

# NCERT Solutions for Class 7 Maths Chapter 10

## Practical Geometry Class 7

Chapter 10 Practical Geometry Exercise 10.1, 10.2, 10.3, 10.4, 10.5 Solutions

**Exercise 10.1 :** Solutions of Questions on Page Number : 196

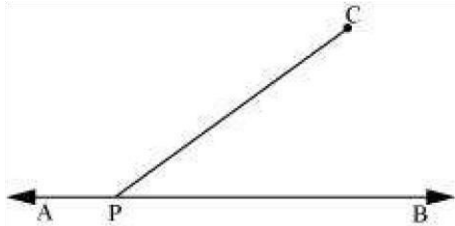
**Q1 :**

**Draw a line, say AB, take a point C outside it. Through C, draw a line parallel to AB using ruler and compasses only.**

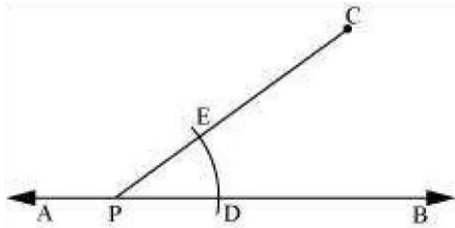
**Answer :**

The steps of construction are as follows.

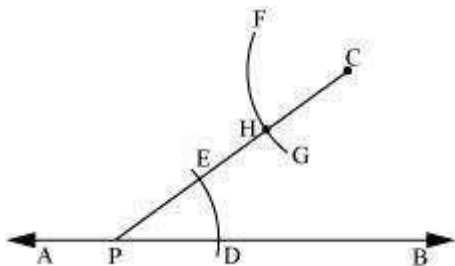
(i) Draw a line AB. Take a point P on it. Take a point C outside this line. Join C to P.



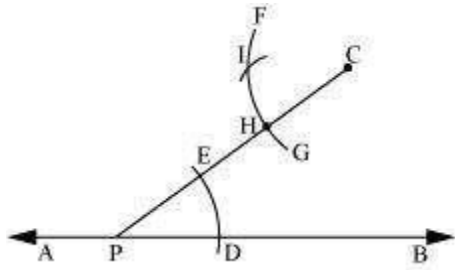
(ii) Taking P as centre and with a convenient radius, draw an arc intersecting line AB at point D and PC at point E.



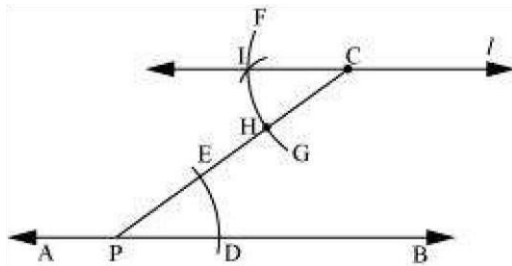
(iii) Taking C as centre and with the same radius as before, draw an arc FG intersecting PC at H.



(iv) Adjust the compasses up to the length of DE. Without changing the opening of compasses and taking H as the centre, draw an arc to intersect the previously drawn arc FG at point I.



(v) Join the points C and I to draw a line ' $l$ '.



This is the required line which is parallel to line AB.

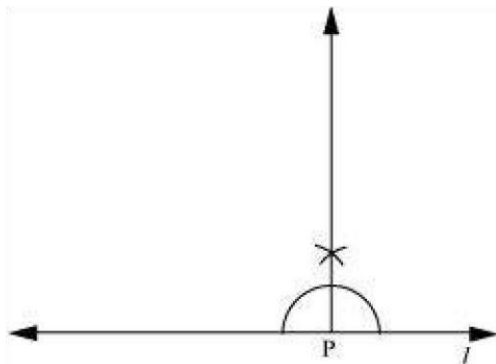
**Q2 :**

Draw a line  $l$ . Draw a perpendicular to  $l$  at any point on  $l$ . On this perpendicular choose a point X, 4 cm away from  $l$ . Through X, draw a line  $m$  parallel to  $l$ .

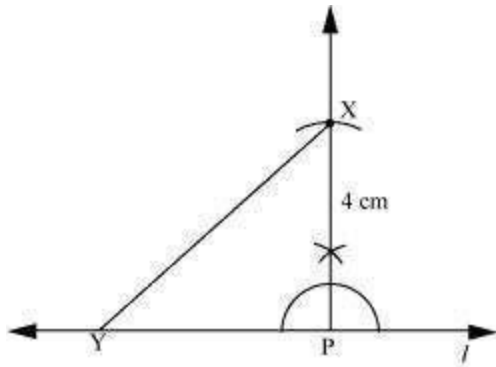
**Answer :**

The steps of construction are as follows.

