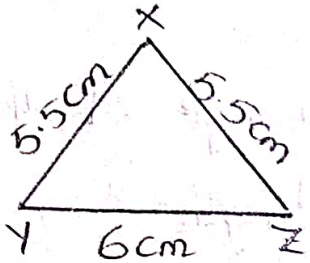
CHAPTER-6

Practical Geometry

Level-1

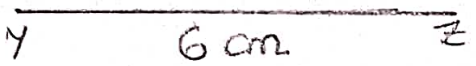
1 Sol:- Given $XY = 5.5cm$, $YZ = 6cm$, $ZX = 5.5cm$.

The rough figure of the triangle is as follows.

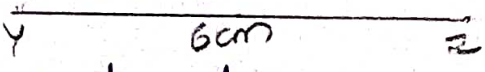


The steps of construction are as follows.

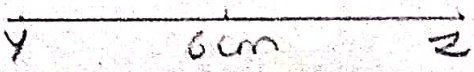
(i) Draw a line segment YZ of length 6cm.



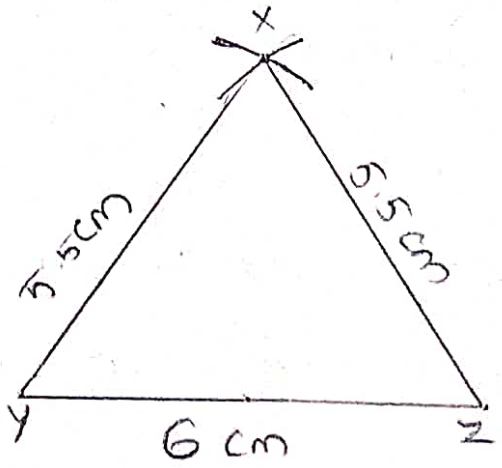
(ii) Taking point Y as Centre : draw an arc of 5.5cm radius.



(iii) Taking point Z as centre · draw an arc of 5.5 cm radius to intersect the previous arc of 5.5cm point X.



(iv), Joint x to y and z.

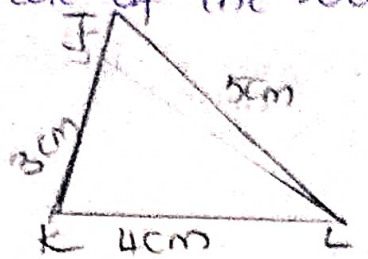


$\triangle XYZ$ is the required triangle As the two sides of the triangle are the same lengths ($XY = YZ$)

$\therefore \triangle XYZ$ is an isosceles triangle.

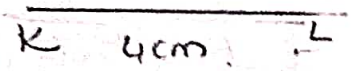
2 Sol:- Given $\triangle JKL$ such that $JK = 3cm$, $KL = 4cm$, $JL = 5cm$.

The rough figure of the triangle as follows.

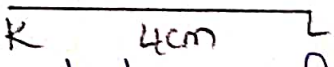


The steps of construction as follows.

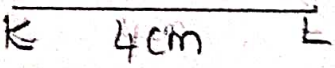
(i) draw a line segment KL of length 4cm.



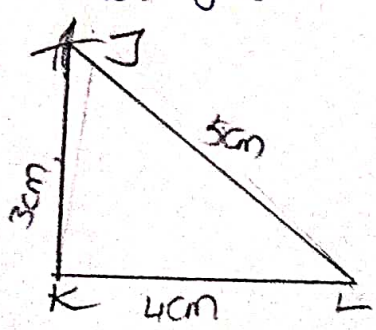
(ii) Point J is a distance of 3cm from point K. Therefore taking Point K as centre, draw an arc of 3cm as radius.



(iii) Point J is a distance of 5cm from point L. Therefore Taking Point L as Centre, draw an arc of 5cm radius.



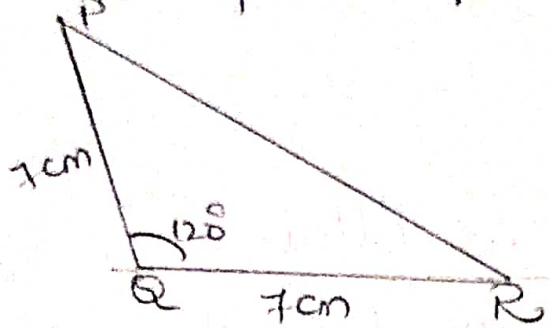
(iv) Join JK and JL.



This is the required triangle

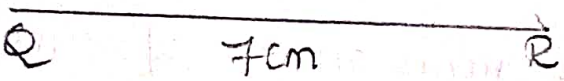
3&sol: Given an isosceles triangle PQR has be constructed with PQ = QR = 7cm.

A rough sketch of the required triangle can be drawn as follows.

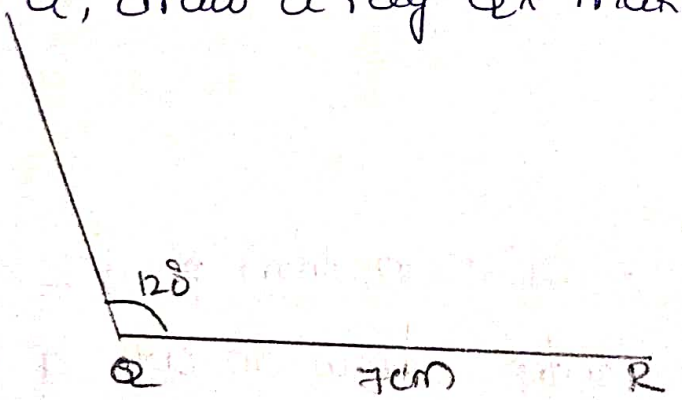


The steps of construction are as follows.

