

Constructions of Triangles

Practice set 4.1

Q. 1. Construct ΔPQR , in which $QR = 4.2\text{cm}$, $\angle Q = 40^\circ$ and $PQ + PR = 8.5\text{cm}$

Answer : Given: base $QR = 4.2\text{cm}$, $PQ + PR = 8.5\text{cm}$ and

$\angle Q = 40^\circ$ of ΔPQR .

Required: To construct a ΔPQR

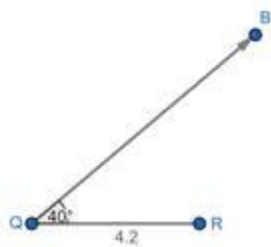
Steps of construction:

s

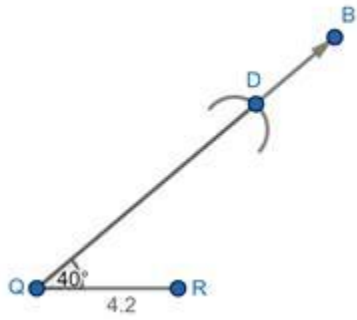
i: Draw a segment QR of length of 4.2cm .



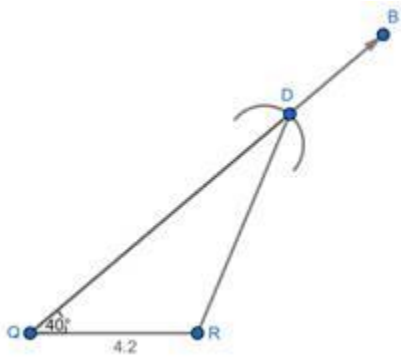
ii: At vertex Q , construct $\angle Q = 40^\circ$ and produce a ray QB .



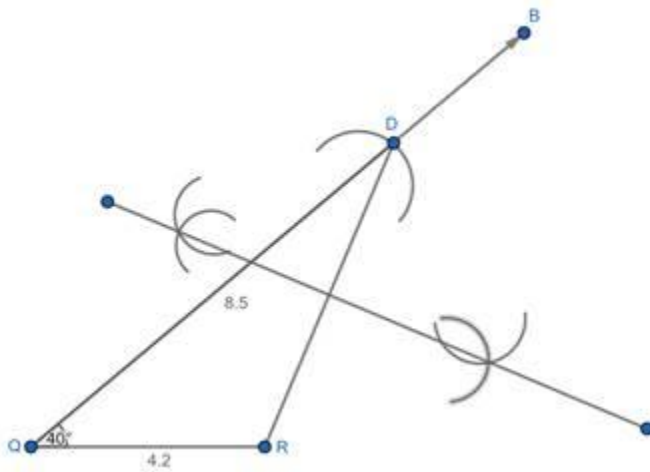
iii: Mark an arc on ray QB cutting at D such that $QD = 8.5\text{cm}$.



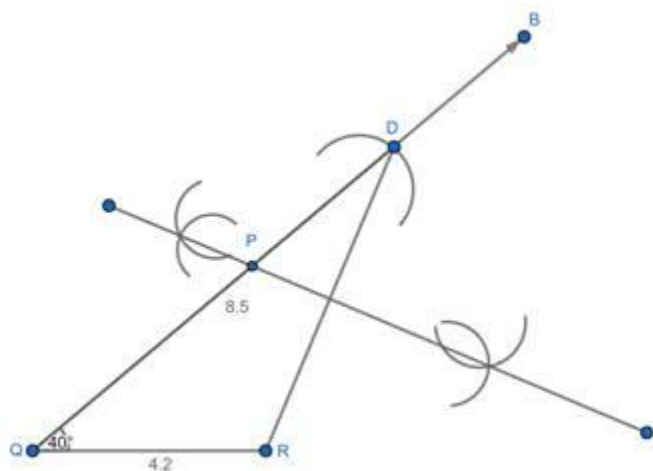
iv: Draw segment DR.



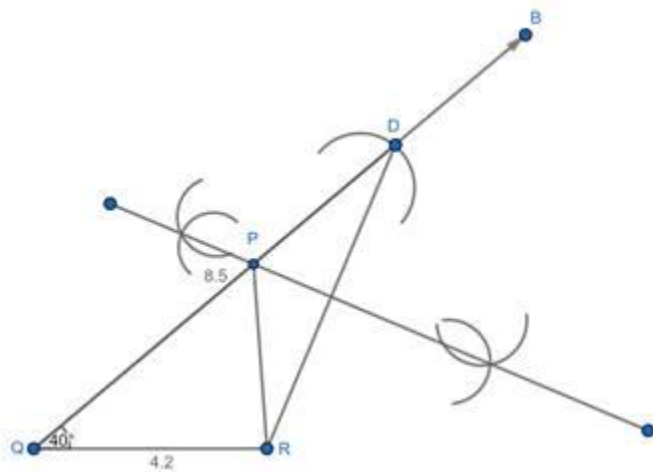
v: Construct the perpendicular bisector of segment DR.



vi: Name the point of intersection of ray QB and the perpendicular bisector of DR as P.



vii: Draw segment RP.



ΔPQR is the required triangle.

Q. 2. Construct ΔXYZ , in which $YZ = 6\text{cm}$, $XY + XZ = 9\text{cm}$ and $\angle Y = 50^\circ$

Answer : Given:

base $YZ = 6\text{cm}$,

$XY + XZ = 9\text{cm}$ and

$\angle Y = 50^\circ$

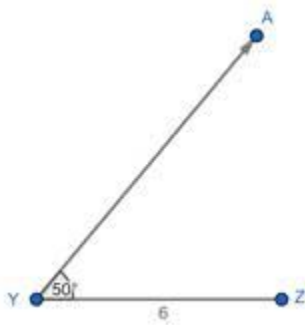
Required: To construct a ΔXYZ

Steps of construction:

i: Draw a segment YZ of length of 6cm.



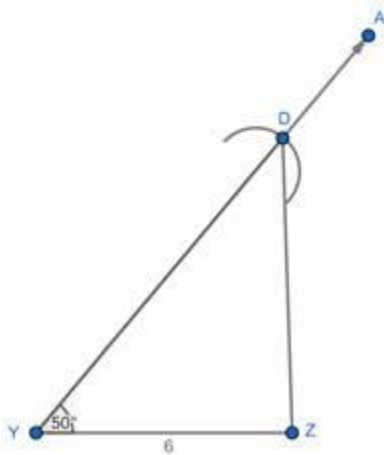
ii: At vertex Y, construct $\angle Y = 50^\circ$ and produce a ray YA.



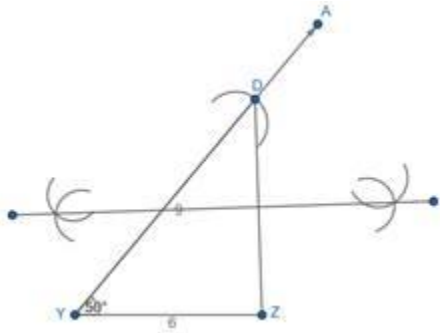
iii: Mark an arc on ray YA cutting at D such that $YD = 9\text{cm}$.



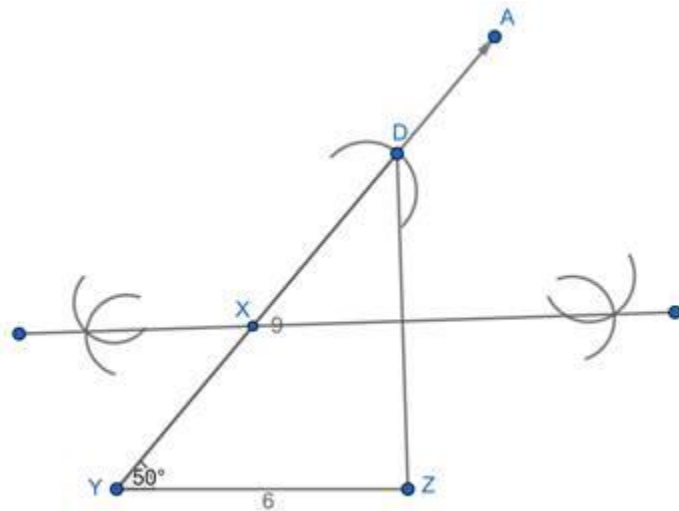
iv: Draw segment ZD.



