}$

iii). At point A construct an angle $m\angle BAX=110^{o}$

iv). At D draw an arc of radius 4cm which intersect the ray $\overrightarrow{AX}$ at D and at B draw an arc of radius 3.5cm which intersect the ray $\overrightarrow{BY}$ at C, Join C to D

v). quadrilateral ABCD is constructed.

vi). Join B to D with dotted line

vii). At C draw an arc of radius $=\overline{BD}$, at B d0raw another arc of radius $=\overline{CD}$ which intersects at F. Join C to F to get $\overrightarrow{BD}\|\overrightarrow{CF}$ to meet $\overrightarrow{AB}$ at E

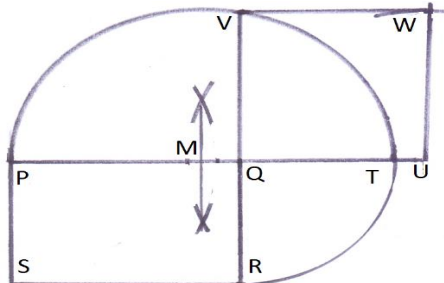vii). Join D to E we get required triangle

∴   area of quadrilateral = area of triangle

Q2: Draw a rectangle PQRS such that $m\overline{PQ}=5cm$ and $m\overline{QR}=3.5cm$ construct a square equal in area to the rectangle PQRS

Sol: Given adjacent sides of rectangle

$m\overline{PQ} = 5cm$ and $m\overline{QR} = 3.5cm$

Required: Area of rectangle=Area of square

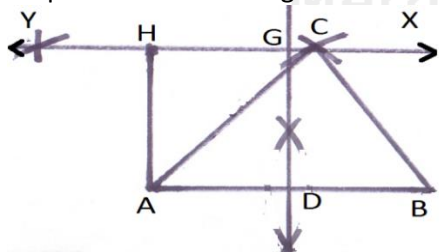Steps of construction.

i). Draw a line segment $m\overline{SR} = 5cm$

ii). At point S and R draw an angle of 90°

iii). At R and S draw an arc of radius 3.5cm which intersect at P and Q.

iv). By Joining P to Q. Rectangle PQRS is constructed

v). At Q draw arc of radius QR which intersect $\overrightarrow{PQ}$ at T

vi). Draw right bisector of $\overline{PT}$ which intersect at M

vii). At M draw a semi-circle which intersect $\overrightarrow{QR}$ at V

viii). At Q draw an arc of radius QV which intersect

$\overrightarrow{PQ}$ at U, similarly at U and V which intersects at W

$\therefore$ Area of rectangle PQRS = Area of Square QUVW

Q3: Draw a triangle ABC such that $m\overline{AB} = 5cm$

$m\overline{BC} = 4cm$ and $m\overline{CA} = 4.5cm$ Construct a rectangle equal in area to the given triangle

Sol: Given $m\overline{AB} = 5cm$ $m\overline{BC} = 4cm$ & $m\overline{CA} = 4.5cm$

Required: Area of triangle = Area of rectangle

Steps of constructions
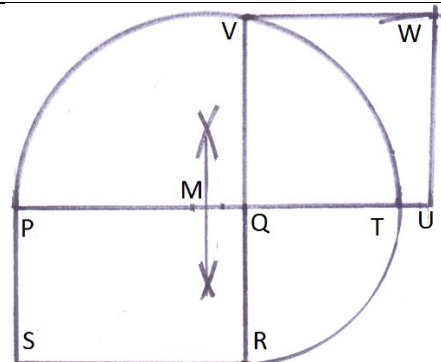
i). Draw a line segment $m\overline{AB} = 5cm$

ii). At B and A draw an arc of radius 4cm & at A draw an arc of radius 4.5cm which intersects at C

iii). Join C to A and B, i.e. $\triangle ABC$ is formed

iv). At C draw an arc of radius 5cm which cuts at Y

v). Join C to Y and extended to get $\overrightarrow{AB} \| \overrightarrow{XY}$

vi). Draw right bisector of AB which passes through D and intersect XY at G

vi). At G draw an arc of radius AD which intersects

$\overrightarrow{XY}$ at H. Join A to H

$\therefore$ Area of triangle ABC = area of rectangle ADGH

Q4. Construct a square having area equal to the given rectangle.