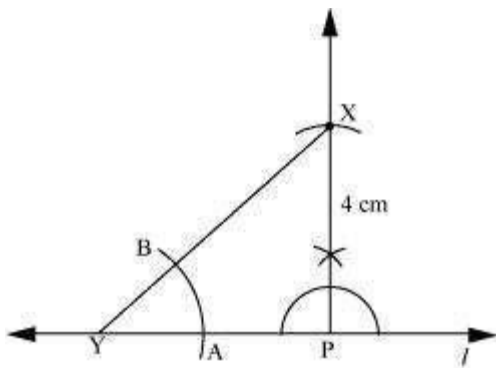
(i) Draw a line  $l$  and take a point P on line  $l$ . Then, draw a perpendicular at point P.



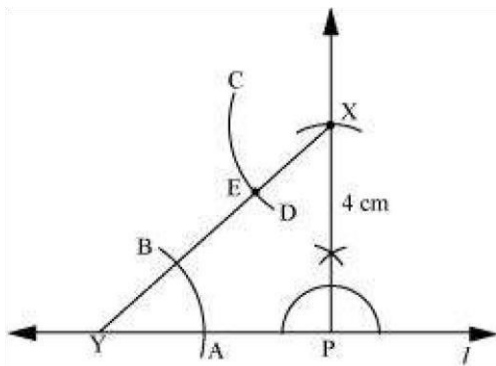
(ii) Adjusting the compasses up to the length of 4 cm, draw an arc to intersect this perpendicular at point X. Choose any point Y on line  $l$ . Join X to Y.



(iii) Taking Y as centre and with a convenient radius, draw an arc intersecting  $l$  at A and XY at B.

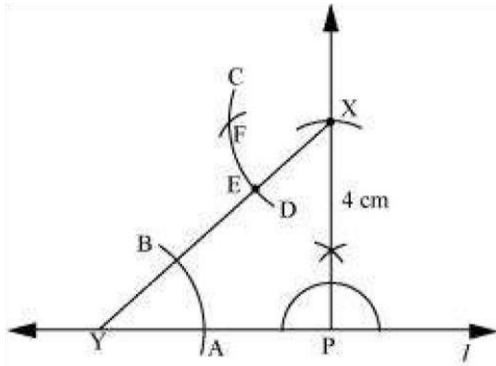


(iv) Taking X as centre and with the same radius as before, draw an arc CD cutting XY at E.

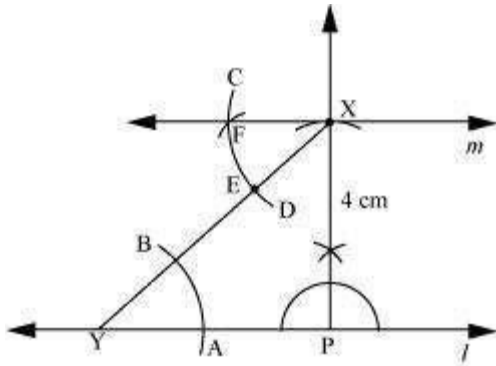


(v) Adjust the compasses up to the length of AB. Without changing the opening of compasses and taking E as the centre, draw an

arc to intersect the previously drawn arc CD at point F.



(vi) Join the points X and F to draw a line  $m$ .



Line  $m$  is the required line which is parallel to line  $l$ .

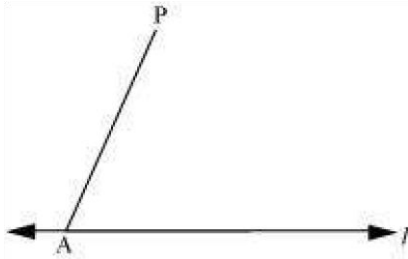
**Q3 :**

Let  $l$  be a line and  $P$  be a point not on  $l$ . Through  $P$ , draw a line  $m$  parallel to  $l$ . Now join  $P$  to any point  $Q$  on  $l$ . Choose any other point  $R$  on  $m$ . Through  $R$ , draw a line parallel to  $PQ$ . Let this meet  $l$  at  $S$ . What shape do the two sets of parallel lines enclose?

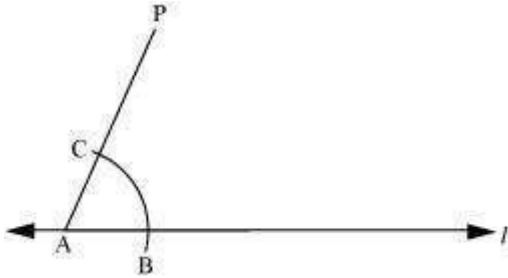
**Answer :**

The steps of construction are as follows.

