CLASS - VIII

CHAPTER – 4

Module – 1/2

PRACTICAL GEOMETRY

1. Introduction:

We require three measurements (of sides and angles) to draw a unique triangle.

Since three measurements were enough to draw a triangle, a natural question arises whether four measurements would be sufficient to draw a unique four sided closed figure, namely, a quadrilateral.

No, five measurements can determine a quadrilateral uniquely.

2. Constructing a Quadrilateral:

We shall learn how to construct a unique quadrilateral given the following measurements:

- When four sides and one diagonal are given.
- When two diagonals and three sides are given.
- When two adjacent sides and three angles are given.
- When three sides and two included angles are given.
- When other special properties are known.

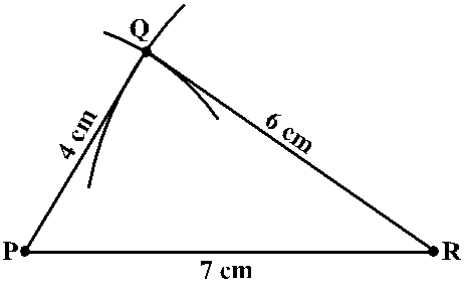
Let us take up these constructions one-by-one.

2.1 When the lengths of four sides and a diagonal are given

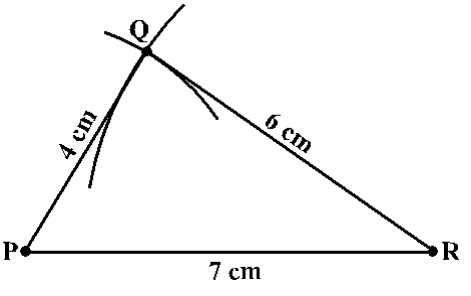
We shall explain this construction through an example.

Example 1: Construct a quadrilateral PQRS where PQ = 4 cm,QR = 6 cm, RS = 5 cm, PS = 5.5 cm and PR = 7 cm.

Step 1 From the rough sketch, it is easy to see that PQR can be constructed using SSS construction condition. Draw PQR.

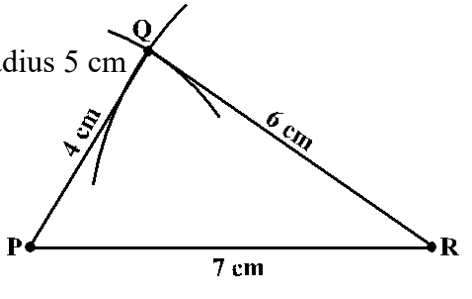


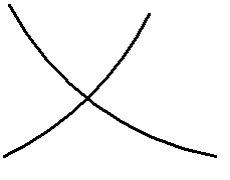
Step 2 Now, we have to locate the fourth point S. This 'S' would be on the side opposite to Q with reference to PR. For that, we have two measurements.



S is 5.5 cm away from P. So, with P as centre, draw an arc of radius 5.5 cm. (The point S is somewhere on this arc!).

Step 3 S is 5 cm away from R. So with R as centre, draw an arc of radius 5 cm (The point S is somewhere on this arc also!) (Fig 4.8).

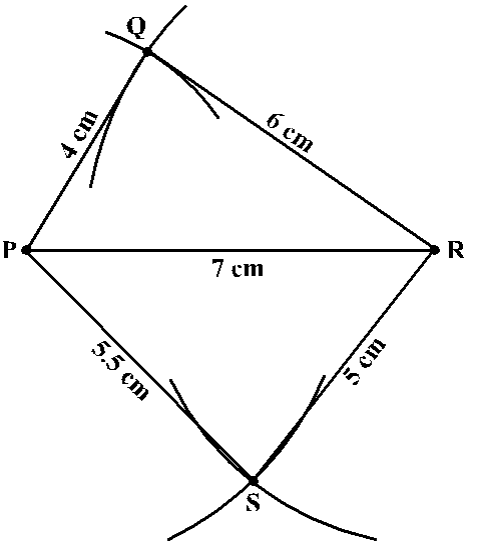




Step 4 S should lie on both the arcs drawn.

So it is the point of intersection of the two arcs. Mark S and complete PQRS.

PQRS is the required quadrilateral.



EXERCISE 1

1. Construct the following quadrilaterals.

(i) Quadrilateral ABCD.