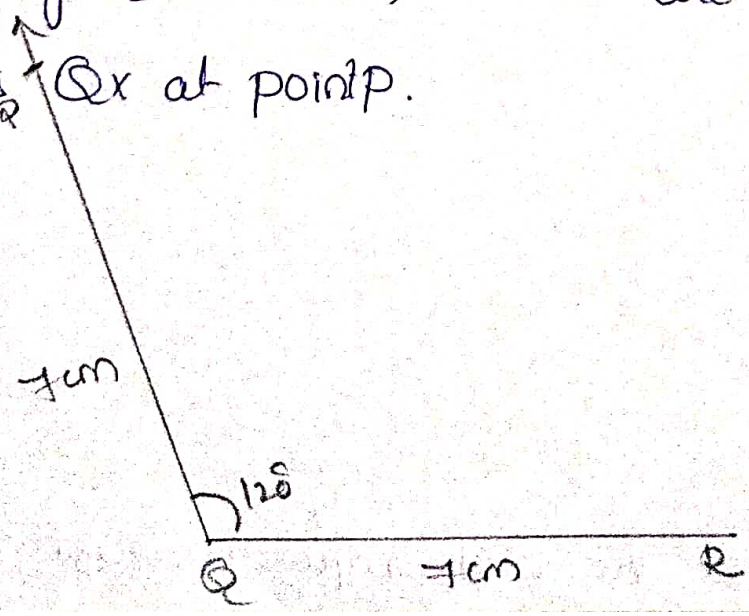
i. Draw a line segment QR of length is 7cm.



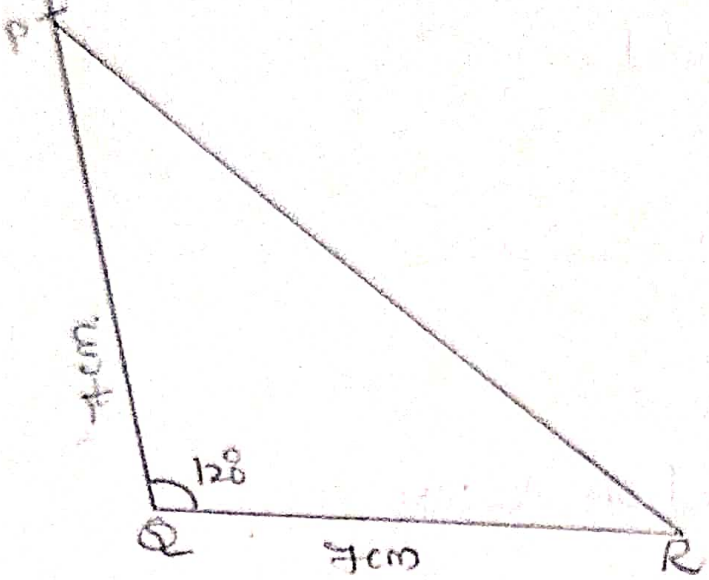
ii, at point Q, draw a ray Qx making an angle 120° with QR



iii, Taking Q as centre, draw an arc of 7cm radius. It intersects Qx at point P.

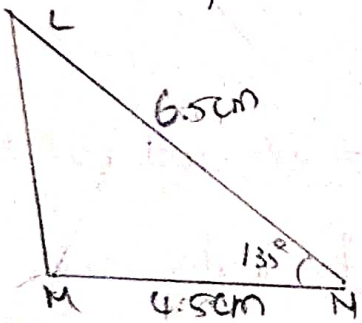


iv, Join P to R to obtain the required triangle PQR



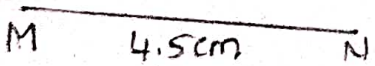
4 Sol:- Given $\triangle LMN$, $MN = 4.5cm$, $LN = 6.5cm$, $m\angle N = 135^\circ$

The rough sketch of the required triangle can be drawn as follows.

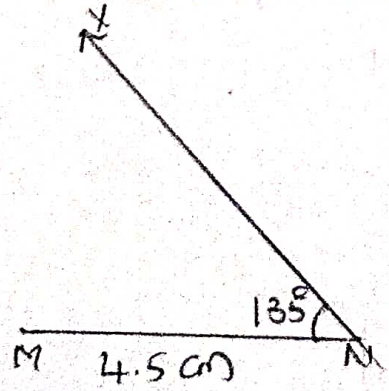


The steps of Construction was follows.

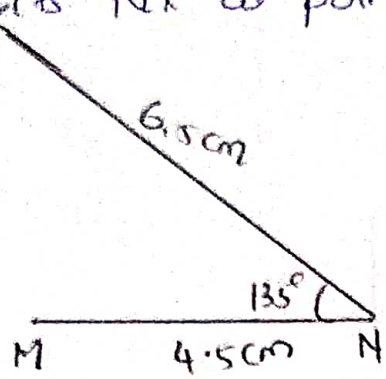
i) Draw a line segment MN of length 4.5cm. 4.5cm



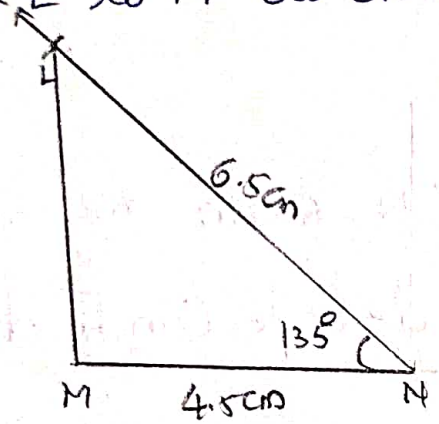
ii) At point N, draw a ray NX making 135° with MN.



iii, Taking N as centre, draw an arc of 6.5cm radius. It intersects Nx at point L.



iv, Join L to M to obtain $\triangle LMN$



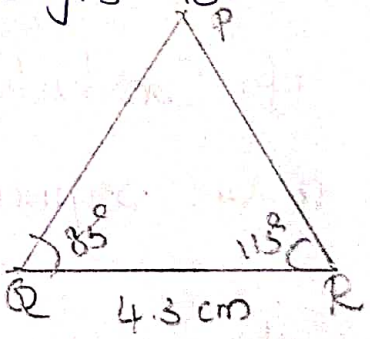
5 Sol:- Given, QR = 4.3cm, $m\angle Q = 85^\circ$ and $m\angle R = 115^\circ$

We know that, sum of angles triangle $= 180^\circ$

But Here,

$$\angle Q + \angle R = 85 + 115$$

$$= 200 > 180.$$



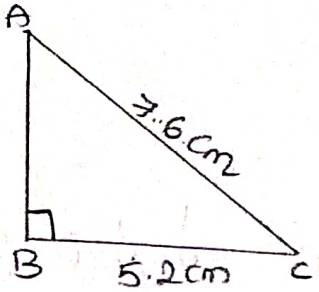
Since Sum of two angles Cannot be greater than 180

$\therefore \triangle PQR$ is not possible.