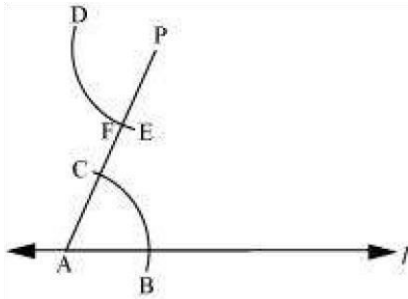
(i) Draw a line  $l$  and take a point  $A$  on it. Take a point  $P$  not on  $l$  and join  $A$  to  $P$ .



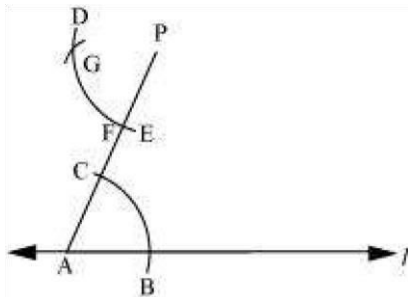
(ii) Taking  $A$  as centre and with a convenient radius, draw an arc cutting  $l$  at  $B$  and  $AP$  at  $C$ .



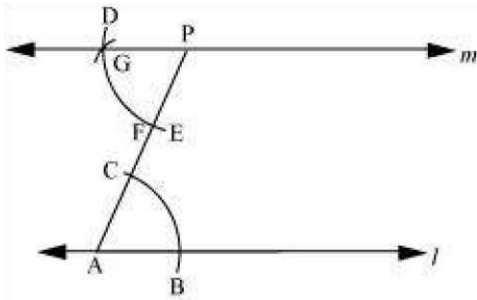
(iii) Taking  $P$  as centre and with the same radius as before, draw an arc  $DE$  to intersect  $AP$  at  $F$ .



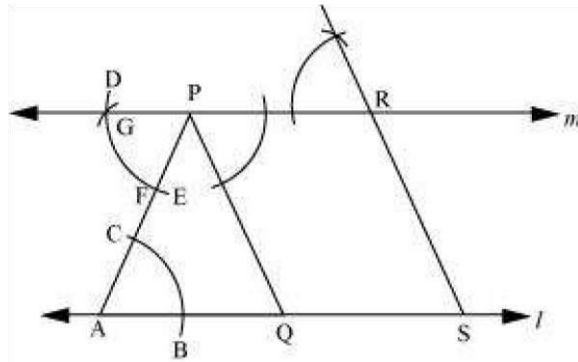
(iv) Adjust the compasses up to the length of  $BC$ . Without changing the opening of compasses and taking  $F$  as the centre, draw an arc to intersect the previously drawn arc  $DE$  at point  $G$ .



(v) Join  $P$  to  $G$  to draw a line  $m$ . Line  $m$  will be parallel to line  $l$ .



(vi) Join P to any point Q on line  $l$ . Choose another point R on line  $m$ . Similarly, a line can be drawn through point R and parallel to PQ.



Let it meet line  $l$  at point S.

In quadrilateral PQSR, opposite lines are parallel to each other.

$PQ \parallel RS$  and  $PR \parallel QS$

Thus, the quadrilateral PQSR is a parallelogram.

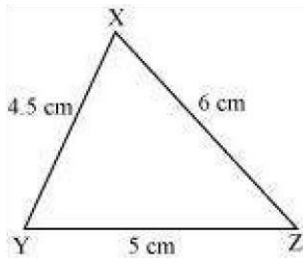
#### Exercise 10.2 : Solutions of Questions on Page Number : 199

**Q1 :**

**Construct  $\Delta XYZ$  in which  $XY = 4.5$  cm,  $YZ = 5$  cm and  $ZX = 6$  cm.**

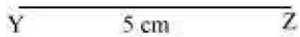
**Answer :**

The rough figure of this triangle is as follows.

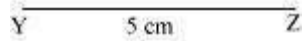


The required triangle is constructed as follows.

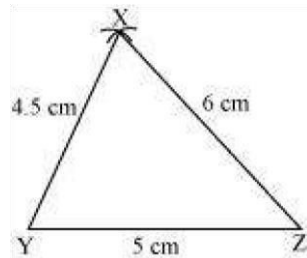
(i) Draw a line segment YZ of length 5 cm.



