Chapter 10

Practical Geometry

Practical Geometry

Here, we will learn how to draw parallel lines and some types of triangles.

Construction of line parallel to the given line through a point not lying on the line

We can follow the given steps to construct a line parallel to the given line:-

Step 1: Take a line 'l' and a point 'A' outside 'l'

Step 2: Take any point B on l and join B to A

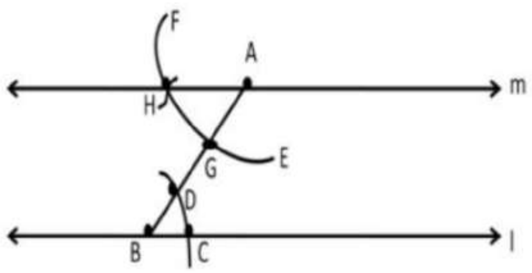
Step 3: With B as center and a convenient radius; draw an arc cutting l at C and BA at D.

Step 4: Now with A as the center and the same radius as in Step 3, draw an arc EF cutting AB at G.

Step 5: Place the pointed tip of the compasses at C and adjust the opening so that the pencil tip is at D.

Step 6: With the same opening as in Step 5 and with G as the center, draw an arc cutting the arc EF at H.

Step 7: Now, join AH to draw a line 'm'.



Construction of triangles

Construction of Triangles
A triangle can be drawn if any one of the following sets of measurements is given:
(i) Three sides.
(ii) Two sides and the angle between them.
(iii) Two angles and the side between them.
(iv) The hypotenuse and a leg in the case of a right-angled triangle.

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

Construct a triangle ABC, given that AB = 5 cm, BC = 6 cm, and AC = 7 cm.

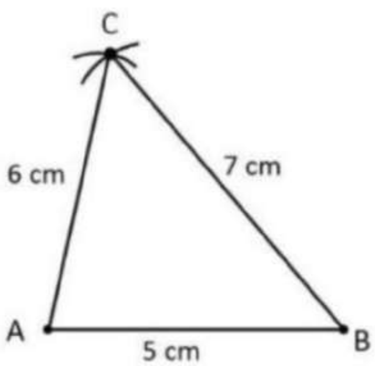
(REFERENCE: NCERT)

Step 1 Draw a line segment BC of length 6 cm

Step 2 From B, point A is at a distance of 5 cm. So, with B as center, draw an arc of radius 5 cm. (Now A will be somewhere on this arc. Our job is to find where exactly A is)

Step 3 From C, point A is at a distance of 7 cm. So, with C as centre, draw an arc of radius 7 cm. (A will be somewhere on this arc, we have to fix it)

Step 4 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. ΔABC is now ready.



CONSTRUCTING A TRIANGLE WHEN THE LENGTHS OF TWO SIDES AND THE MEASURE OF THE ANGLE BETWEEN THEM ARE KNOWN. (SAS CRITERION)

EXAMPLE: Construct a triangle PQR, given that PQ = 3 cm, QR = 5.5 cm and ∠PQR = 60°.

(REFERENCE: NCERT)

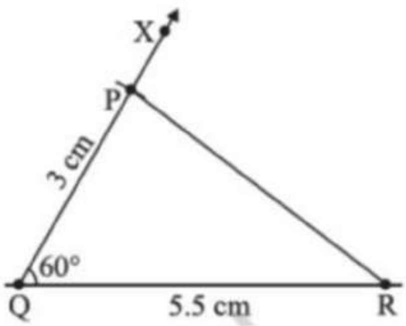
Step 1 First, we draw a rough sketch with given measures. (This helps us to determine the procedure in construction)

Step 2 Draw a line segment QR of length 5.5 cm

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

Step 4 (To fix P, the distance QP has been given). With Q as center, draw an arc of radius 3 cm. It cuts QX at the point P

Step 5 Join PR. ΔPQR is now obtained.



CONSTRUCTING A TRIANGLE WHEN THE MEASURES OF TWO OF ITS ANGLES AND THE LENGTH OF THE SIDE INCLUDED BETWEEN THEM IS GIVEN. (AS A CRITERION)

EXAMPLE : Construct ΔXYZ if it is given that XY = 6 cm, m∠ZXY = 30° and m∠XYZ = 100°.

(REFERENCE: NCERT)

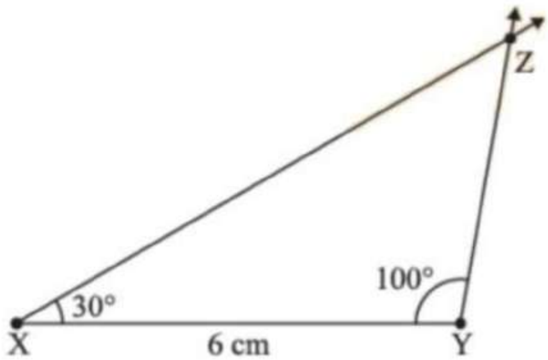
Step 1 we draw a rough sketch with measures marked on it. (This is just to get an idea as to how to proceed)

Step 2 Draw XY of length 6 cm.

Step 3 At X, draw a ray XP making an angle of 30° with XY. By the given condition Z must be somewhere on the XP.

Step 4 At Y, draw a ray YQ making an angle of 100° with YX. By the given condition, Z must be on the ray YQ also.

Step 5 Z has to lie on both the rays XP and YQ. So, the point of intersection of the two rays is Z. ΔXYZ is now completed.



CONSTRUCTING A RIGHT-ANGLED TRIANGLE WHEN THE LENGTH OF ONE LEG AND ITS HYPOTENUSE ARE GIVEN (RHS CRITERION)

EXAMPLE: Construct _LMN, right-angled at M, given that LN = 5 cm and MN = 3 cm.

(REFERENCE: NCERT)

SOLUTION
Step 1 Draw a rough sketch and mark the measures. Remember to mark the right angle

Step 2 Draw MN of length 3 cm.

Step 3 At M, draw MX perpendicular to MN. (L should be somewhere on this perpendicular)

Step 4 With N as center, draw an arc of radius 5 cm. (L must be on this arc since it is at a distance of 5 cm from N)

Step 5 L has to be on the perpendicular line MX as well as on the arc drawn with centre N.
Therefore, L is the meeting point of these two.
ΔLMN is now obtained.