6 Sol:- Given hypotenuse is 7.6 cm long, one of the leg is 5.2cm

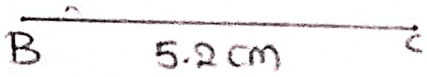
A right-angled triangle ABC with hypotenuse 7.6cm. and one of the legs as 5.2cm has to be Constructed

A rough sketch of $\triangle ABC$ is as follows.

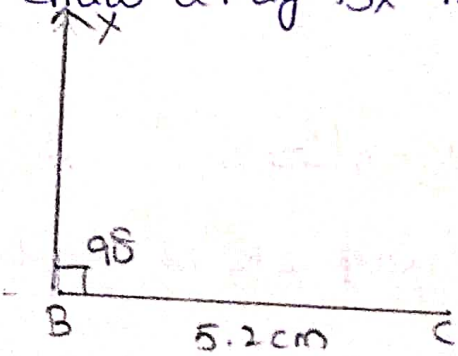


The steps of Construction are as follows.

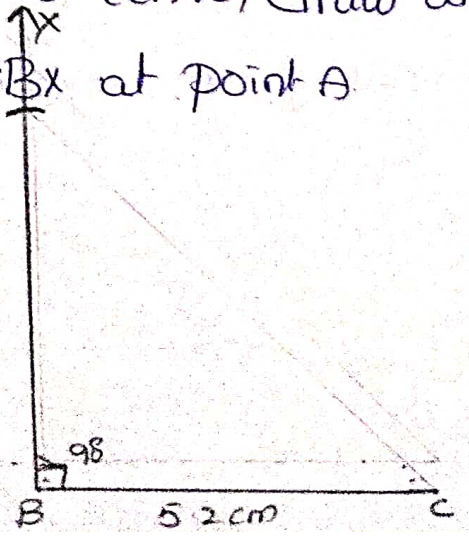
(i) Draw a line segment BC of length 5.2cm.



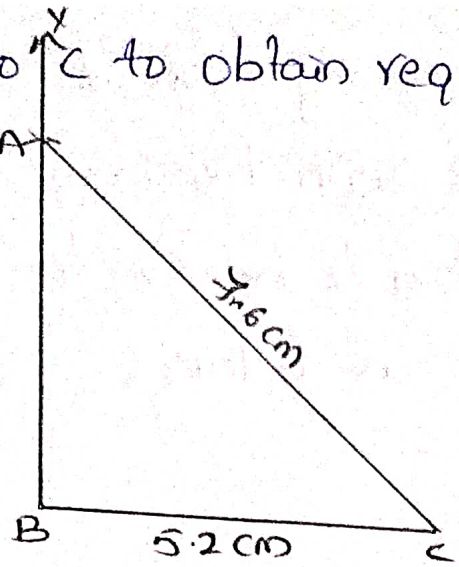
(ii) At point B, draw a ray Bx making an angle of 98 with BC.



(iii) Taking C as Centre, draw an arc of 7.6 cm radius to intersect ray Bx at point A



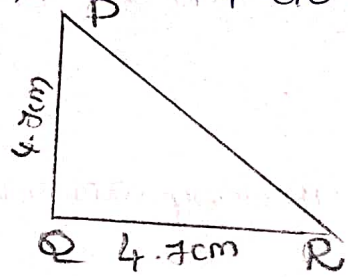
(iv), Join A to C to obtain required $\triangle ABC$



7 Sol:- Given Isosceles & right angled triangle PQR

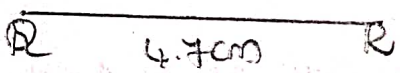
Let $\triangle PQR$, $PQ = QR = 4.7$cm, $\angle PQR = 90°$

A rough sketch of the $\triangle PQR$ is as follows.

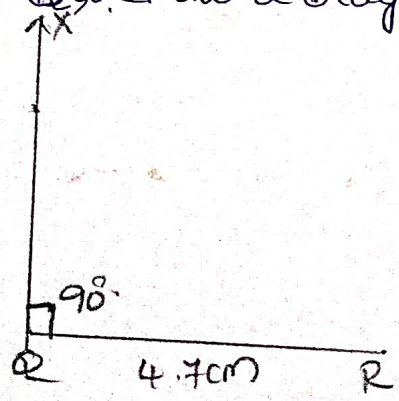


The steps of construction are as follows.

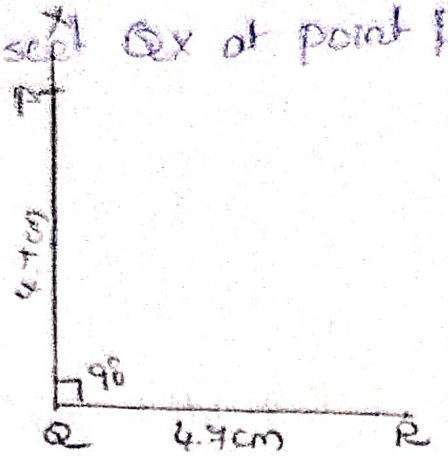
(i) Draw a line segment BC (Q1) of length QR of length 4.7 cm



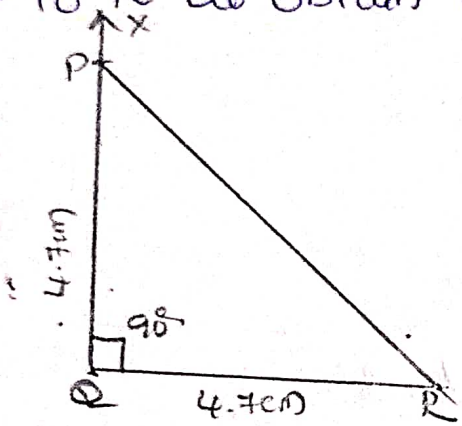
(ii) At point B (Q) draw a ray BX (QX) making an angle of 90° with BQR



iii, Taking point Q as centre, draw an arc of 4.7cm radius to intersect Qx at point P.