Sol: Let adjacent sides of rectangle $m\overline{PQ} = 5cm$

and $m\overline{QR} = 3.5cm$

Required: Area of rectangle=Area of square

Steps of construction.

i). Draw a line segment $m\overline{SR} = 5cm$

ii). At point S and R draw an angle of 90°

iii). At R and S draw an arc of radius 3.5cm which intersect at P and Q.

iv). By Joining P to Q. Rectangle PQRS is constructed

v). At Q draw arc of radius QR which intersect $\overrightarrow{PQ}$ at T

vi). Draw right bisector of $\overline{PT}$ which intersect at M

vii). At M draw a semi-circle which intersect $\overrightarrow{QR}$ at V

viii). At Q draw an arc of radius QV which intersect

$\overrightarrow{PQ}$ at U, similarly at U and V which intersects at W

$\therefore$ Area of rectangle PQRS = Area of Square QUVW

Q5. Construct a square equal in area to a rectangle whose adjacent side are 4.5cm and 2.2cm respectively. Measure the sides of square and find its area and compare with the rectangle.

Sol: Given adjacent sides of rectangle are 4.5cm & 2.2cm

Required: area of rectangle=area of square
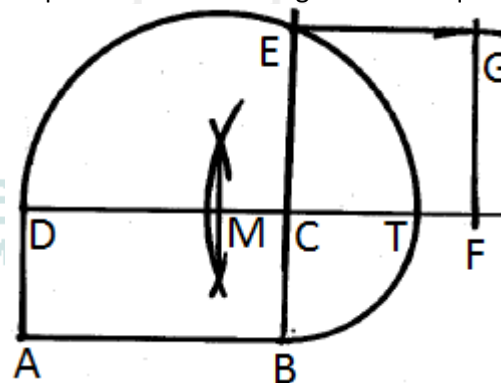
Steps of construction.

i). Draw a line segment $m\overline{AB}$ = 4.5cm

ii). At point A and B draw an angle of 90°

iii). At A and B draw an arc of radius 2.2cm which intersect at C and D.

iv). By Joining C to D. Rectangle ABCD is constructed

v). At C draw arc of radius BC which intersect $\overrightarrow{DC}$ at T

vi). Draw right bisector of $\overline{DT}$ which intersect at M

vii). At M draw a semi-circle which intersect $\overrightarrow{BC}$ at E

viii). At C draw arc of radius CE which intersect $\overrightarrow{DC}$ at F, similarly at C and E draw arc which intersects at G

$\therefore$ Area of rectangle ABCD = Area of Square CFGE

$$m\overline{AB} \times m\overline{BC} = \left(m\overline{CF}\right)^2$$
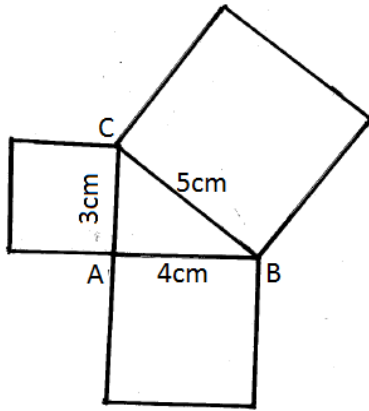
$$4.5cm \times 2.2cm = \left(3.15cm\right)^2$$

$$9.9cm^2 = 9.9cm^2$$

Q6. Construct a square equal in area in the sum of two square having sides 3cm and 4cm respectively.