(ii) Point X is at a distance of 4.5 cm from point Y. Therefore, taking point Y as centre, draw an arc of 4.5 cm radius.



(iii) Point X is at a distance of 6 cm from point Z. Therefore, taking point Z as centre, draw an arc of 6 cm radius. Mark the point of intersection of the arcs as X. Join XY and XZ.



XYZ is the required triangle.

**Q2 :**

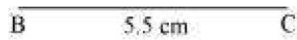
**Construct an equilateral triangle of side 5.5 cm.**

**Answer :**

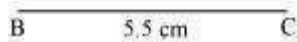
An equilateral triangle of side 5.5 cm has to be constructed. We know that all sides of an equilateral triangle are of equal length.

Therefore, a triangle ABC has to be constructed with  $AB = BC = CA = 5.5$  cm.

The steps of construction are as follows.

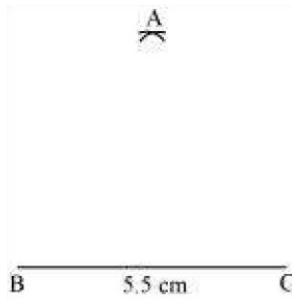


(ii) Taking point B as centre, draw an arc of 5.5 cm radius.

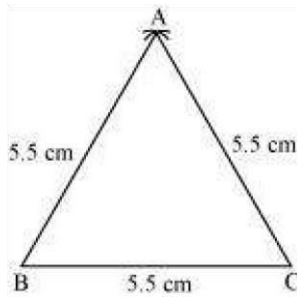


(i) Draw a line segment BC of length 5.5 cm.

(iii) Taking point C as centre, draw an arc of 5.5 cm radius to meet the previous arc at point A.



(iv) Join A to B and C.



ABC is the required equilateral triangle.

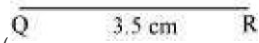
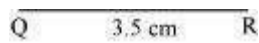
**Q3 :**

Draw  $\Delta PQR$  with  $PQ = 4$  cm,  $QR = 3.5$  cm and  $PR = 4$  cm. What type of triangle is this?

**Answer :**

The steps of construction are as follows.

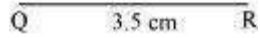
(i) Draw a line segment QR of length 3.5 cm.



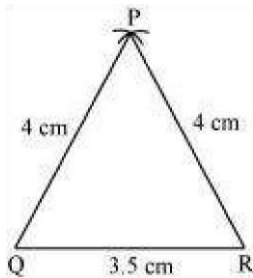
(ii) Taking point Q as centre, draw an arc of 4 cm radius.

(iii) Taking point R as centre, draw an arc of 4 cm radius to intersect the previous arc at point P.





(iv) Join P to Q and R.



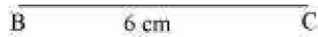
$\Delta PQR$  is the required triangle. As the two sides of this triangle are of the same length ( $PQ = PR$ ), therefore,  $\Delta PQR$  is an isosceles triangle.

**Q4 :**

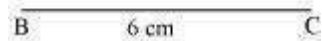
**Construct  $\Delta ABC$  such that  $AB = 2.5$  cm,  $BC = 6$  cm and  $AC = 6.5$  cm. Measure  $\angle B$ .**

**Answer :**

The steps of construction are as follows.



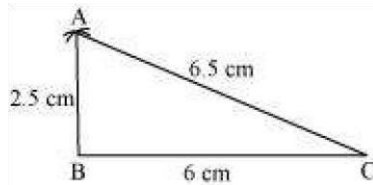
(ii) Taking point C as centre, draw an arc of 6.5 cm radius.



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



(iii) Taking point B as centre, draw an arc of radius 2.5 cm to meet the previous arc at point A.  
 ((iv) Join A to B and C.



$\triangle ABC$  is the required triangle.  $\angle B$  can be measured with the help of protractor. It comes to  $90^\circ$ .

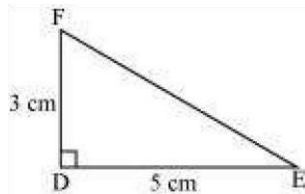
**Exercise 10.3 : Solutions of Questions on Page Number : 200 Q1**

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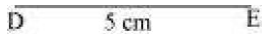
**Construct  $\triangle DEF$  such that  $DE = 5$  cm,  $DF = 3$  cm and  $m\angle EDF = 90^\circ$ .**

**Answer :**

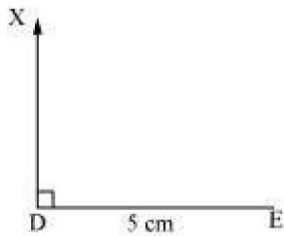
The rough sketch of the required  $\triangle DEF$  is as follows.