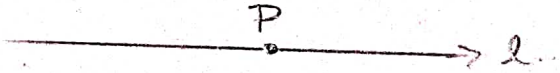


iv, Join P to R to obtain required $\triangle PQR$.

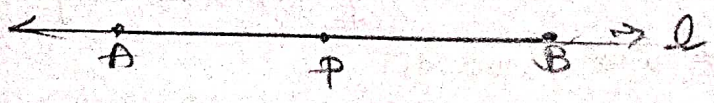


& Sol: Let's first draw a perpendicular to line l at point P.

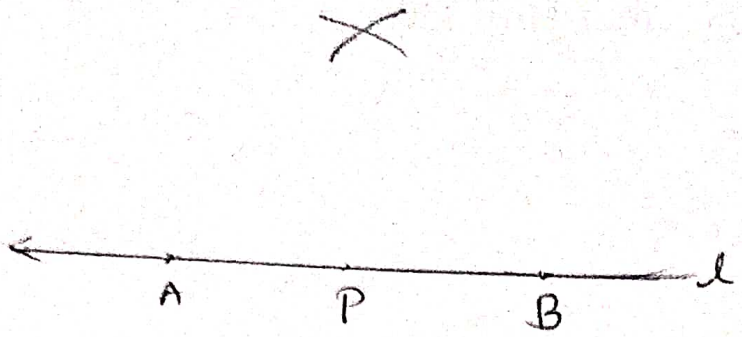
1. Given a line l with point P marked on it.



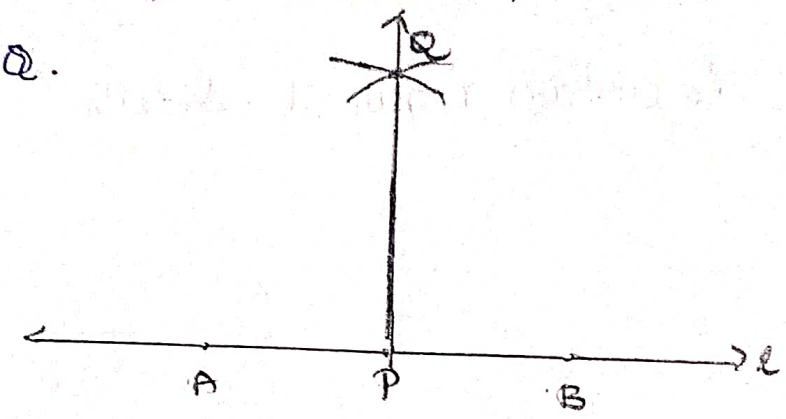
2. With P as Center, and any radius. Draw an arc intersecting the line at point A and B.
Now with A as Center, and radius more than AP draw an arc



3. With B as center, and same radius as before, draw an arc

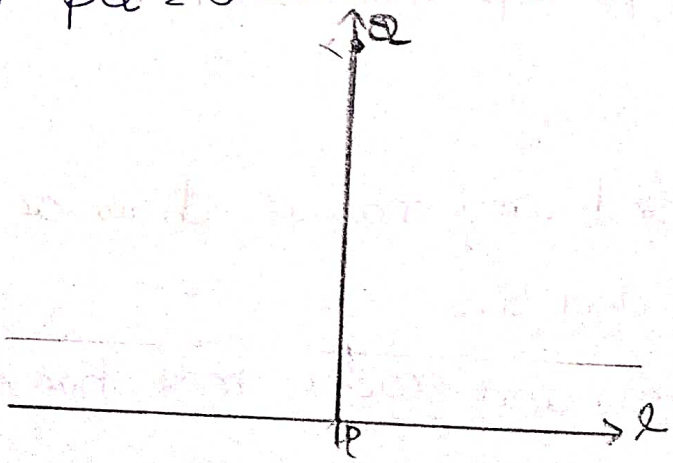


4. Mark the point of intersection of two arcs as point Q.
Joint p and Q.

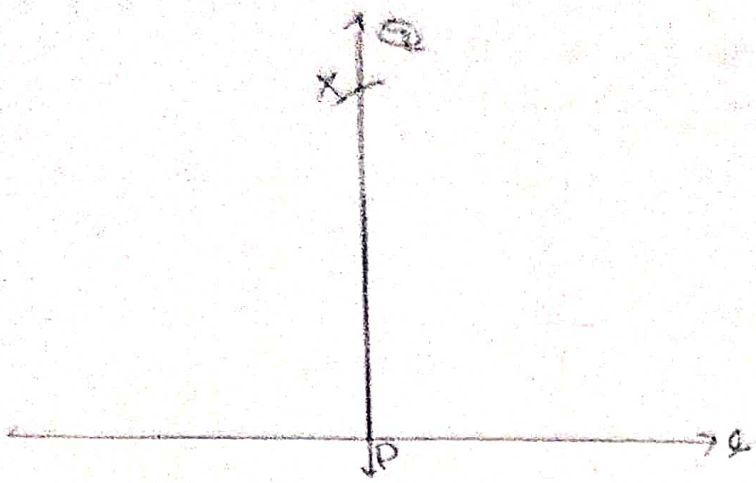


∴ PQ is the line perpendicular to l.

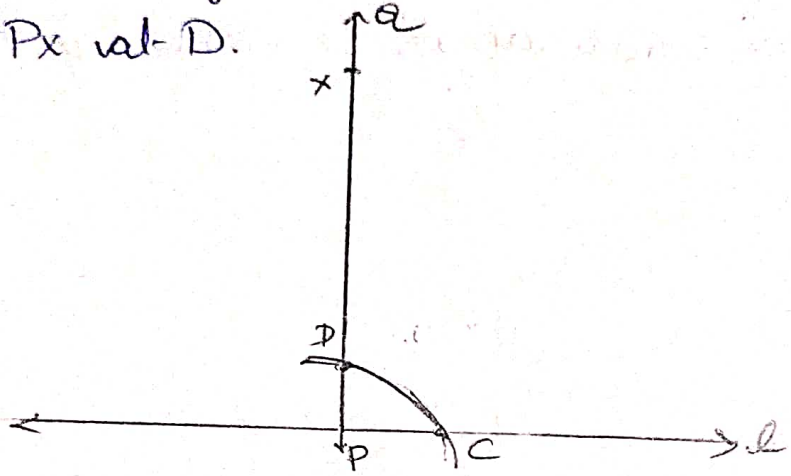
5; Let mark a point X on PQ.
Such that PQ = 5.5cm.