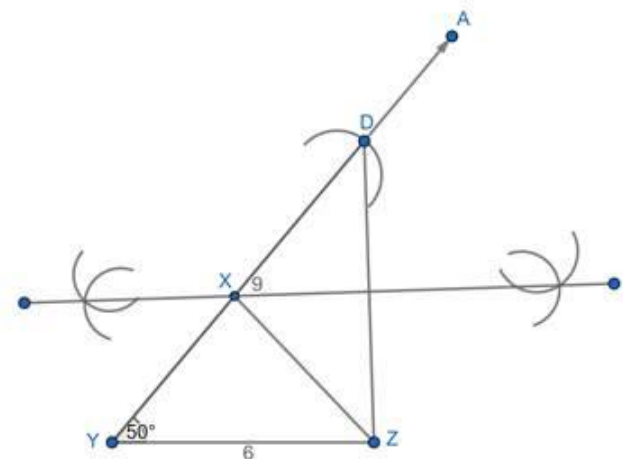
v: Construct the perpendicular bisector of segment ZD.



vi: Name the point of intersection of ray YD and the perpendicular bisector of ZD as X.



vii: Draw segment XZ.



$\triangle XYZ$ is the required triangle.

Q. 3. Construct $\triangle ABC$, in which $BC = 6.2\text{cm}$, $\angle C = 50^\circ$, $AB + AC = 9.8\text{cm}$

Answer : Given: base $BC = 6.2\text{cm}$,

$AB + AC = 9.8\text{cm}$ and

$\angle C = 50^\circ$ of $\triangle ABC$.

Required: To construct a $\triangle ABC$

Steps of construction:

i: Draw a segment BC of length of 6.2cm .



ii: At vertex C , construct $\angle C = 50^\circ$ and produce a ray CP .



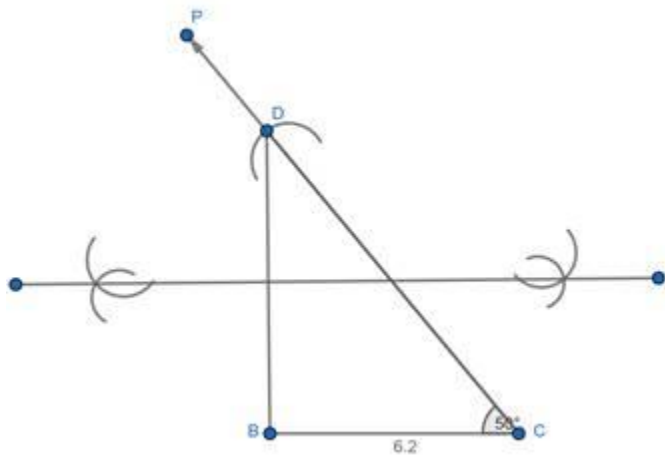
iii: Mark an arc on ray CP cutting at D such that $CD = 9.8\text{cm}$.



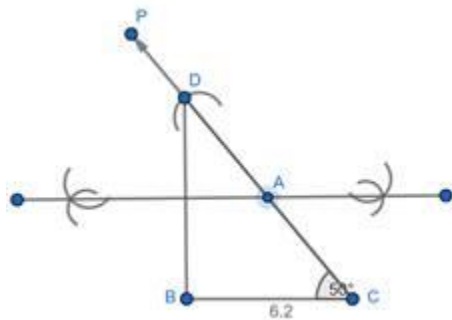
iv: Draw segment DB.



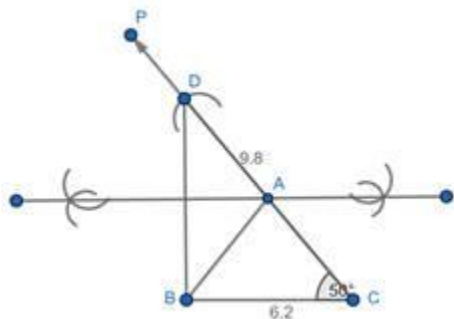
v: Construct the perpendicular bisector of segment DB.



vi: Name the point of intersection of ray CP and the perpendicular bisector of DB as A.



vii: Draw segment AB.



$\triangle ABC$ is the required triangle.

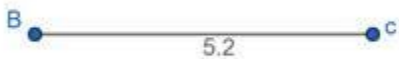
Q. 4. Construct $\triangle ABC$, in which $BC = 5.2\text{cm}$, $\angle C = 45^\circ$ and perimeter of $\triangle ABC$ is 10 cm.

Answer : Given: base $BC = 5.2\text{cm}$, $\angle C = 45^\circ$ of $\triangle ABC$ and
perimeter of $\triangle ABC = 10\text{ cm}$.

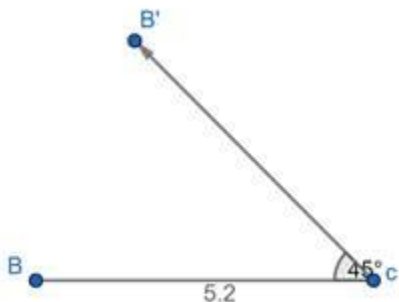
Required: To construct a $\triangle ABC$

Steps of construction:

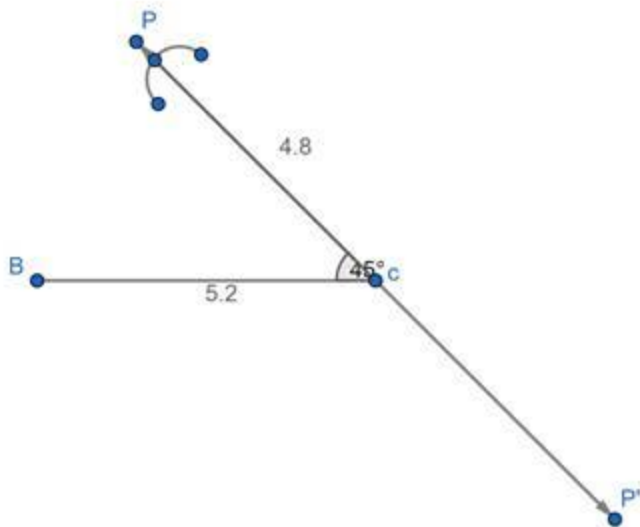
i: Draw a segment BC of length of 5.2cm .



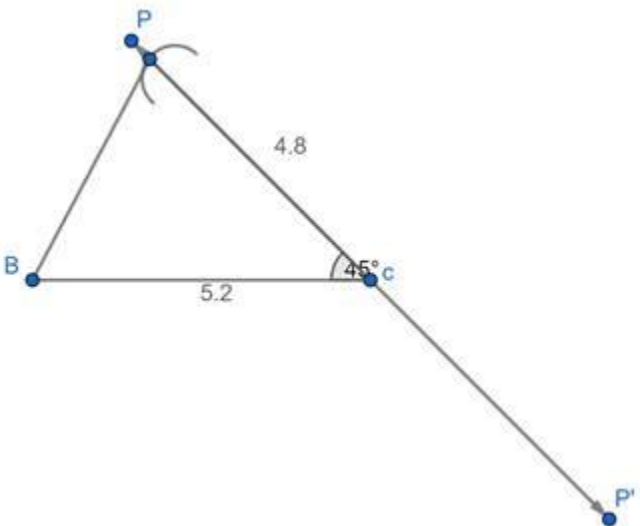
ii: At vertex C , construct $\angle C = 45^\circ$ and produce a ray $P'C$



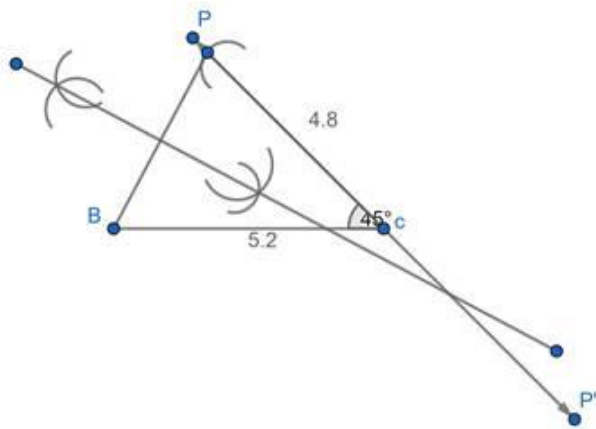
iii: Mark an arc on ray CP cutting at D such that $CD = 4.8\text{cm}$.



