

Chapter – 10

Practical Geometry

Exercise 10.1

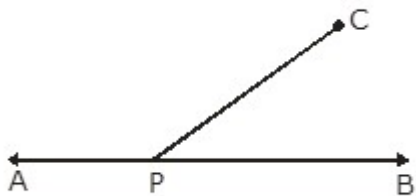
1. Draw a line, say AB, take a point C outside it. Through C, draw a line parallel to AB using ruler and compasses only.

Answer:

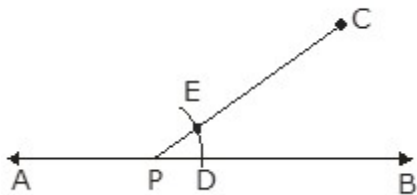
Here,

We have to draw the figure using following steps of construction:

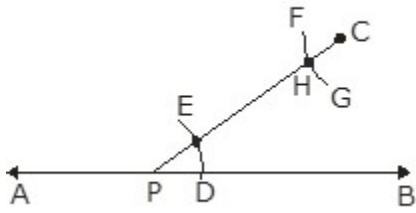
Step 1: Draw a line AB and take a point P on the line AB. Also, take another point C outside the line AB and join PC.



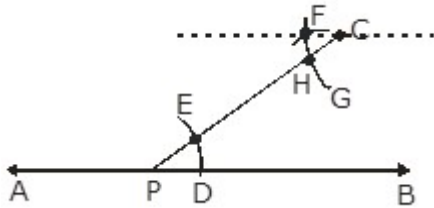
Step 2: Now, taking P as a centre and with a certain radius (which should be much lesser than PC), draw an arc intersecting AB at D and PC at point E.



Step 3: Now taking C as a centre and with the same radius, draw an arc FG intersecting PC at H.

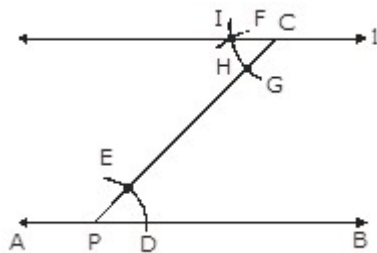


Step 4: Adjust the compasses according to the length of DE. And with the same opening, taking H as a centre, draw another arc intersecting the previous arc at the point I.



Step 5: Now, join CI in order to draw a line 'l'.

This is the desired line parallel to line AB



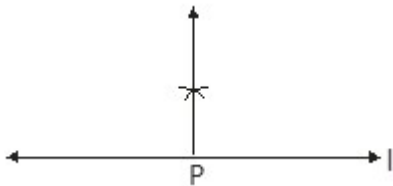
2. Draw a line l. Draw a perpendicular to l at any point on l. On this perpendicular choose a point X, 4 cm away from l. Through X, draw a line m parallel to l.

Answer:

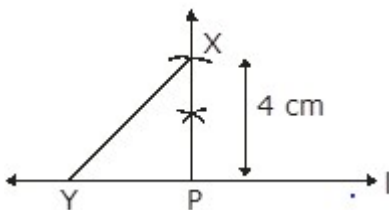
According to the question,

We have to draw figure using following steps of construction:

Step 1: At first, draw a line l and take a point P on the line and hence draw a perpendicular to the line l at point P .

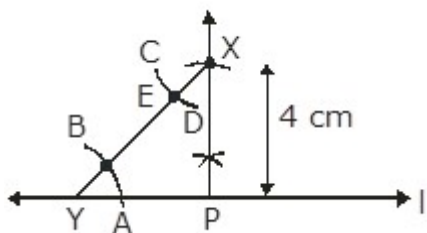


Step 2: Now taking point P as a center and Radius as 4 cm draw an arc intersecting the perpendicular at point X . Then, take any point Y on the line l and join XY .

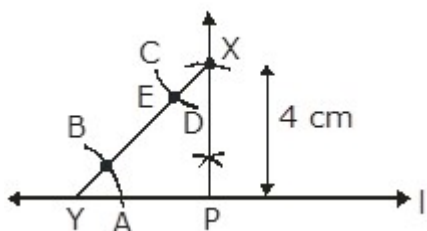


Following are steps to draw a parallel line with reference to line l and passing through X .

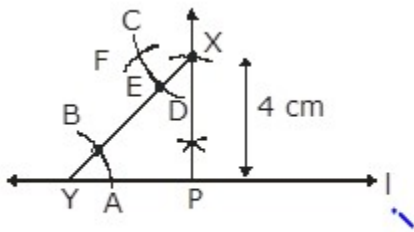
Step 3: Now, taking Y as a center and with certain radius mark an arc intersecting line l at A and XY at B .



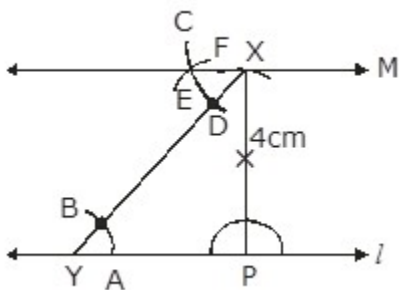
Step 4: Then, with the same previous radius and taking center as X draw an arc CD intersecting XY at E .