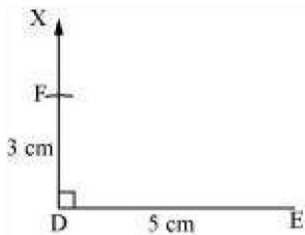
The steps of construction are as follows.



(ii) At point D, draw a ray DX making an angle of  $90^\circ$  with DE.



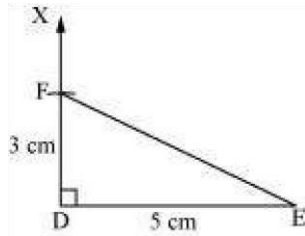
(iii) Taking D as centre, draw an arc of 3 cm radius. It will intersect DX at point F.



DE of length 5 cm.

(iv) Join F to E.  $\triangle DEF$  is the required triangle.

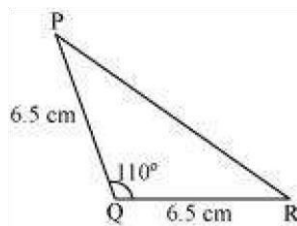
( i) Draw a line segment



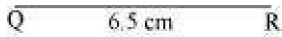
**Q2 :**  
**Construct an isosceles triangle in which the lengths of each of its equal sides is 6.5 cm and the angle between them is  $110^\circ$ .**

**Answer :**

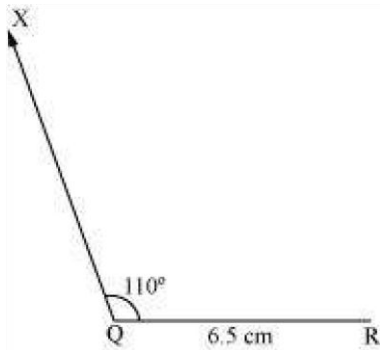
An isosceles triangle PQR has to be constructed with  $PQ = QR = 6.5$  cm. A rough sketch of the required triangle can be drawn as follows.



The steps of construction are as follows.

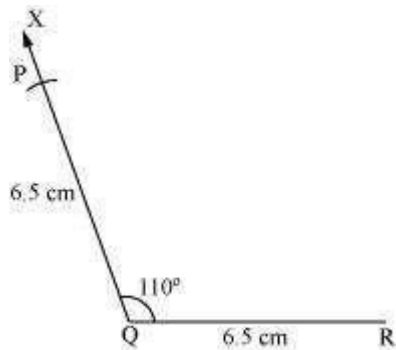


(ii) At point Q, draw a ray QX making an angle  $110^\circ$  with QR.

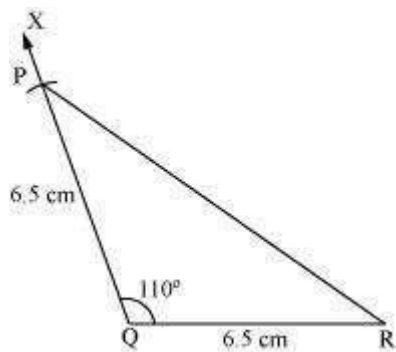


(i) Draw the line segment QR of length 6.5 cm.

(iii) Taking Q as centre, draw an arc of 6.5 cm radius. It intersects QX at point P.



(iv) Join P to R to obtain the required triangle PQR.

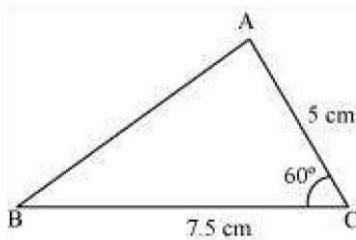


**Q3 :**

**Construct  $\triangle ABC$  with  $BC = 7.5$  cm,  $AC = 5$  cm and  $m\angle C = 60^\circ$ .**

**Answer :**

A rough sketch of the required triangle is as follows.

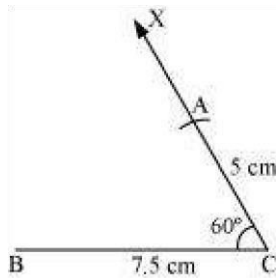
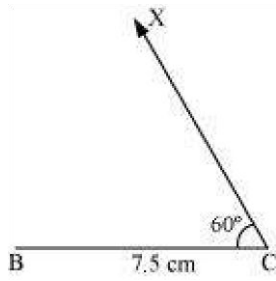


The steps of construction are as follows.

