CLASS - VIII

CHAPTER – 4

Module – 2/2

PRACTICAL GEOMETRY

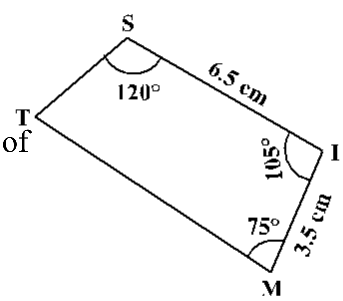
2.3 When two adjacent sides and three angles are known:

As before, we start with constructing a triangle and then look for the fourth point to complete the quadrilateral.

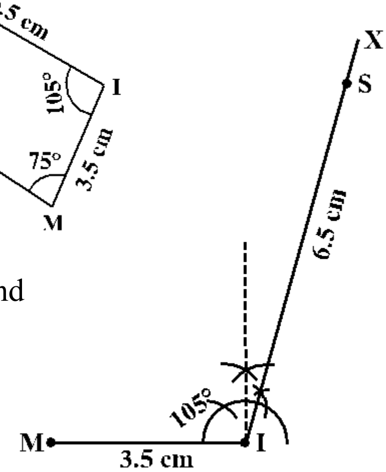
Example 3: Construct a quadrilateral MIST where MI = 3.5 cm, IS = 6.5 cm, ∠M = 75°, ∠I = 105° and ∠S = 120°.

Solution:

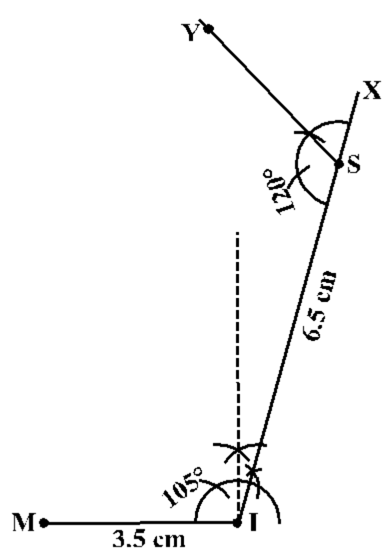
Here is a rough sketch that would help us in deciding our steps of construction. We give only hints for various steps:



Step 1 How do you locate the points? What choice do you make for the base and what is the first step? (Fig 4.16)

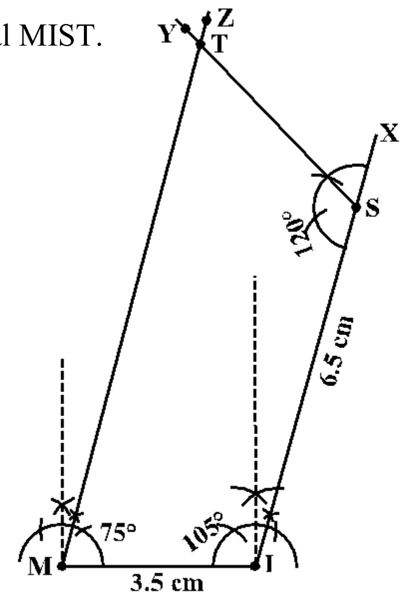


Step 2 Make ∠ISY = 120° at S (Fig 4.17).



Step 3 Make ∠IMZ = 75° at M. (where will SY and MZ meet?) Mark that point as T.

We get the required quadrilateral MIST.



EXERCISE 3

1. Construct the following quadrilaterals.

(i) Quadrilateral MORE

MO = 6 cm

OR = 4.5 cm

∠M = 60°

∠O = 105°

∠R = 105°

(ii) Quadrilateral PLAN

PL = 4 cm

LA = 6.5 cm

∠P = 90°

∠A = 110°

∠N = 85°

(iii) Parallelogram HEAR

HE = 5 cm

EA = 6 cm

∠R = 85°

(iv) Rectangle OKAY

OK = 7 cm

KA = 5 cm

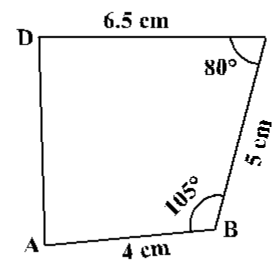
2.4 When three sides and two included angles are given

Under this type, when you draw a rough sketch, note carefully the “included” angles in particular.

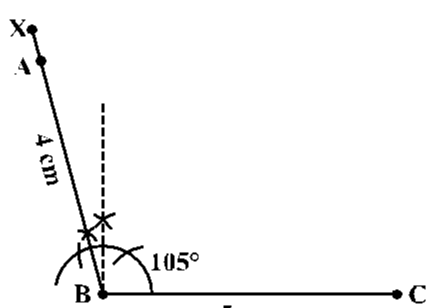
Example 4: Construct a quadrilateral ABCD, where AB= 4 cm, BC = 5 cm, CD = 6.5 cm and ∠B = 105° and ∠C = 80°.