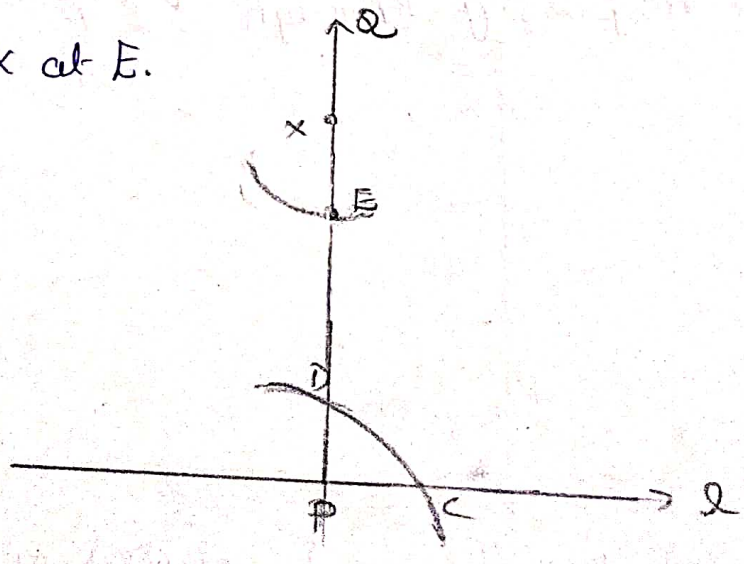
6 Making use 5.5cm using ruler and compass
Compass opened the same length, drawing an arc on pa
Marking this point as point X.



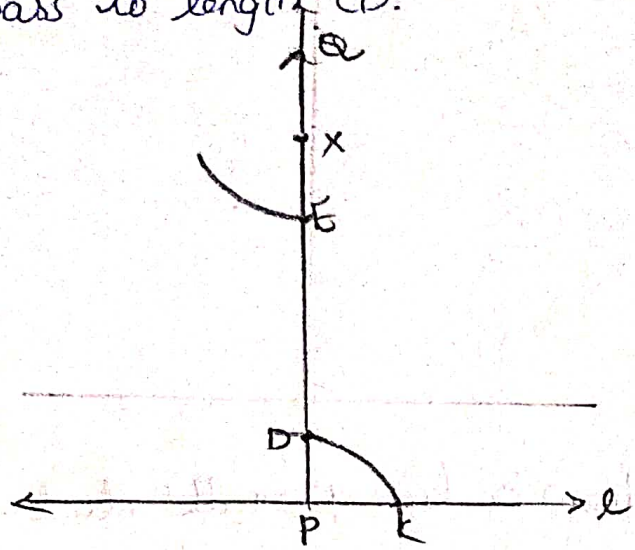
7. Now, we need to draw a line parallel to ℓ through point x with P as center, any radius draw an arc intersecting ℓ at C, and Px at D.



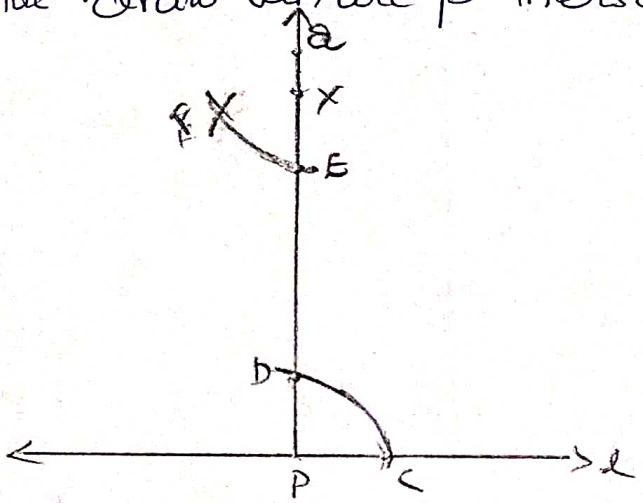
8, With x as center, and same radius as before draw an intersecting Px at E.



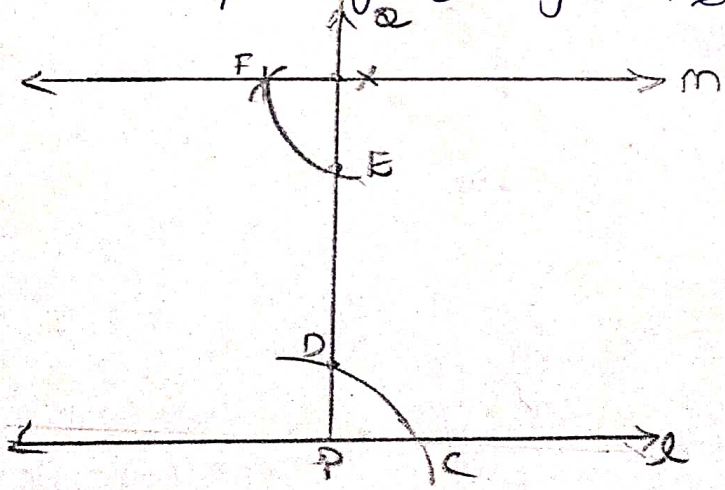
9. Draw Compass to length CD.



10, Now, with E as Center, and Compass opened the same radius as before. Draw an arc to intersecting the previous arc at



11. Draw a line m passing through X & F



Thus, m is the line parallel to ℓ, and passing through point X.