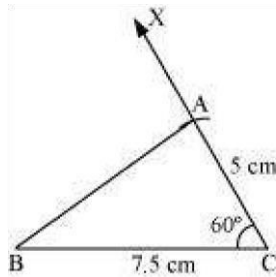
(i) Draw a line segment BC of length 7.5 cm.



(ii) At point C, draw a ray CX making  $60^\circ$  with BC.



(iv) Join A to B to obtain triangle ABC.



(iii) Taking C as centre, draw an arc of 5 cm radius. It intersects CX at point A.

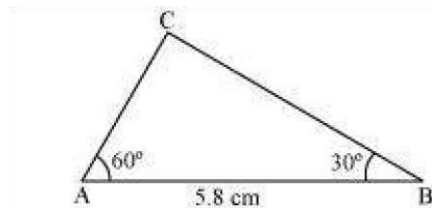
**Exercise 10.4 : Solutions of Questions on Page Number : 202 Q1**

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**Construct  $\triangle ABC$ , given  $m\angle A = 60^\circ$ ,  $m\angle B = 30^\circ$  and  $AB = 5.8$  cm.**

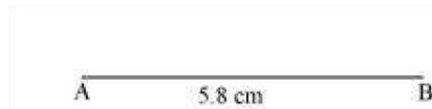
**Answer :**

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

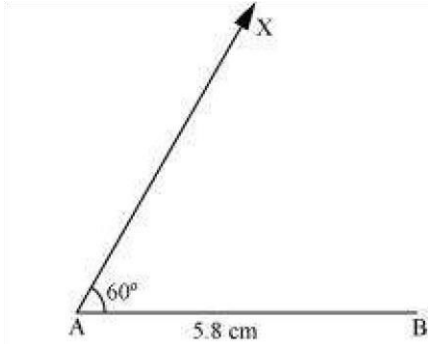


The steps of construction are as follows.

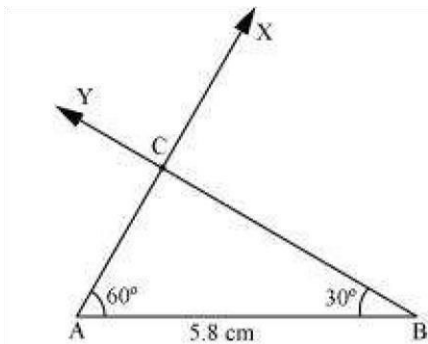
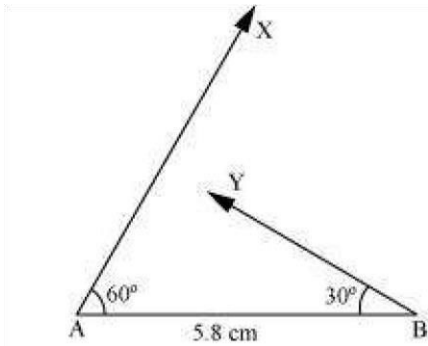
(i) Draw a line segment AB of length 5.8 cm.



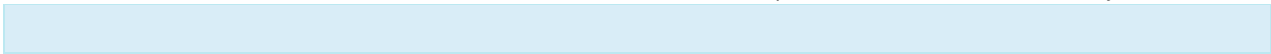
(ii) At point A, draw a ray AX making  $60^\circ$  angle with AB.



(iii) At point B, draw a ray BY, making  $30^\circ$  angle with AB.



(This is the required triangle ABC. iv) Point C has to lie on both the rays, AX and BY. Therefore, C is the point of intersection of these two rays.



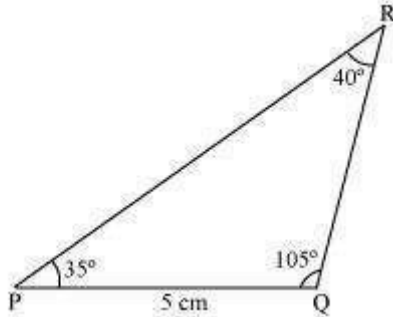
**Q2 :**

Construct  $\Delta PQR$  if  $PQ = 5$  cm,  $m\angle PQR = 105^\circ$  and  $m\angle QRP = 40^\circ$ .

(Hint: Recall sum property of a triangle).

**Answer :**

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



In order to construct  $\Delta PQR$ , the measure of  $\angle RPQ$  has to be calculated.