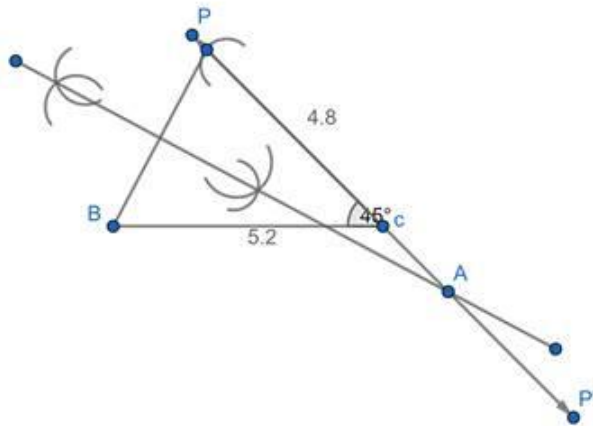
iv: Draw segment DB.



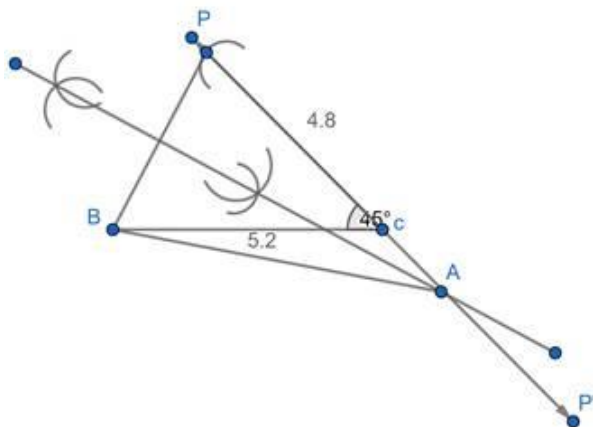
v: Construct the perpendicular bisector of segment DB.



vi: Name the point of intersection of ray CP and the perpendicular bisector of DB as A.



vii: Draw segment AB.



$\triangle ABC$ is the required triangle.

Practice set 4.2

Q. 1. Construct ΔXYZ , in which $YZ = 7.4\text{cm}$, $\angle XYZ = 45^\circ$ and $XY - XZ = 2.7\text{cm}$

Answer : Given: Base $YZ = 7.4\text{cm}$, $XY - XZ = 2.7\text{cm}$ and

$\angle Y = 45^\circ$ of ΔXYZ .

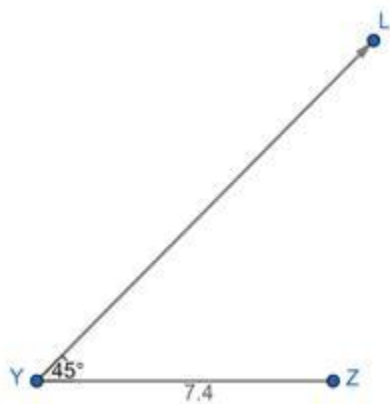
Required: To construct a triangle XYZ .

Steps of construction:

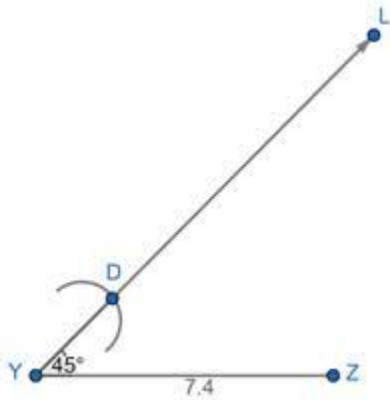
i: Draw a segment YZ of length 7.4cm .



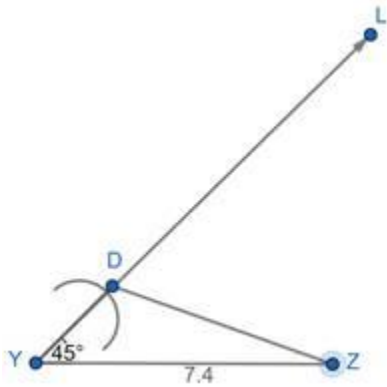
ii: Draw ray YL such that $\angle Y = 45^\circ$



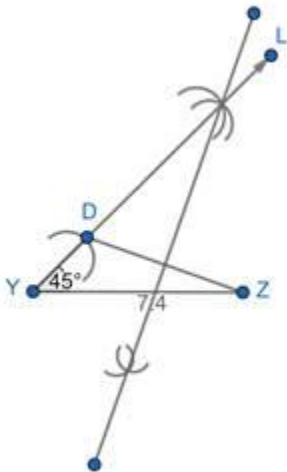
iii: Mark an arc on ray YL cutting at D such that $YD = 2.7\text{cm}$.



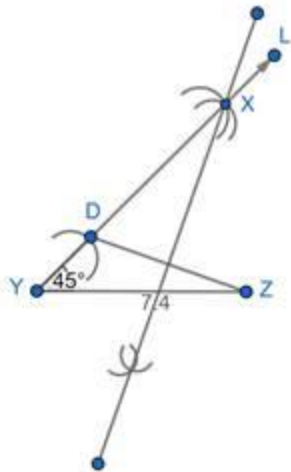
iv: Draw segment ZD.



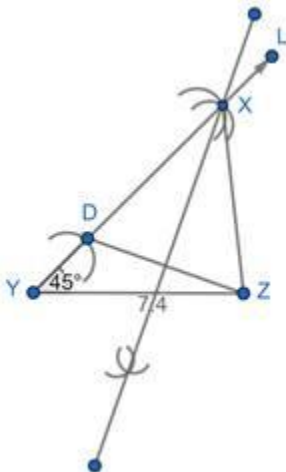
v: Construct the perpendicular bisector of segment ZD.



vi: Name the point of intersection of ray YL and the perpendicular bisector of ZD as X.



vii: Draw segment XZ.



$\triangle XYZ$ is the required triangle.

Q. 2. Construct $\triangle PQR$, in which $QR = 6.5\text{cm}$, $\angle PQR = 60^\circ$ and $PQ - PR = 2.5\text{cm}$

Answer : Given: Base $QR = 6.5\text{cm}$,

$PQ - PR = 2.5\text{cm}$ and

$\angle Q = 60^\circ$ of $\triangle PQR$.

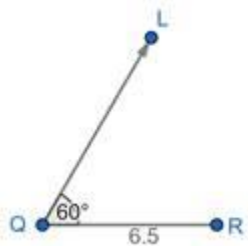
Required: To construct a triangle PQR .

Steps of construction:

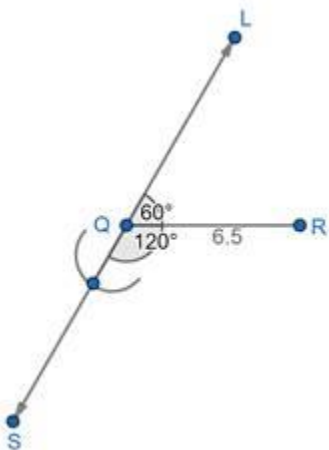
i: Draw a segment QR of length 6.5cm .