$\therefore \ell \parallel m$

9. Sol:- In order to construct $\triangle UVW$, the measure of $\angle UVW$ has been calculated.

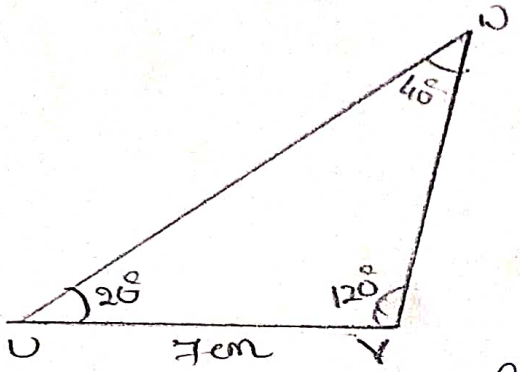
According to the angle sum property of triangle

$$\angle UVW + \angle VWU + \angle WUV = 180^\circ$$

$$120^\circ + 40^\circ + \angle WUV = 180$$

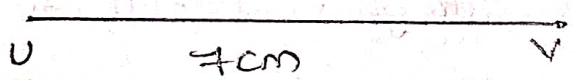
$$\angle WUV = 180 - 160 = 20^\circ$$

A rough sketch of the required $\triangle UVW$ as follows.

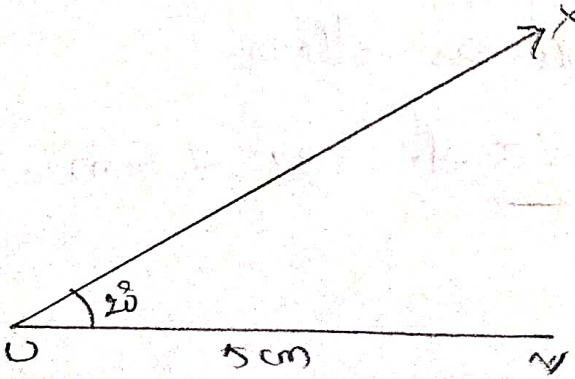


The steps of construction are as follows

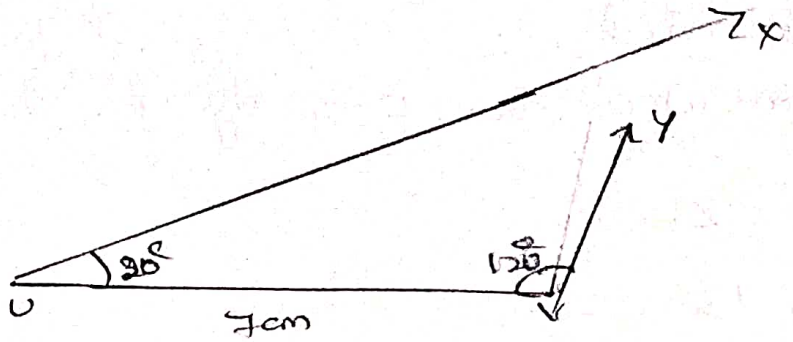
(i) Draw a line segment UV of length 7cm



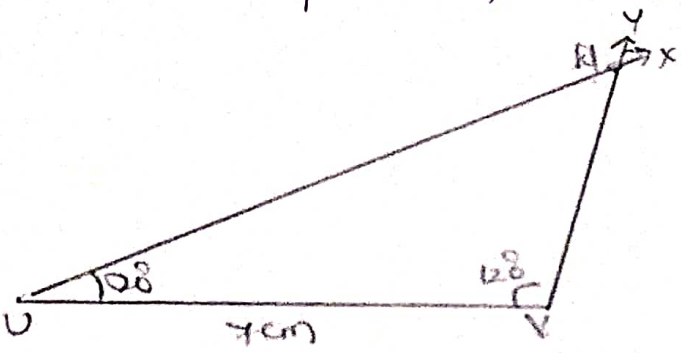
(ii) At U, draw a ray UX making an angle of 20° with UV.



(iii) At point V, draw a ray VY making an angle 128° with VU



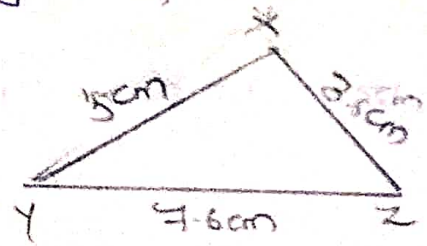
(iv) Point W has to lie on both the rays - UX and VY.
Therefore W is the point of intersection of these two rays.



This is the required triangle UVW.

10 Sol: Given: XY = 5cm, YZ = 7.6cm, ZX = 3.5cm

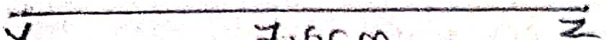
The rough figure of this triangle is as follows.



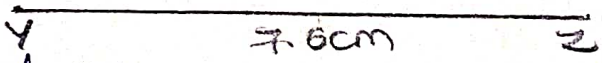
The steps of construction are as follows.

(i) Draw a line segment YZ of length 7.6cm

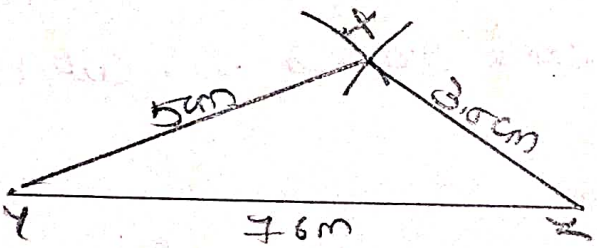
(ii) Point X is at a distance of 5cm from point Y. Therefore taking point Y as Centre. draw an arc of 5cm radius



(iii) Point X is a distance of 3.5cm from point Z. Therefore taking point Z as Centre. draw an arc of 3.5cm radius. Marks the point of Intersection of the ares as X.



(iv) Joint XY and XZ.



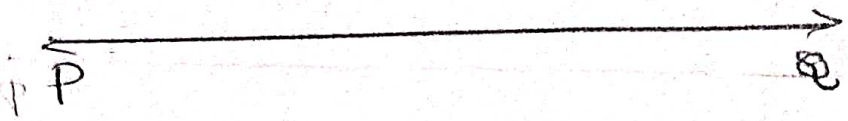
XYZ is required triangle.

This is scalene triangle. The two three sides of triangle is different. So this is scalene triangle.