According to the angle sum property of triangles,  $\angle$

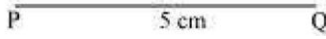
$$\angle PQR + \angle PRQ + \angle RPQ = 180^\circ$$

$$105^\circ + 40^\circ + \angle RPQ = 180^\circ$$

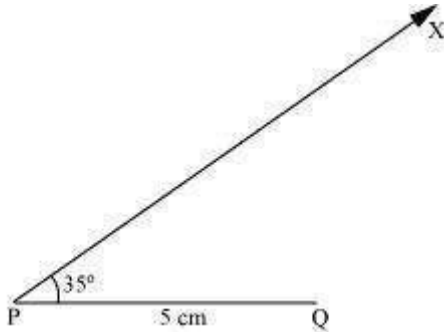
$$145^\circ + \angle RPQ = 180^\circ$$

$$\angle RPQ = 180^\circ - 145^\circ = 35^\circ$$

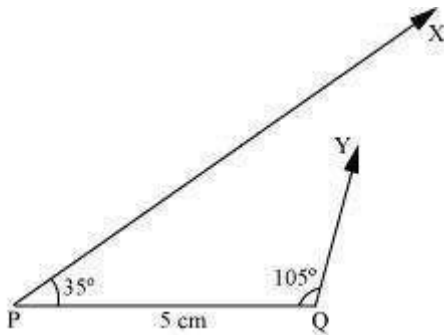
The steps of construction are as follows.



(ii) At P, draw a ray PX making an angle of  $35^\circ$  with PQ.

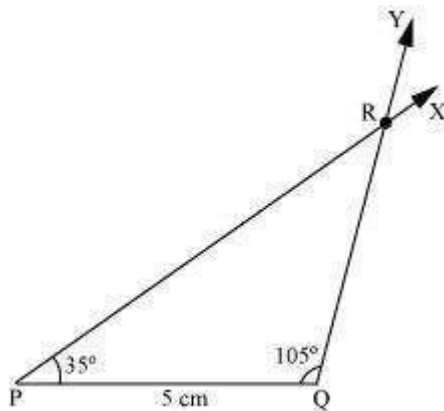


(iii) At point Q, draw a ray QY making an angle of  $105^\circ$  with PQ.



(i) Draw a line segment PQ of length 5 cm.

(iv) Point R has to lie on both the rays, PX and QY. Therefore, R is the point of intersection of these two rays.



This is the required triangle PQR.

**Q3 :**

Examine whether you can construct  $\triangle DEF$  such that  $EF = 7.2$  cm,  $m\angle E = 110^\circ$  and

$m\angle F = 80^\circ$ . Justify your answer.



**Answer :** Given

that,

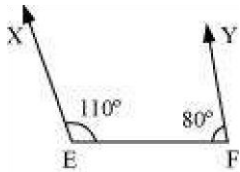
$m\angle E = 110^\circ$  and  $m\angle F = 80^\circ$  Therefore,

$$m\angle E + m\angle F = 110^\circ + 80^\circ = 190^\circ$$

However, according to the angle sum property of triangles, we should obtain  $m$

$$m\angle E + m\angle F + m\angle D = 180^\circ$$

Therefore, the angle sum property is not followed by the given triangle. And thus, we cannot construct  $\triangle DEF$  with the given measurements.



Also, it can be observed that point D should lie on both rays, EX and FY, for constructing the required triangle. However, both rays are not intersecting each other. Therefore, the required triangle cannot be formed.

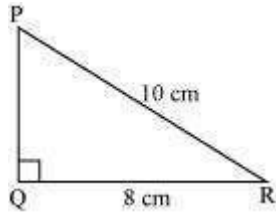
**Exercise 10.5 :** Solutions of Questions on Page Number : 203 Q1

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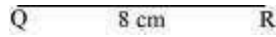
**Construct the right angled  $\triangle PQR$ , where  $m\angle Q = 90^\circ$ ,  $QR = 8$  cm and  $PR = 10$  cm.**

**Answer :**

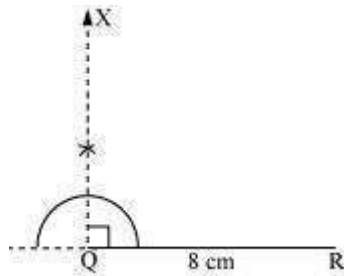
A rough sketch of  $\Delta PQR$  is as follows.



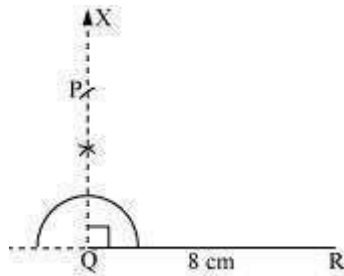
The steps of construction are as follows.



