

Handout-3/4

In the previous session, triangles are constructed if the given data satisfies the properties of triangles. Whereas if all the three measures of a triangle are given, all of us will get different sizes of triangles with the same measures of angles. So, in order to construct a **UNIQUELY** i.e the same shape and size of the triangle, though orientation is different, it is needed to fulfil some other conditions of triangle i.e. the concept of CONGRUENCE of triangles.

To recall, SSS criterion: Two triangles are said to be **congruent** if and only if three sides of one triangle **correspondingly** equal to the three sides of another.

Similarly, SAS, ASA and RHS criterion of triangles.

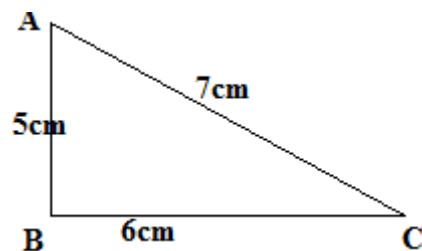
So, triangle can be constructed uniquely if and only if any one of the following sets of measurements is given:

- a) Three sides (**SSS Criterion**)
- b) Two sides and the angle between them. (**SAS Criterion**)
- c) Two angles and the side between them. (**ASA Criterion**)
- d) The hypotenuse and a leg in the case of a right angled triangle. (**RHS Criterion**)

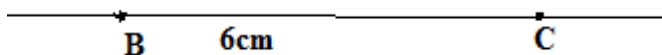
D) CONSTRUCTION OF A TRIANGLE WHEN THE LENGTHS OF ITS THREE SIDES ARE KNOWN (SSS CRITERION)

Example: Construct a $\triangle ABC$, given that $AB=5\text{cm}$ $BC=6\text{cm}$ $AC=7\text{cm}$

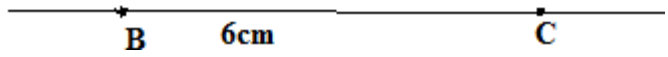
Step: 1) Draw a rough sketch with the given measurements (to decide how to proceed to the construction of the required triangle)



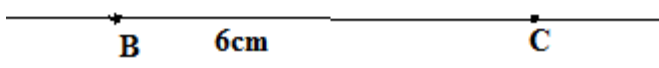
Step: 2) Draw a line segment BC of length 6cm.



Step:3) From B, Point 'A' is at a distance of 5cm. So, with B as centre, draw an arc of radius 5cm. (Now the point 'A' will be somewhere on this arc)

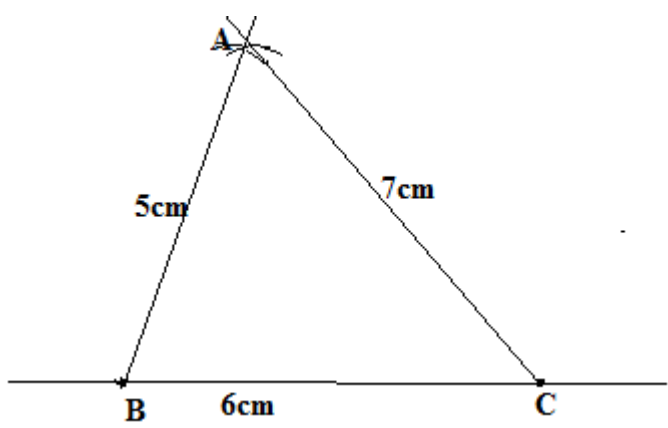


Step:4) From 'C', point 'A' is at a distance of 7cm. So, with C as centre, draw an arc of radius 7cm. (The point 'A' will be somewhere on this arc.)



Step:5) 'A' has to be on both the arcs drawn. So, it is the point of intersection of arcs.

Mark the point of intersection of arcs as A. Join AB and AC.

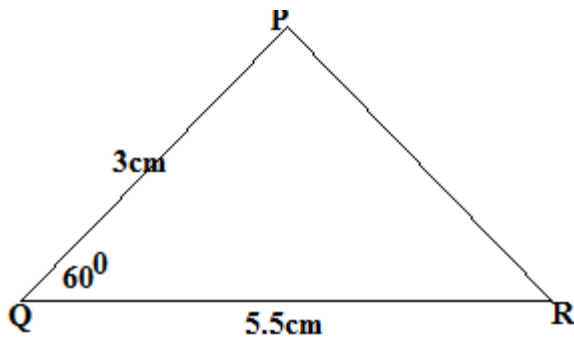


The required ΔABC is formed.