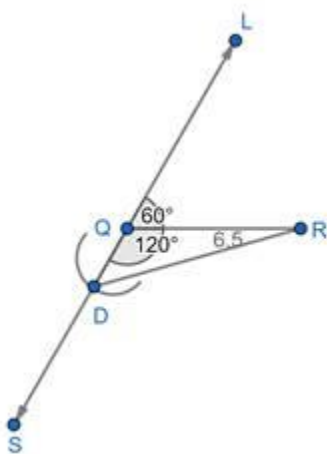
ii: Draw ray QL such that $\angle Q = 60^\circ$



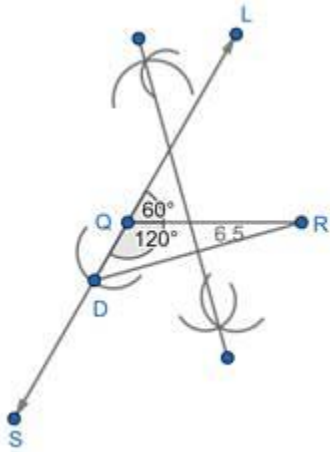
iii: Mark an arc on opposite ray QL i.e. QS cutting at D such that $QD = 2.5\text{cm}$.



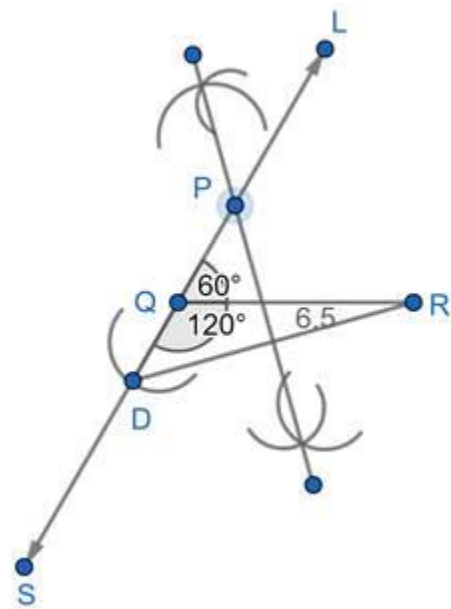
iv: Draw segment RD.



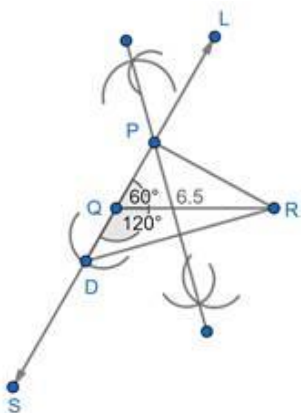
v: Construct the perpendicular bisector of segment RD.



vi: Name the point of intersection of ray QL and the perpendicular bisector of RD as P.



vii: Draw segment PR.



ΔPQR is the required triangle.

Q. 3. Construct ΔABC , in which $BC = 6\text{cm}$, $\angle ABC = 100^\circ$ and $AC - AB = 2.5\text{cm}$

Answer : Given: Base $BC = 6\text{cm}$, $AC - AB = 2.5\text{cm}$ and $\angle B = 100^\circ$ of ΔABC .

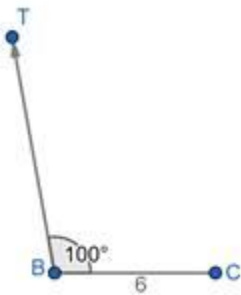
Required: To construct a triangle ABC .

Steps of construction:

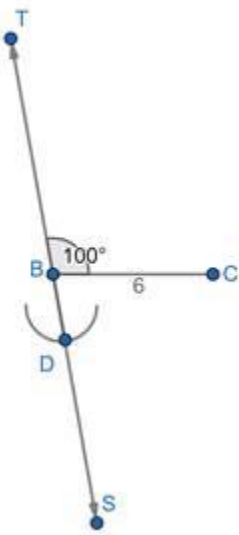
i: Draw a segment BC of length 6cm .



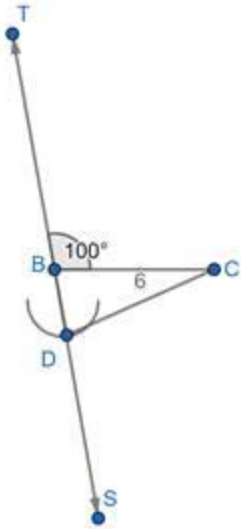
ii: Draw ray BT such that $\angle B = 100^\circ$



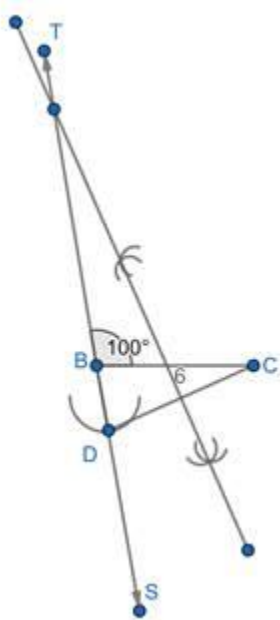
iii: Mark an arc on opposite of ray BT i.e. ray BS cutting at D such that $BD = 2.5\text{cm}$.



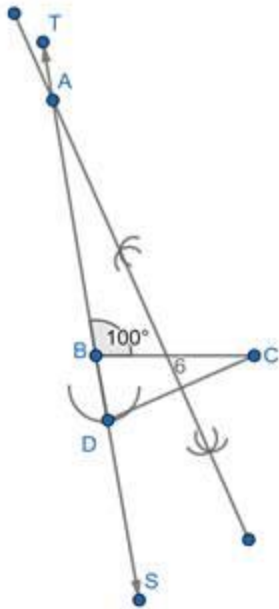
iv: Draw segment CD .



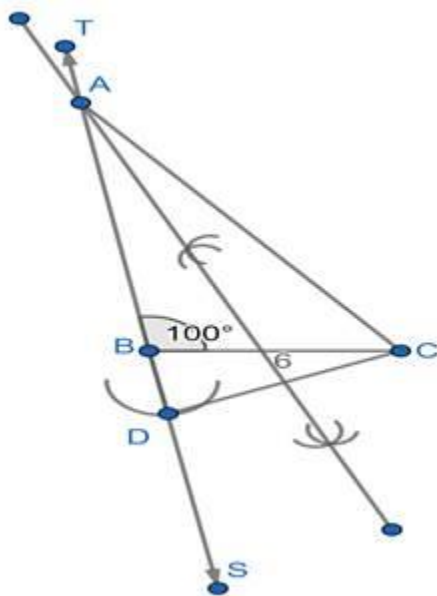
v: Construct the perpendicular bisector of segment CD.



vi: Name the point of intersection of ray BS and the perpendicular bisector of CD as A.



vii: Draw segment AC.



$\triangle ABC$ is the required triangle.