Sol: Given squares having sides 3cm and 4cm

Required: Make a new square whose are equal to area of given square

Steps of construction:

i). Draw a line segment $\overline{AB}$ =4cm
ii). At A draw an arc of radius 3cm
iii). At B draw an arc of radius 5cm which intersect at C.
iv) draw square on each side of triangle
Hence
Sum of square of the sides = square of the hypotenuse

$$4^2 + 3^2 = 5^2$$
$$16 + 9 = 25$$
$$25 = 25$$

Q7. Construct a triangle having base 3.5cm and other two sides equal to 3.4cm and 3.8cm respectively. transform it into an equal square.
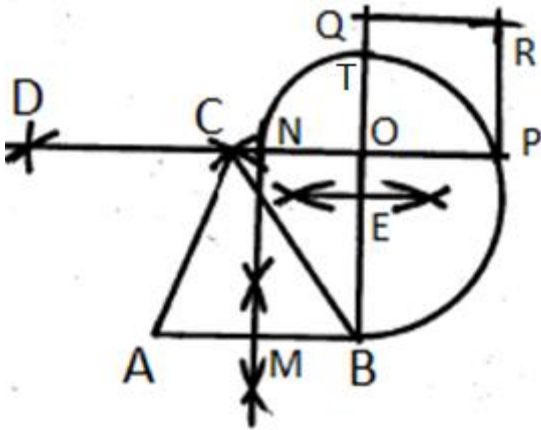
Steps of constructions

i). Draw a line segment $m\overline{AB}$ =3.5cm
ii). At B and A draw an arc of radius 3.8cm & at A draw an arc of radius 3.4cm which intersects at C
iii). Join C to A and B, i.e. $\triangle ABC$ is formed
iv). At C draw an arc of radius 3.5cm which cuts at D
v). Join C to D and extended to get $\overrightarrow{AB} \| \overrightarrow{CD}$
vi). Draw right bisector of AB which passes through M and intersect CD at N
vi). At N draw an arc of radius AM which intersects CD at O. Join O to B
vii). At O draw arc of radius ON which cut $\overrightarrow{OB}$ at T
viii). Draw right bisector of $\overline{BT}$ which intersect at E
ix). At E draw a semi-circle which intersect $\overrightarrow{CD}$ at P
x). At O draw an arc of radius OP which cut $\overrightarrow{OB}$ at Q, similarly at P and Q draw an arc which cut at R
∴ Area of triangle ABC = Area of Square OPWQ

Q8. Construct a triangle having base 5cm and other sides equal to 5cm and 6cm. also construct a square equal in area to the given triangle.
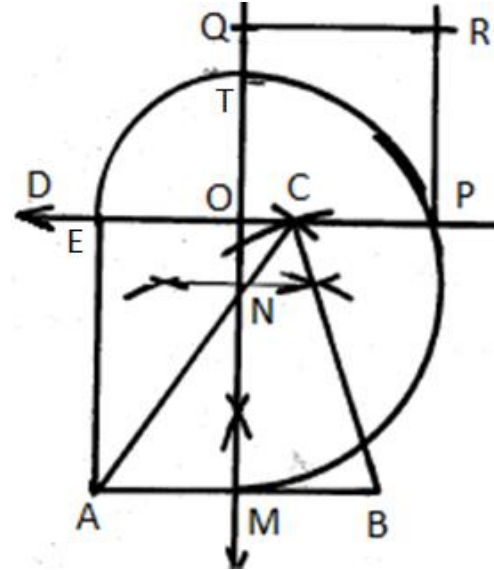

Steps of constructions

i). Draw a line segment $m\overline{AB}$ =5cm
ii). At B and A draw an arc of radius 5cm & at A draw an arc of radius 6cm which intersects at C
iii). Join C to A and B, i.e. $\triangle ABC$ is formed
iv). At C draw an arc of radius 5cm which cuts at D
v). Join C to D and extended to get $\overrightarrow{AB} \| \overrightarrow{CD}$
vi). Draw right bisector of AB which passes through M and intersect CD at O
vi). At O draw an arc of radius AM which intersects CD at E. Join A to E
vii). At O draw arc of radius OE which cut $\overrightarrow{OM}$ at T
viii). Draw right bisector of $\overline{MT}$ which intersect at N
ix). At N draw a semi-circle of radius MN which cut $\overrightarrow{CD}$ at P
x). At O draw an arc of radius OP which cut $\overrightarrow{OM}$ at Q, similarly at P and Q draw an arc which cut at R
∴ Area of triangleABC = Area of Square OPWQ