Solution:

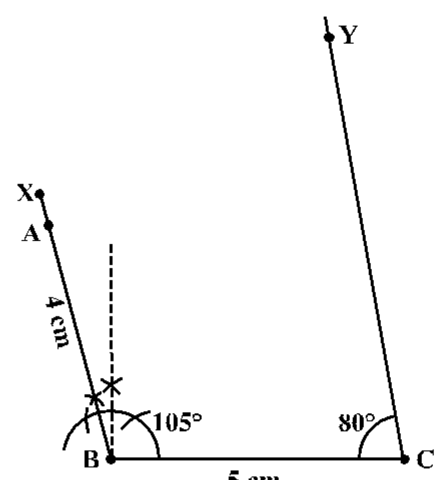
We draw a rough sketch, as usual, to get an idea of how we can start off. Then we can devise a plan to locate the four points.



Step 1 Start with taking BC = 5 cm on B. Draw an angle of 105° along BX. Locate A 4 cm away on this. We now have B, C and A (Fig 4.20).

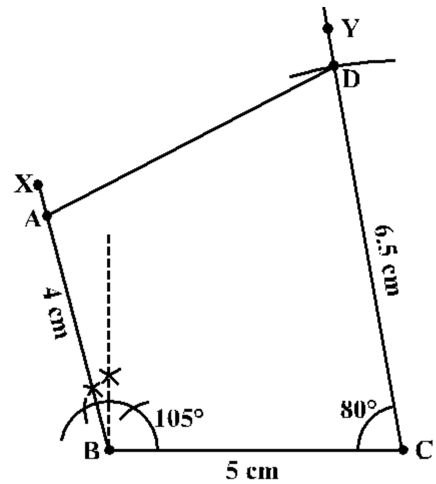


Step 2 The fourth point D is on CY which is inclined at 80° to BC. So make ∠BCY = 80° at C on BC (Fig 4.21).



Step 3 D is at a distance of 6.5 cm on CY. With C as centre, draw an arc of length 6.5 cm. It cuts CY at D.

Step 4 Complete the quadrilateral ABCD. ABCD is the required quadrilateral (Fig 4.23).



EXERCISE 4

1. Construct the following quadrilaterals.

(i) Quadrilateral DEAR

DE = 4 cm

EA = 5 cm

AR = 4.5 cm

$\angle E = 60°$

$\angle A = 90°$

(ii) Quadrilateral TRUE

TR = 3.5 cm

RU = 3 cm

UE = 4 cm

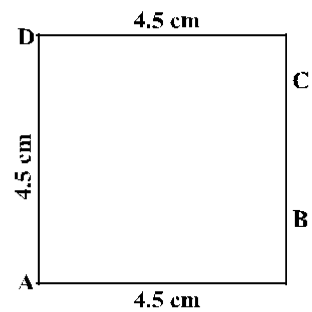
$\angle R = 75°$

$\angle U = 120°$

2.5 Some Special Cases

To draw a quadrilateral, we used 5 measurements in our work. Is there any quadrilateral which can be drawn with less number of available measurements? The following examples examine such special cases.

Example 5: Draw a square of side 4.5 cm.



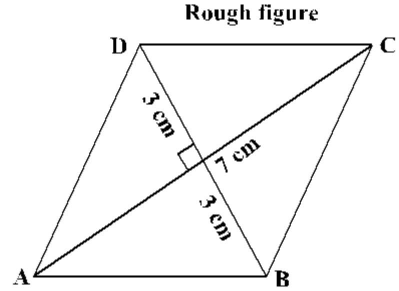
Solution: Initially it appears that only one measurement has been given. Actually we have many more details with us, because the figure is a special quadrilateral, namely a square. We now know that each of its angles is a right angle. (See the rough figure) (Fig 4.24)

This enables us to draw ABC using SAS condition. Then D can be easily located. Try yourself now to draw the square with the given measurements.

Example 6: Is it possible to construct a rhombus ABCD where AC = 6 cm and BD = 7 cm? Justify your answer.

Solution: Only two (diagonal) measurements of the rhombus are given. However, since it is a rhombus, we can find more help from its properties.

Rough figure



The diagonals of a rhombus are perpendicular bisectors of one another.

So, first draw AC = 7 cm and then construct its perpendicular bisector. Let them meet at 0. Cut off 3 cm lengths on either side of the drawn bisector. You now get B and D.

EXERCISE 5

Draw the following.

1. The square READ with RE = 5.1 cm.
2. A rhombus whose diagonals are 5.2 cm and 6.4 cm long.
3. A rectangle with adjacent sides of lengths 5 cm and 4 cm.
4. A parallelogram OKAY where OK = 5.5 cm and KA = 4.2 cm.

****