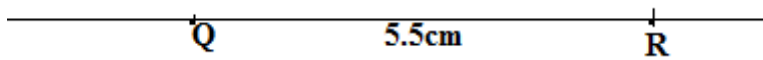
II) CONSTRUCTION OF A TRIANGLE WHEN THE LENGTHS OF TWO SIDES AND THE MEASURE OF THE ANGLE BETWEEN THEM ARE GIVEN (SAS CRITERION)

Example: Construct a ΔPQR , given that $PQ=3cm$ $QR=5.5cm$ and $m \angle PQR=60^\circ$

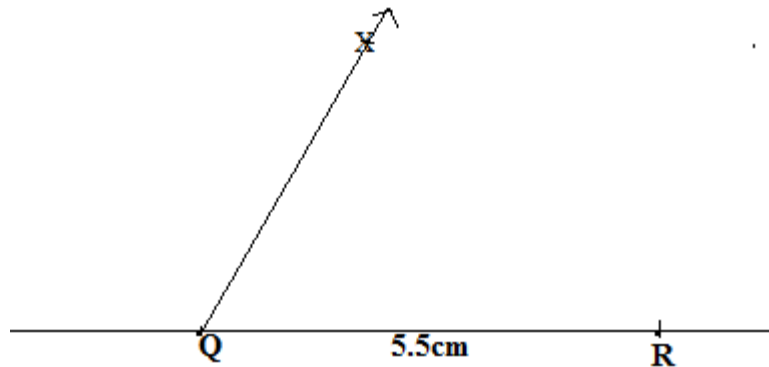
Step: 1) Draw a rough sketch with the given measurements (to decide how to proceed to the construction of the required triangle)



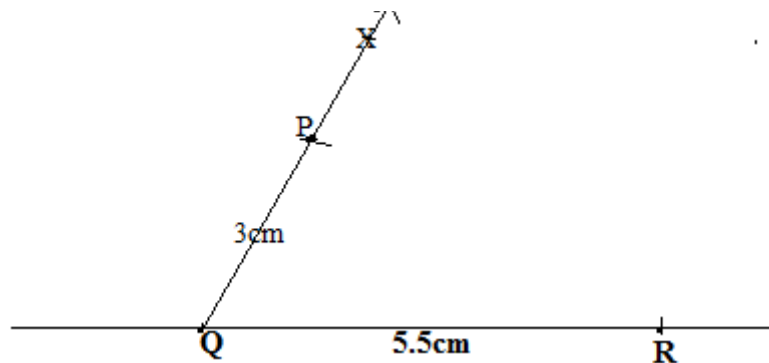
Step:2) Draw a line segment QR of length 5.5cm



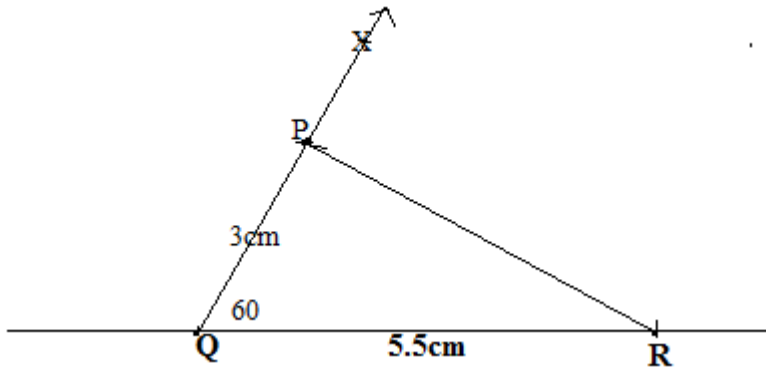
Step:3) At 'Q', draw QX making 60° with QR. (The point 'P' must be somewhere on the ray of the angle)



Step: 4) With 'Q' as centre, draw an arc of radius 3cm. It cuts QX at the point 'P'



Step: 5) Join PR.



The required ΔPQR is formed.

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