Practice set 4.3

Q. 1. Construct $\triangle PQR$, in which $\angle Q = 70^\circ$, $\angle R = 80^\circ$ and $PQ + QR + PR = 9.5\text{cm}$

Answer : Given: $\angle Q = 70^\circ$,

$\angle R = 80^\circ$ and

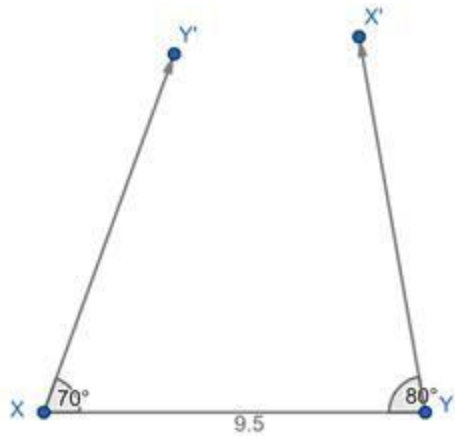
perimeter of ΔPQR

Steps of construction:

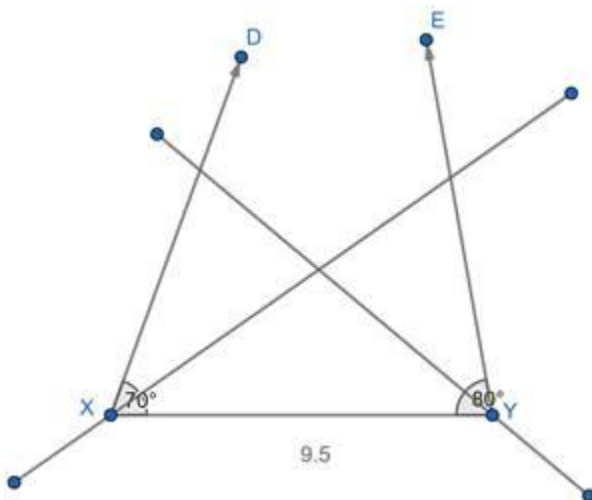
i: Draw a line segment XY of 9.5cm.



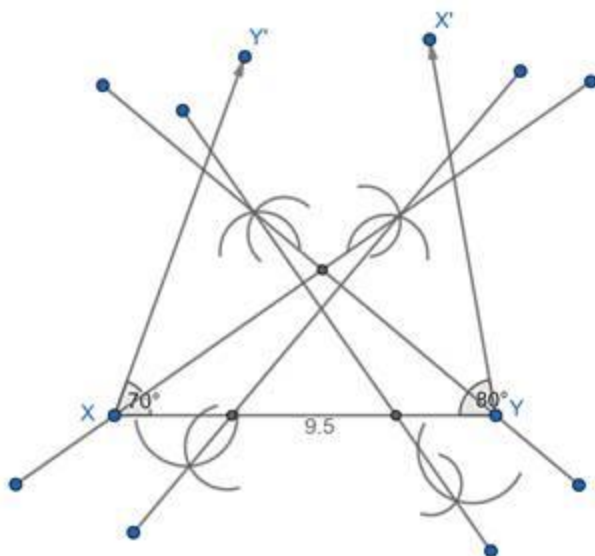
ii: From point X draw a ray XD at 70° and from Y draw a ray YE at 80° .



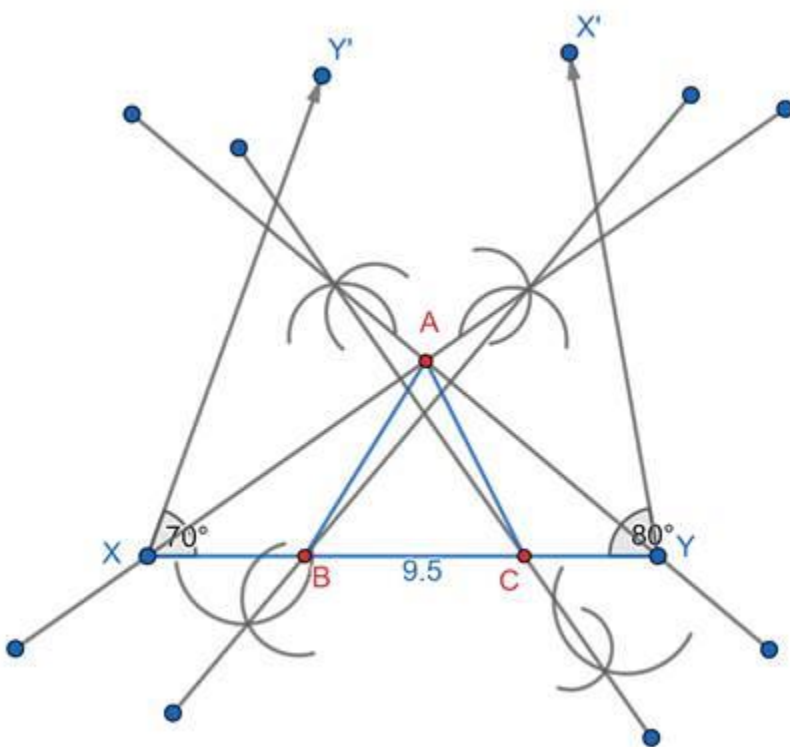
iii: Draw an angle bisector of X and Y, two angle bisectors intersect each other at point A.



iv: Draw a line bisector of XA and AY respectively these two line bisectors intersect at point B and C.



v: Join AB and AC.



vi: $\triangle ABC$ is required triangle.

Q. 2. Construct $\triangle XYZ$ in which $\angle Y = 58^\circ$, $\angle X = 46^\circ$ and perimeter of triangle is 10.5 cm.

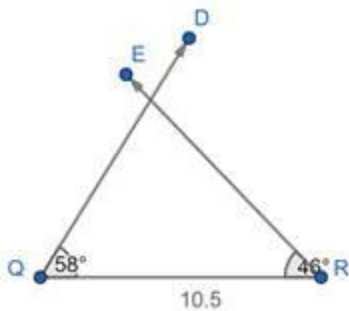
Answer : Given: $\angle Y = 58^\circ$, $\angle X = 46^\circ$ and perimeter of ΔPQR

Steps of construction:

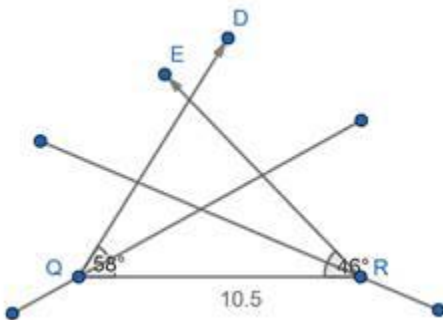
i: Draw a line segment QR of 10.5cm.



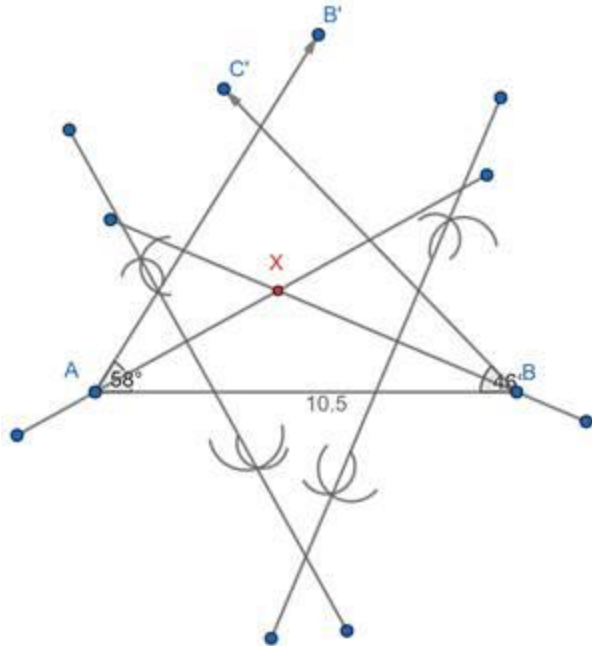
ii: From point Q draw a ray QD at 58° and from R draw a ray RE at 46°



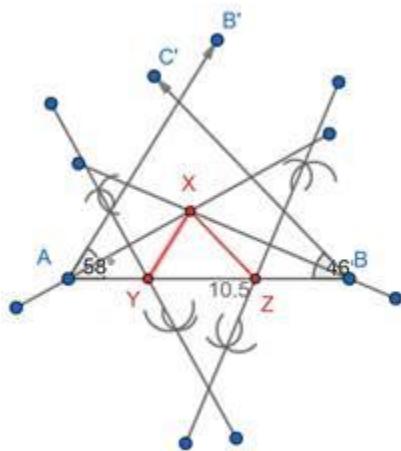
iii: Draw an angle bisector of Q and R, two angle bisectors intersect each other at point X.



iv: Draw a line bisector of QX and XR respectively these two-line bisectors intersect at point Y and Z



v: Join XY AND XZ.



vi: ΔXYZ is required triangle.