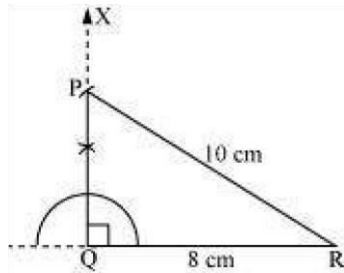
(ii) At point Q, draw a ray QX making  $90^\circ$  with QR.



(iii) Taking R as centre, draw an arc of 10 cm radius to intersect ray QX at point P.



(iv) Join P to R.  $\Delta PQR$  is the required right-angled triangle.



segment QR of length 8 cm.

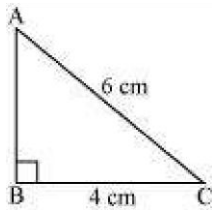
(i) Draw a line

**Q2 :**

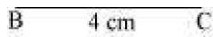
Construct a right-angled triangle whose hypotenuse is 6 cm long and one of the legs is 4 cm long.

**Answer :**

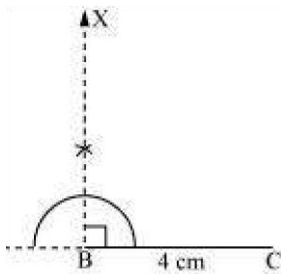
A right-angled triangle ABC with hypotenuse 6 cm and one of the legs as 4 cm has to be constructed. A rough sketch of  $\Delta ABC$  is as follows.



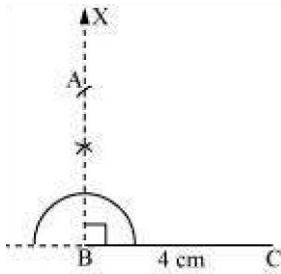
The steps of construction are as follows.



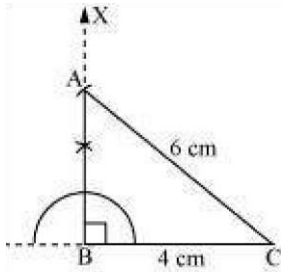
(ii) At point B, draw a ray BX making an angle of  $90^\circ$  with BC.



(iii) Taking C as centre, draw an arc of 6 cm radius to intersect ray BX at point A.



(iv) Join A to C to obtain the required  $\Delta ABC$ .



( i ) Draw a line

segment BC of length 4 cm.

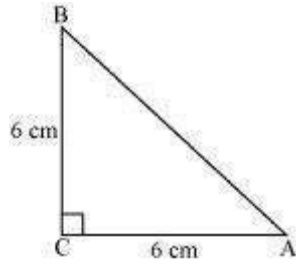
**Q3 :**

Construct an isosceles right-angled triangle ABC, where,  $m\angle ACB = 90^\circ$  and  $AC = 6$  cm.

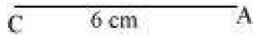
**Answer :**

In an isosceles triangle, the lengths of any two sides are equal.

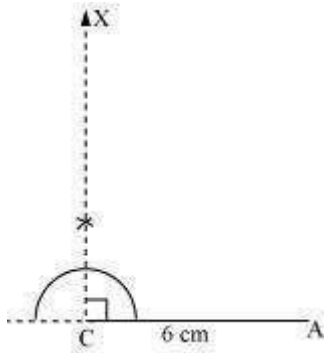
Let in  $\triangle ABC$ ,  $AC = BC = 6$  cm. A rough sketch of this  $\triangle ABC$  is as follows.



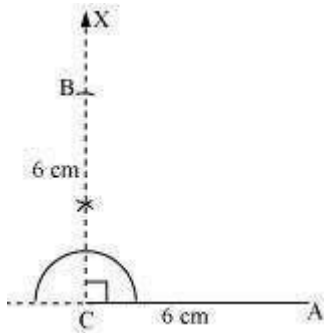
The steps of construction are as follows.



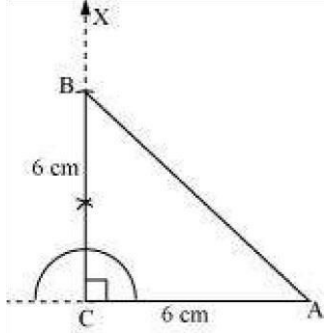
(ii) At point C, draw a ray CX making an angle of  $90^\circ$  with AC.



(iii) Taking point C as centre, draw an arc of 6 cm radius to intersect CX at point B.



(iv) Join A to B to obtain the required  $\triangle ABC$ .



segment AC of length 6 cm.

(i) Draw a line