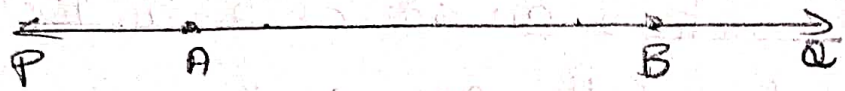
11 Sol:- A rough diagram

The steps of Construction as follows.

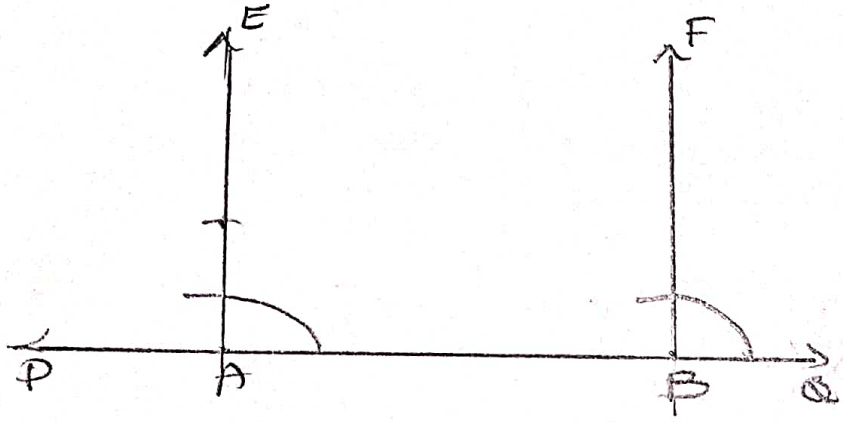
i, Draw a line PQ.



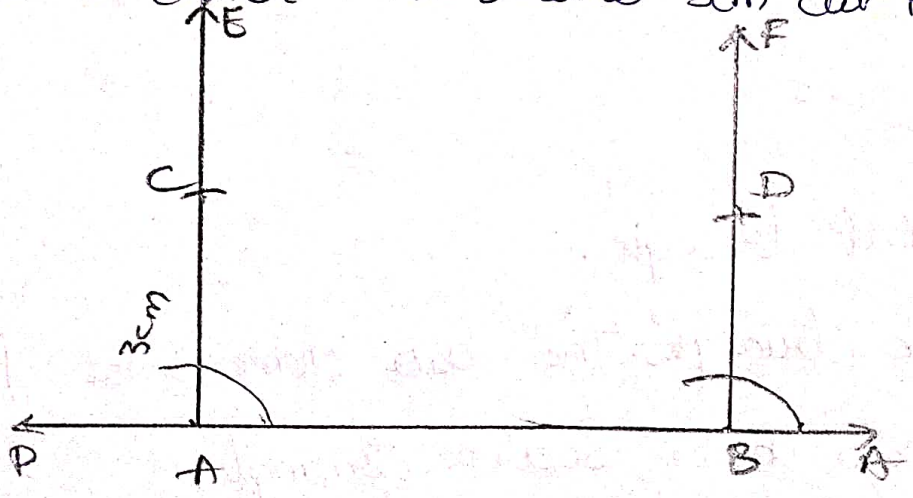
ii, Take any two point on A and B on this line



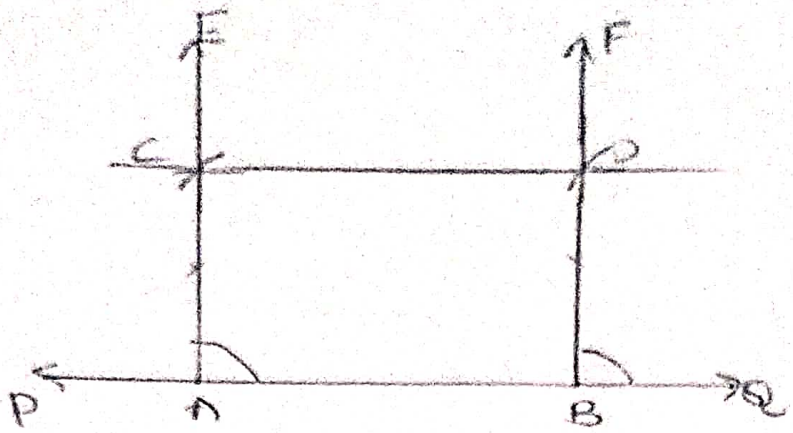
iii, Construct ∠PBF = 90° and ∠QAE = 90°



iv, With A as Center and radius 3cm cut AE at C and With B as Center and radius 3cm cut BF at D



v, Join CD and produce it on either side to get the required line parallel to AB. at distance of 3cm



∴ This required line parallel to AB.

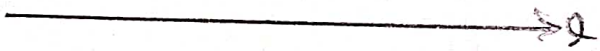
12 Sol:-

The steps of Construction was follows.

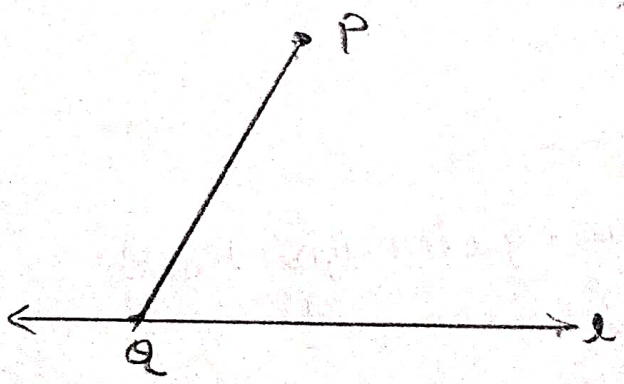
(i) Draw a line PQ ∥ AB l. With point P not on it

We need to draw a line parallel to line l, passing through point P.