Review Exercise 17

Q1: Select the correct answer.
i). What is first step in constructing an angle bisector
a). Draw a ray b). Measure the line
c). label the point of intersection
d). Place the compass point on the vertex
ii). What is geometric construction shown in figure
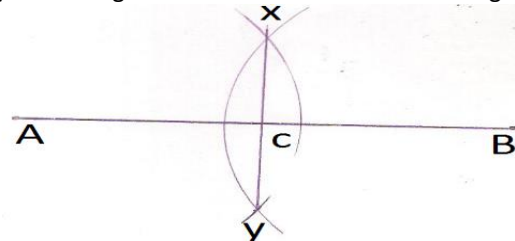
a). A line parallel to a given line
b). An angle congruent to a given angle
c). An angle bisector
d). A perpendicular bisector
iii). A line segment joining the midpoint of one side of a triangle to its opposite vertex is called
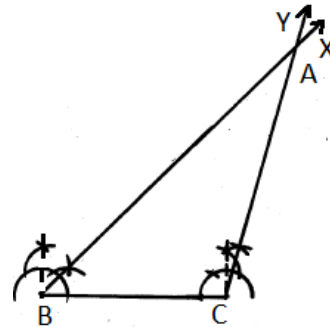a). Right bisector b). Median
c). Altitude d). Angle bisector

iv). You are looking at a triangle orthocenter, centroid and circumcenter are all the same point. What type of triangle are you looking at?

a).   Scalene   b).   Isosceles
c).   Equilateral   d).   Right angled

v). The centroid of a triangle divides the medians into the ratio of

a).   2:1   b).   3:1
c).   4:1   d).   5:1

vi). The centroid of a triangle divides the median into the ratio of

a).   2:1   b).   3:1
c).   4:1   d).   5:1

vi). A line which is perpendicular to a line segment at its midpoint is called a/an

a).   Right bisector b).   Median
c).   Altitude   d).   Angle bisector

vii). The point of intersection of the bisectors of the angles of a triangle is equidistant from the .... Of the triangle

a).   Vertices   b).   Sides
c).   Altitudes   d).   Medians

viii). Altitude of a triangle are ....

a). equal in length   b). concurrent
c). equidistant from the vertices
d). Perpendicular bisector

ix). If Measure of three angles of a triangle are known how many triangles can be constructed?

a).   Only one triangle b). Two triangles
c).   No Triangle   d).   Infinite triangles

x). the point of intersection of the perpendicular bisectors of the sides of a triangle is equidistant from the .... Of the triangle.

a).   Altitude   b).   Medians
c).   Sides   d).   Vertex

Q2. Construct $\triangle$ABC such that $\overline{AB}$ =3.7cm, $\overline{BC}$ =2.5cm and $m\angle B = 50^{o}$

Sol: Given $\overline{AB}$ =3.7cm, $\overline{BC}$ =2.5cm , $m\angle B = 50^{o}$
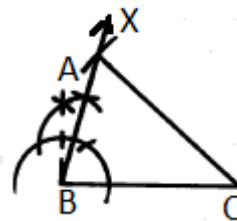Required: Construct triangle ABC
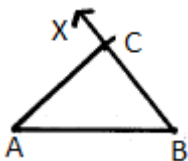
Step of construction:

i). Draw a line segment $\overline{AB}$ =3.7cm

ii). At point B draw an angle $m\angle ABX = 50^{o}$

iii). At Point B draw an arc of radius 2.5cm which cuts at C

iv). Join A to C.

v). $\triangle$ABC is constructed

Q3. Construct $\triangle$ABC such that $\overline{BC}$ =5.8cm $m\angle A = 30^{o}$ and $m\angle B = 45^{o}$

Sol: Given $\overline{BC}$ =5.8cm $m\angle A = 30^{o}$, $m\angle B = 45^{o}$
Required: Construct Triangle ABC