Q. 3. Construct ΔLMN , in which $\angle M = 60^\circ$, $\angle N = 80^\circ$ and $LM + MN + NL = 11\text{cm}$.

Answer : Given: $\angle Q = 70^\circ$,

$\angle R = 80^\circ$ and

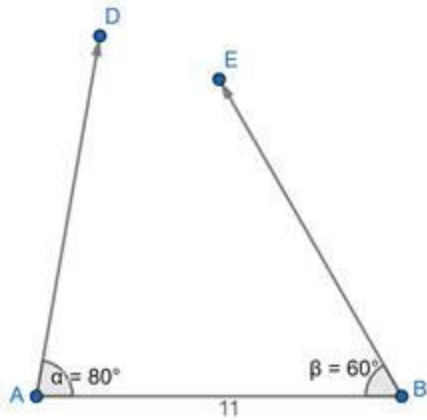
perimeter of ΔPQR

Steps of construction:

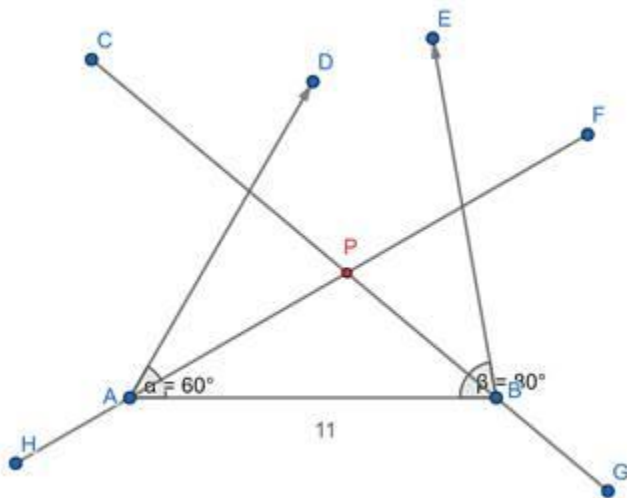
i: Draw a line segment AB of 11cm.



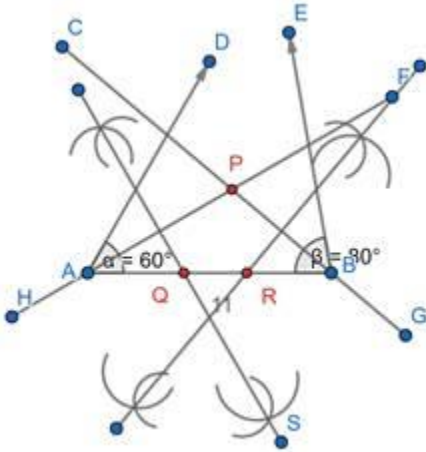
ii: From point A draw a ray AD at 60° and from B draw a ray BE at 80°



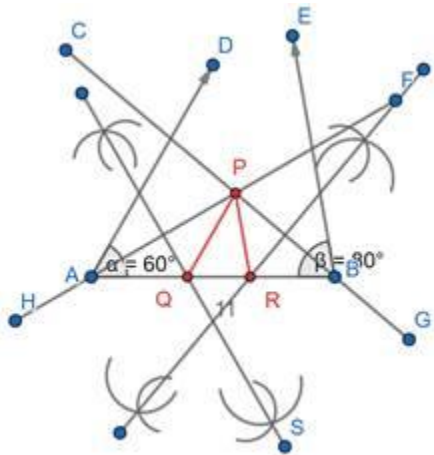
iii: Draw an angle bisector of A and B, two angle bisectors intersect each other at point P.



iv: Draw a line bisector of AP and BP respectively these two line bisectors intersect at point Q and R



v: Join PQ AND PR



vi: ΔPQR is required triangle.

Problem set 4

Q. 1. Construct ΔXYZ , such that $XY+XZ= 10.3\text{cm}$, $YZ=4.9\text{cm}$, $\angle XYZ = 45^\circ$

Answer : Given: base $YZ= 6\text{cm}$, $XY+XZ= 9\text{cm}$ and $\angle Y = 50^\circ$ of ΔXYZ .

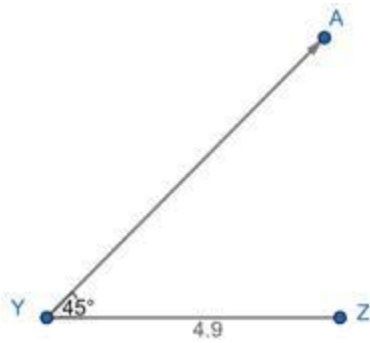
Required: To construct a ΔXYZ

Steps of construction:

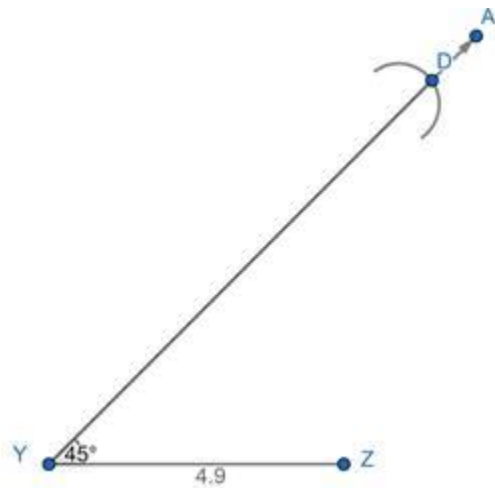
i: Draw a segment YZ of length of 4.9cm .



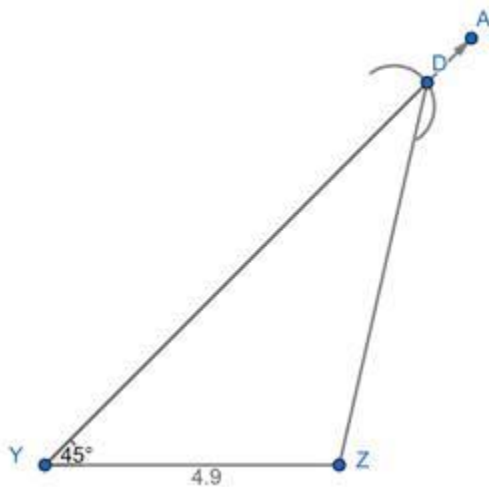
ii: At vertex Y, construct $\angle Y = 45^\circ$ and produce a ray YA.



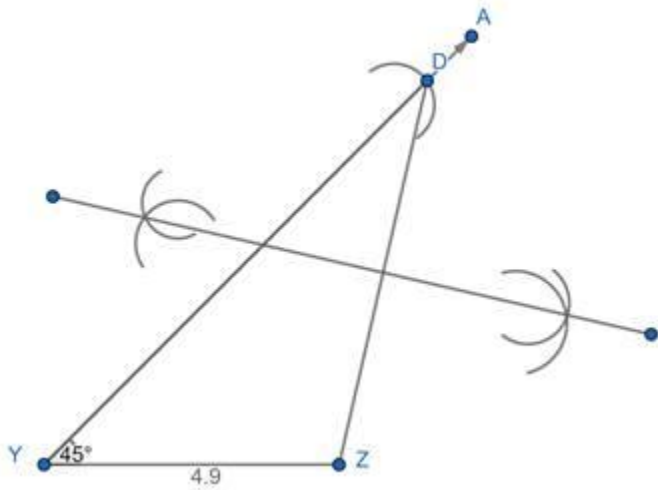
iii: Mark an arc on ray YA cutting at D such that $YD = 9\text{cm}$.