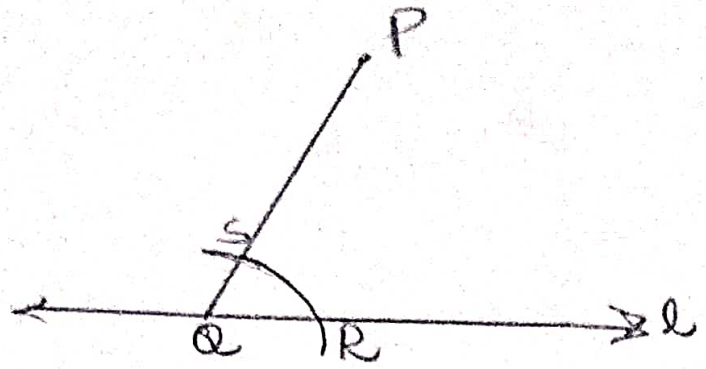
(ii)



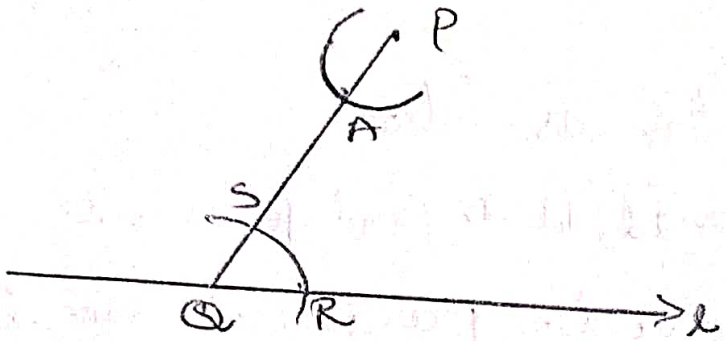
(ii), Mark point Q on the line l. Join PQ.



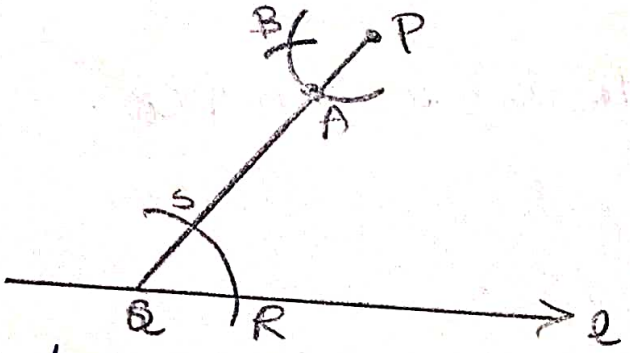
3, With B as center and any radius, draw an arc intersecting l at R and AP PQ at S.



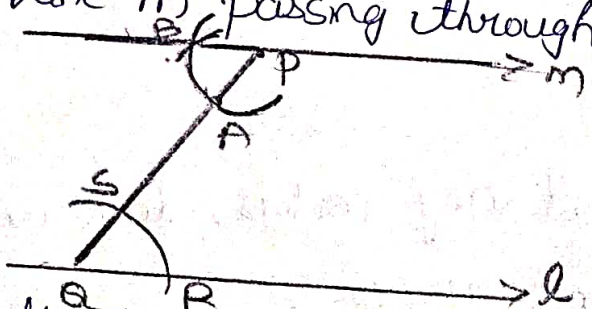
iv) With A as center, and same radius as before. draw an intersecting arc AB at A.



v) Open Compass to length RS. Now A as Centre and Compass opende the same radius as before(RS) Draw an arc intersecting the previous at B.



vi) Draw a line m passing through P & B.



∴ Thus, m is the line parallel to l and Passing through point P.

MULTIPLE CHOICE QUESTIONS

1 Sol: B, 10°

Explanation:

Two angles are said to be Complementary If the sum of their measures is 90°

The given Angle is 80°

Let the measure of its supplement be x°

Then,

$$x^\circ + 80 = 90$$

$$x^\circ = 90 - 80 = 10$$

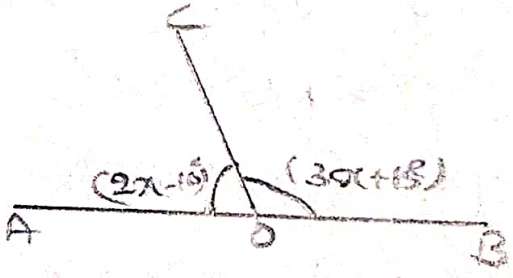
$$x^\circ = 10$$

Hence, the Complement of the given angle is measure is 10°

2 Sol:- B, 35°

We know that

AOB will be straight line only if the Adjacent angles form a linear pair



$$\angle BOC + \angle AOC = 180^\circ$$

$$(3x+15) + (2x-10) = 180^\circ$$

$$5x + 5 = 180$$

$$5x = 180 - 5 = 175$$

$$x = \frac{175}{5} = 35$$

3 Sol:- B, 38°

Explanation: Given $\angle A = 65°$, $\angle C = 85°$

The sum of Angles $= 180°$

$\angle A + \angle B + \angle C = 180°$

$65° + \angle B + 85° = 180°$

$\angle B + 150 = 180°$

$\angle B = 180° - 150 = 38°$

$\therefore \angle B = 38°$

4 Sol:- d. 180

Explanations: The sum of Angles of triangle is 180°

5 Sol:- (c) 12cm

Explanation: Given $\angle B = 90°$, AB = 5cm, AC = 13cm

In Pythagorous theorem

$AC^2 = AB^2 + BC^2$

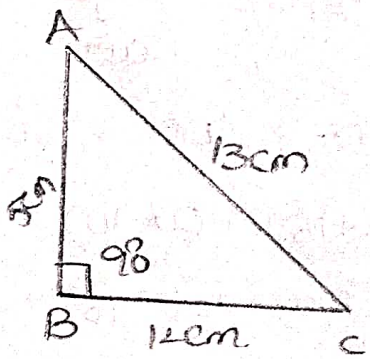
$(13)^2 = (5)^2 + BC^2$

$\Rightarrow (BC)^2 = (13)^2 - 5^2$

$= 169 - 25$

$= 144$

$BC = \sqrt{144} = 12$ //



6 Sol: (b) 40°

Explanation: Given $\angle PAB = 68°$, $\angle ACS = 108°$

From the figure, since PQ || RS.

it is clear that $\angle PAC = \angle ACS$

$\Rightarrow \angle PAB + \angle BAC = \angle ACS$

$68° + \angle BAC = 100°$

$\angle BAC = 100 - 68$

$\angle BAC = 40°$ //