AB = 4.5 cm

BC = 5.5 cm

CD = 4 cm

AD = 6 cm

AC = 7 cm

(ii) Quadrilateral JUMP

JU = 3.5 cm

UM = 4 cm

MP = 5 cm

PJ = 4.5 cm

PU = 6.5 cm

(iii) Parallelogram MORE

OR = 6 cm

RE = 4.5 cm

EO = 7.5 cm

(iv) Rhombus BEST

BE = 4.5 cm

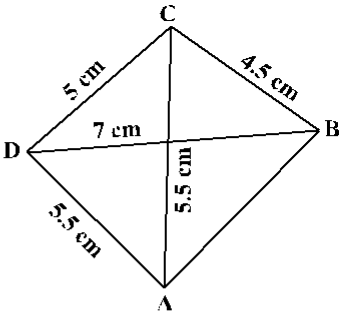
ET = 6 cm

2.2 When two diagonals and three sides are given:

When four sides and a diagonal were given, we first drew a triangle with the available data and then tried to locate the fourth point. The same technique is used here.

Example 2: Construct a quadrilateral ABCD, given that BC = 4.5 cm, AD = 5.5 cm, CD = 5 cm the diagonal AC = 5.5 cm and diagonal BD = 7 cm.

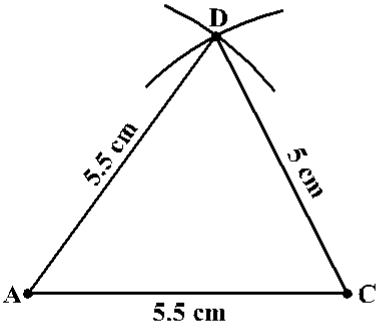
Solution:



Here is the rough sketch of the quadrilateral ABCD.

Studying this sketch, we can easily see

that it is possible to draw ACD first (How?).

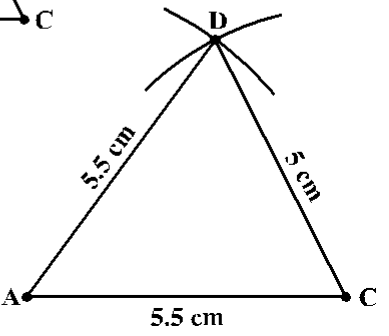


Step 1 Draw ACD using SSS

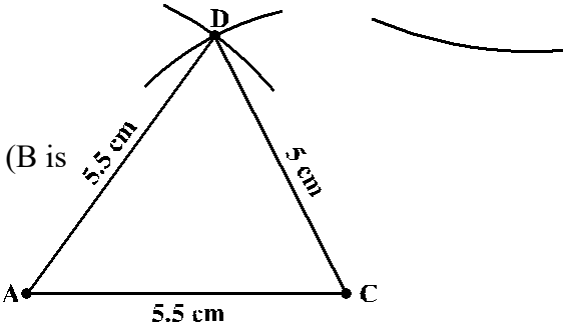
construction (Fig 4.11).

(We now need to find B at a distance

of 4.5 cm from C and 7 cm from D).



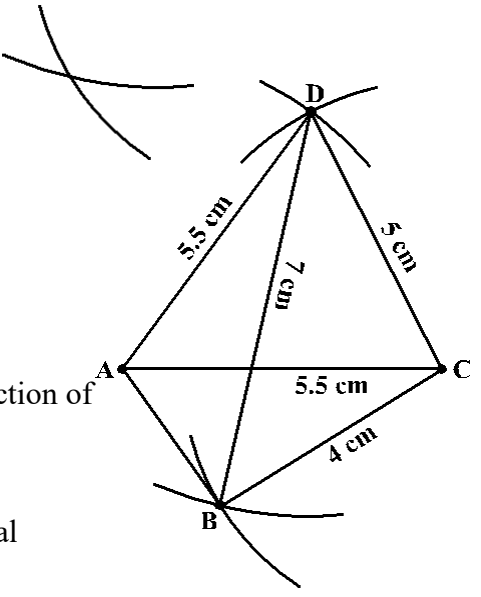
Step 2 With D as centre, draw an arc of radius 7 cm. (B is somewhere on this arc).



Step 3 With C as centre, draw an arc of

radius 4.5 cm (B is somewhere on

this arc also).



Step 4 Since B lies on both the arcs, B is the point intersection of the two arcs. Mark B and complete ABCD.

ABCD is the required quadrilateral

EXERCISE 2

1. Construct the following quadrilaterals.

(i) quadrilateral LIFT

LI = 4 cm

IF = 3 cm

TL = 2.5 cm

LF = 4.5 cm

IT = 4 cm

(ii) Quadrilateral GOLD

OL = 7.5 cm

GL = 6 cm

GD = 6 cm

LD = 5 cm

OD = 10 cm

(iii) Rhombus BEND

BN = 5.6 cm

DE = 6.5 cm

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