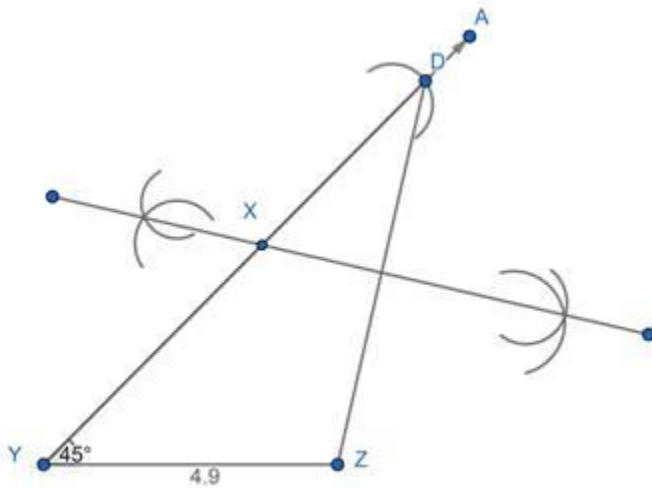
iv: Draw segment ZD.



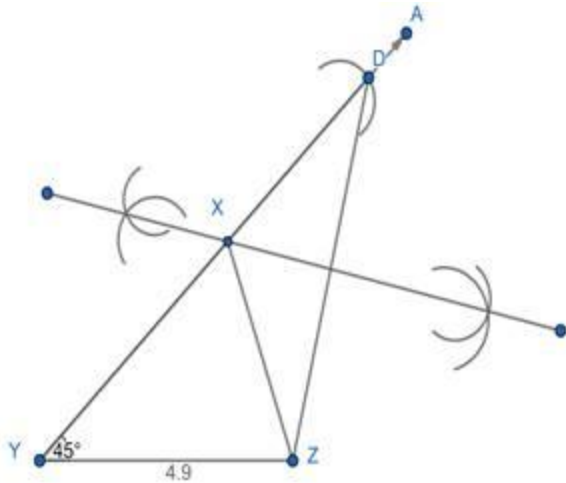
v: Construct the perpendicular bisector of segment ZD.



vi: Name the point of intersection of ray YD and the perpendicular bisector of ZD as X.



vii: Draw segment XZ.



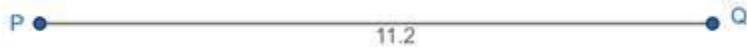
$\triangle XYZ$ is the required triangle.

Q. 2. Construct $\triangle ABC$, in which $\angle B = 70^\circ$, $\angle C = 60^\circ$, $AB + BC + AC = 11.2\text{cm}$.

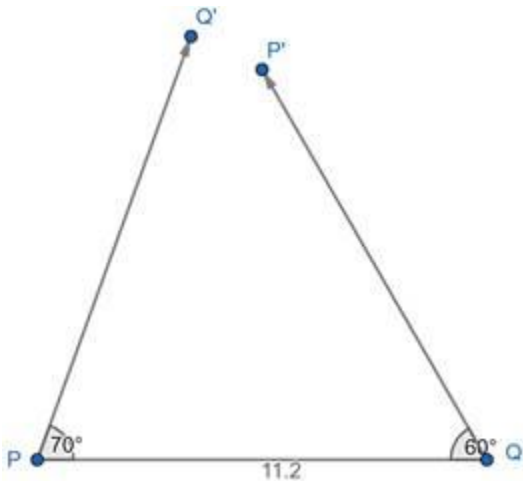
Answer : Given: $\angle B = 70^\circ$, $\angle C = 60^\circ$ and perimeter of $\triangle ABC$

Steps of construction:

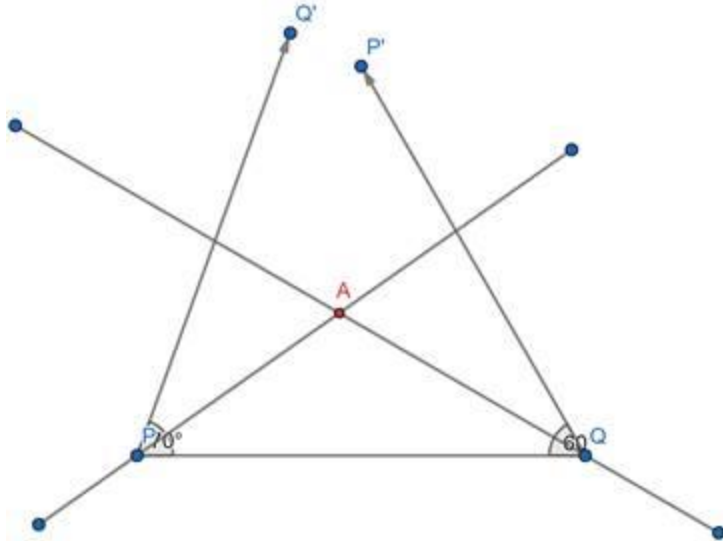
i: Draw a line segment PQ of 11.2cm.



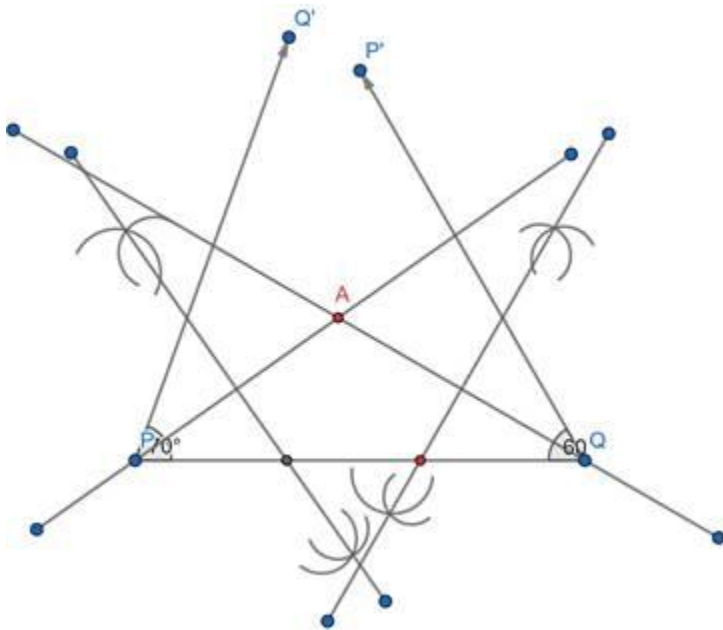
ii: From point P draw a ray PD at 70° and from Q draw a ray QE at 60°



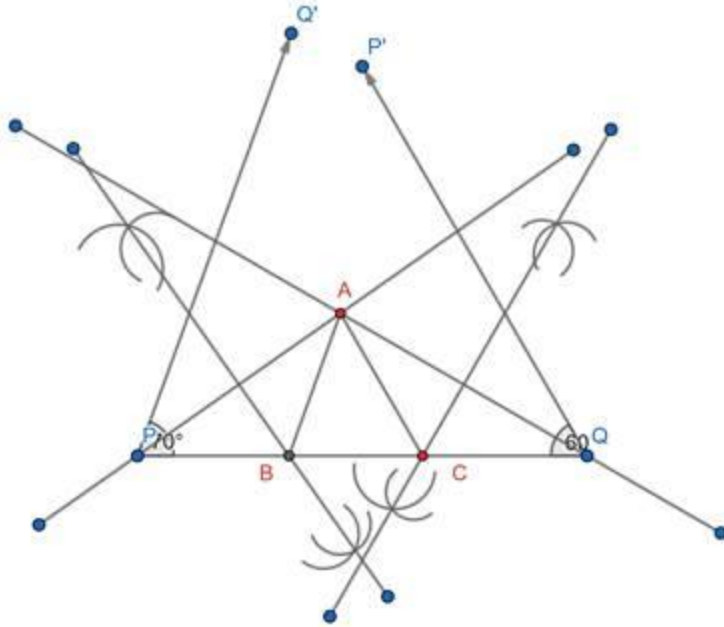
iii: Draw an angle bisector of P and Q, two angle bisectors intersect each other at point A.



iv: Draw a line bisector of AP and AQ respectively these two-line bisectors intersect at po B and C



v: Join AB AND AC



vi: ΔABC is required triangle.