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

$30^{o} + 45^{o} + m\angle C = 180^{o}$
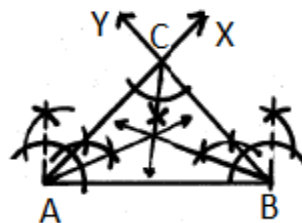
$m\angle C = 180^{o} - 30^{o} - 45^{o} = 105^{o}$

Step of construction:

i). Draw a line segment $\overline{BC}$ =5.8cm

ii). At point B draw an angle $m\angle CBX = 45^{o}$

iii). At point C draw an angle $m\angle BCY = 105^{o}$ which cuts at A

Iv). $\triangle$ABC is constructed

Q4. Construct $\triangle$ABC such that $\overline{AC}$ =4.5cm, $\overline{BC}$ =4.1cm and $m\angle B = 75^{o}$

Sol: Given $\overline{AC}$ =4.5cm, $\overline{BC}$ =4.1cm& $m\angle B = 75^{o}$
Required: Construct $\triangle$ABC

Step of construction:

i). Draw a line segment $\overline{BC}$ =4.1cm

ii). At point B draw an angle $m\angle CBX = 75^{o}$

iii). At point C draw an arc of radius 4.5cm which cuts at A

iv). $\triangle$ABC is constructed

Q5. Construct $\triangle$ABC, Draw their angle bisectors and verify their concurrency when $\overline{AB}$ =3.5cm, $m\angle A = 45^{o}$ and $m\angle B = 45^{o}$

Sol: Given $\overline{AB}$ =3.5cm, $m\angle A = 45^{o}$ & $m\angle B = 45^{o}$
Required: Angles bisectors are concurrent.

Step of construction:

i). Draw a line segment $\overline{AB}$ =3.5cm

ii). At point A draw an angle $m\angle BAX = 45^{o}$

iii). At point B draw an angle $m\angle ABY = 45^{o}$ which intersect at C

iv). $\triangle$ABC is constructed

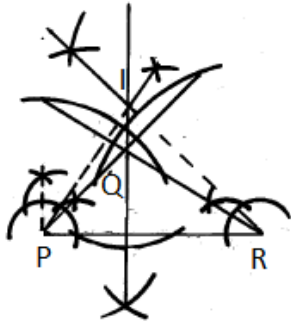v). Draw angles bisectors of A,B,C which passes through the same point. Thus angle bisectors are concurrent.

Q6. Construct $\triangle$PQR, Draw their altitudes and verify their concurrency when $\overline{PR}$ =5.8cm, $m\angle P = 45^{o}$ and $m\angle Q = 105^{o}$

Sol: Given $\overline{PR}$ =5.8cm, $m\angle P = 45^{o}$, $m\angle Q = 105^{o}$
Required: Altitudes of a triangle are concurrent

$m\angle P + m\angle Q + m\angle R = 180^{o}$

$45^{o} + 105^{o} + m\angle R = 180^{o}$

$m\angle R = 180^{o} - 45^{o} - 105^{o} = 30^{o}$

Step of construction:

i). Draw a line segment $\overline{PR}$ =5.8cm

ii). At point P draw an angle $m\angle P = 45^{o}$

iii). At point R draw an angle $m\angle R = 30^{o}$ which intersect at Q

Iv). $\triangle PQR$ is constructed

v). Draw altitudes From P to QR, R to PQ & Q to PQ which intersect at the same point I. Thus altitudes of the $\triangle PQR$ are concurrent.
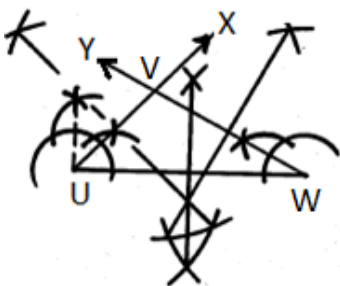
Q7. Construct $\triangle UVW$, Draw their Perpendicular bisectors and verify their concurrency when $\overline{UW}$ =5.8cm, $m\angle U = 45^{o}$ and $m\angle V = 105^{o}$