Q. 3. The perimeter of a triangle is 14.4 cm and the ratio of lengths of its side is 2:3:4. Construct the triangle.

Answer : Given: perimeter of $\Delta = 14.4\text{cm}$ and ratio of its sides = 2:3:4

Steps of construction:

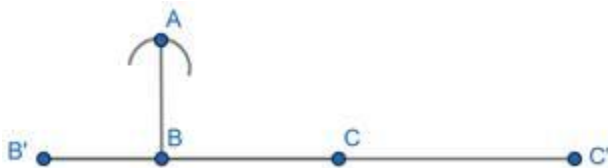
i: Draw $B'C' = 9\text{cm}$



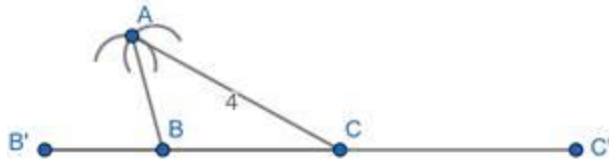
ii: Then divide $B'C'$ in the ratio 2:3:4. $B'B:BC::CC' = 2:3:4$ (by similarity of triangles)



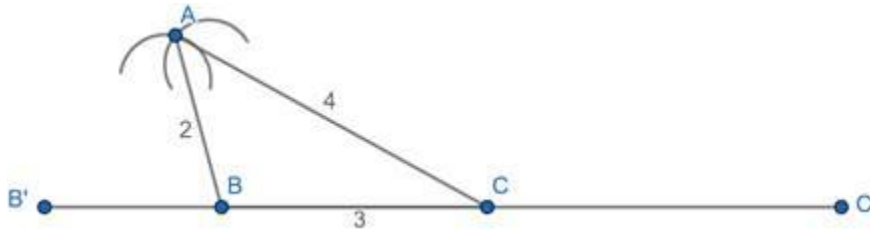
iii: Now construct $AB = B'B$.



iv: Construct $AC = CC'$.



v: Hence, $AB:BC:AC = 2:3:4$



vi: Hence, ΔABC is the required triangle.

Q. 4. Construct ΔPQR , in which $PQ-PR= 2.4\text{cm}$, $QR= 6.4\text{cm}$ and $\angle PQR = 55^\circ$.

Answer : Given: Base $QR= 6.4\text{cm}$, $PQ-PR= 2.4\text{cm}$ and

$\angle Q = 545^\circ$ of ΔPQR .

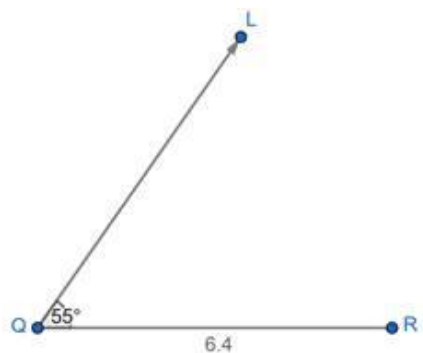
Required: To construct a triangle PQR .

Steps of construction:

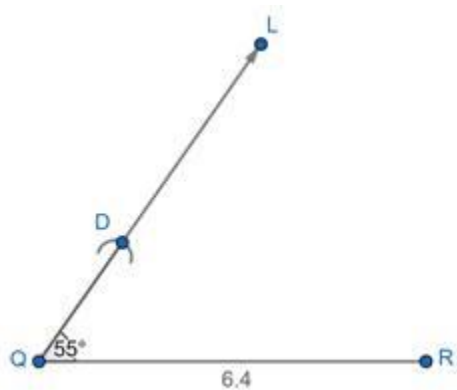
i: Draw a segment QR of length 6.4cm .



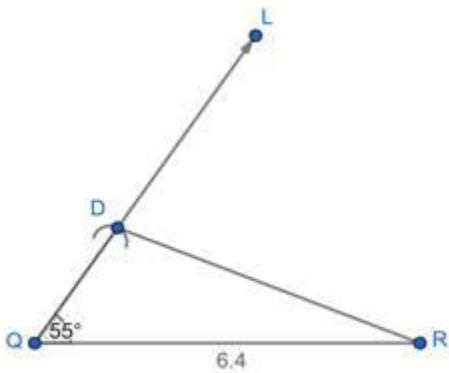
ii: Draw ray QL such that $\angle Q = 55^\circ$



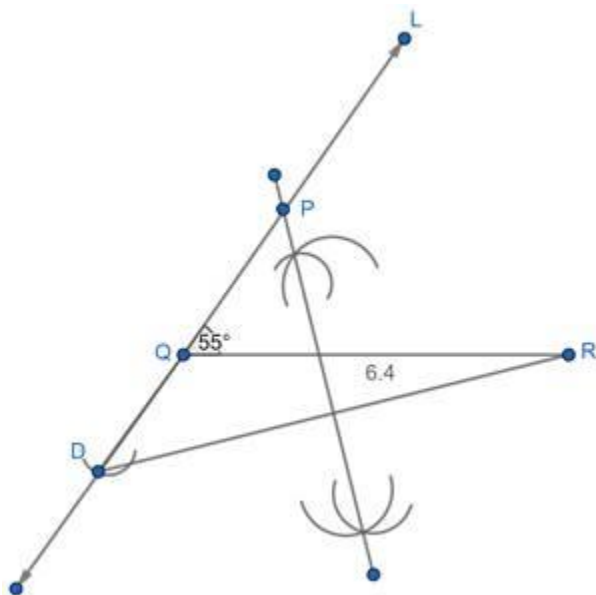
iii: Mark an arc on ray QL cutting at D such that $QD = 2.4\text{cm}$.



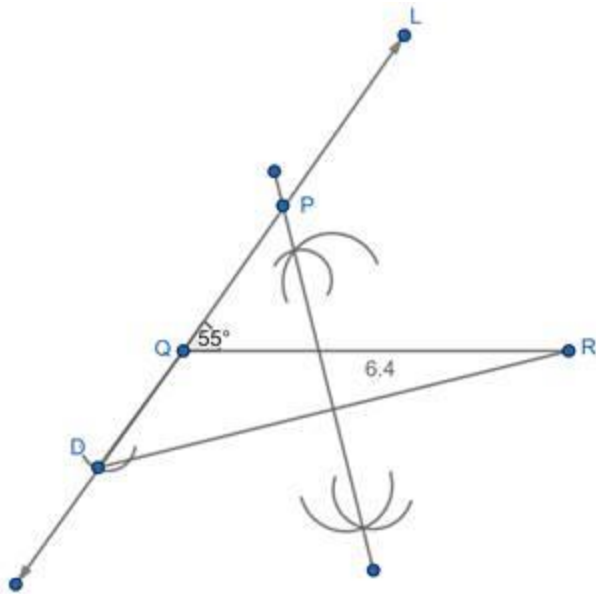
iv: Draw segment RD.



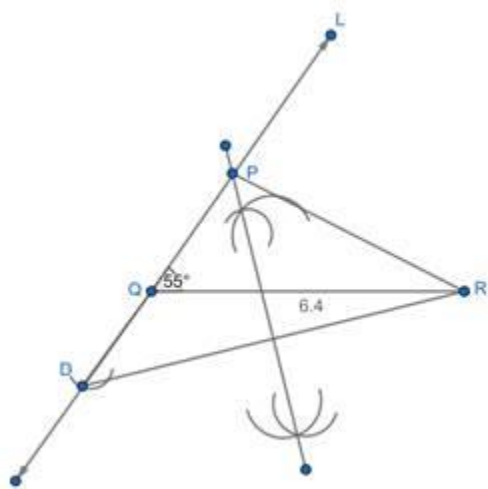
v: Construct the perpendicular bisector of segment RD.



vi: Name the point of intersection of ray QL and the perpendicular bisector of RD as P.



vii: Draw segment PR.



$\triangle PQR$ is the required triangle.