Sol: Given $\overline{UW}$ =5.8cm $m\angle U = 45^{o}$ & $m\angle V = 105^{o}$

Required: Right bisector of the $\triangle$ are concurrent

$m\angle U + m\angle V + m\angle W = 180^{o}$

$45^{o} + 105^{o} + m\angle W = 180^{o}$

$m\angle W = 180^{o} - 105^{o} - 45^{o} = 30^{o}$

Step of construction:

i). Draw a line segment $\overline{UW}$ =5.8cm

ii). At point U draw an angle $m\angle WUX = 45^{o}$

iii). At point W draw an angle $m\angle UWY = 30^{o}$ which intersect at V

Iv). $\triangle UVW$ is constructed

v). Draw right bisectors of UV, VW & UW which intersect at the same point. Thus Right bisectors of the $\triangle PQR$ are concurrent.
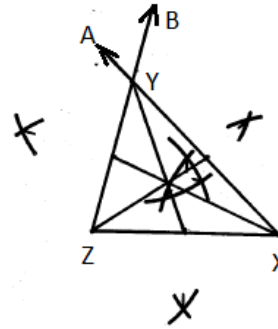
Q8. Construct $\triangle XYZ$, Draw their medians and verify their concurrency when $\overline{ZX}$ =6cm, $m\angle Y = 60^{o}$ and $m\angle Z = 75^{o}$

Sol: Given $\overline{ZX}$ =6cm, $m\angle Y = 60^{o}$ & $m\angle Z = 75^{o}$

Required: Medians of $\triangle$ are concurrent

$m\angle X + m\angle Y + m\angle Z = 180^{o}$

$m\angle X + 60^{o} + 75^{o} = 180^{o}$

$m\angle X = 180^{o} - 75^{o} - 60^{o} = 45^{o}$


Step of construction:

i). Draw a line segment $\overline{ZX}$ =3.5cm

ii). At point Z draw an angle $m\angle XZB = 75^{o}$

iii). At point X draw an angle $m\angle ZXA = 45^{o}$ which intersect at Y

iv). $\triangle XYZ$ is constructed

v). Find midpoint of ZX,XY & ZY and then joining the opposite vertex Y,Z & X which passes through same point. Thus Medians are concurrent.

Q4: Draw a triangle PQR such that $\overline{PQ}$ =5.6cm, $\overline{QR}$ =4.5cm & $m\overline{PR} = 3.4cm$ Construct a triangle SPQ equivalent in area to the triangle PQR.

Sol: Given $\overline{PQ}$ =5.6cm, $\overline{QR}$ =4.5cm $m\overline{PR} = 3.4cm$

Required: Area of Triangle PQR = Area of Triangle PQS
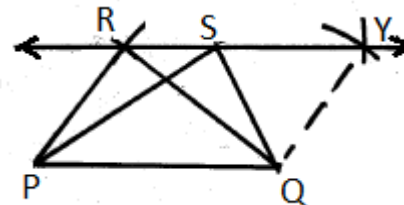
i). Draw a line segment $m\overline{PQ} = 5.6cm$

ii). At Q draw an arc of radius 4.5cm and at P draw an arc of radius 3.4cm which intersects at R

iii). Join R to P and Q, i.e. $\triangle PQR$ is formed

iv). At Q draw an arc of radius 3.4cm and at R draw an arc of radius 5.6cm which intersects at Y. Join R to Y we get $\overline{PQ} \| \overline{RY}$

v). Take any point S on $\overrightarrow{XY}$ and join to P and Q.

Q10: Construct a rectangle whose adjacent sides are 2.5cm & 5cm respectively.

Sol: Given adjacent sides of rectangle 2.5cm & 5cm

Required: Draw a rectangle
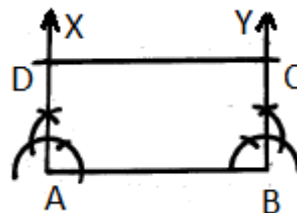
Step of construction:

i). Draw a line segment $\overline{AB}$ =5cm

ii). At point A draw an angle $m\angle BAX = 90^{o}$

iii). At point A draw an angle $m\angle ABY = 90^{o}$

iv). Draw an arc of radius 2.5cm at A and B which cut at C and D

v). Jion C to D

vi). Rectangle ABCD is constructed.