Step 5: Adjust the compasses according to the length of AB. And with same opening, taking E as a centre, draw another arc intersecting the previous arc CD at point F.



Step 6: Now, join XF in order to draw a line 'm'

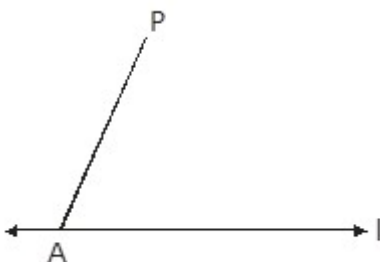


3. Let l be a line and P be a point not on l . Through P , draw a line m parallel to l . Now join P to any point Q on l . Choose any other point R on m . Through R , draw a line parallel to PQ . Let this meet l at S . What shape do the two sets of parallel lines enclose?

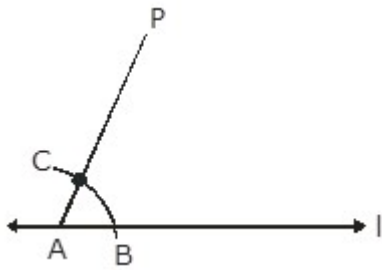
Answer:

We have to draw figure using following steps of construction:

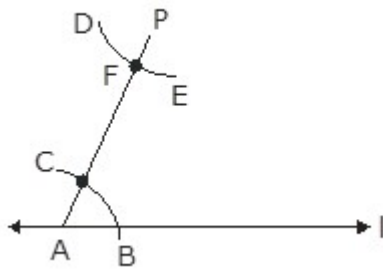
Step 1: Draw a line l and mark one-point A on the line l and the other point P above the line l



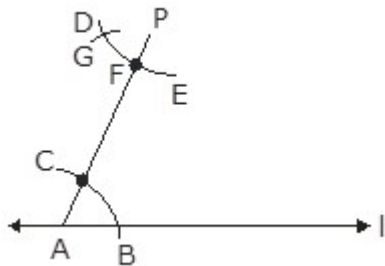
Step 2: With A as a center and a certain radius draw an arc intersecting l at B and AP at C.



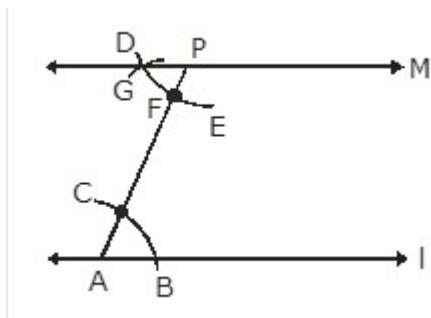
Step 3: Now, with the same radius taking the center as P draw an arc DE cutting AP at F.



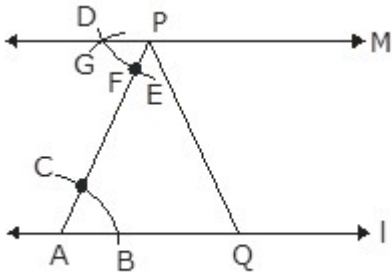
Step 4: Adjust the compasses according to the length of BC. And with same opening, taking F as a center, draw another arc intersecting the previous arc DE at point G.



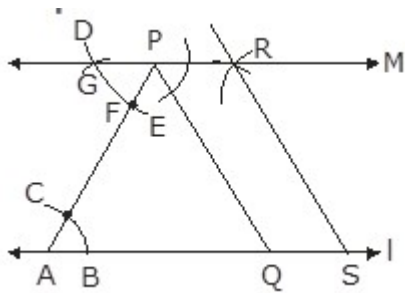
Step 5: Now, join PG to draw a line m which will be parallel to line l



Step 6: Now, join P to Any random point Q on the line l.



Step 7: Then choose another point R on line m. Draw a line from R which is parallel to PQ.



Hence, extend it to meet line l at point S.

\therefore In quadrilateral PQRS opposite lines are parallel to each other.

And PQRS is a parallelogram.

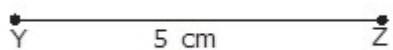
Exercise 10.2

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

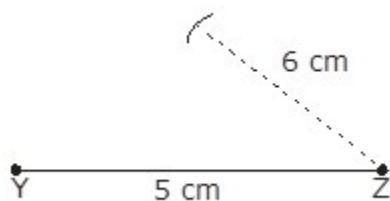
Answer:

We have to draw figure using following steps of construction:

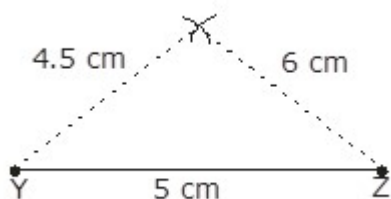
Step 1: Draw a line segment ZY of 5 cm.



Step 2: Taking Z as a center and radius 6 cm mark an arc.

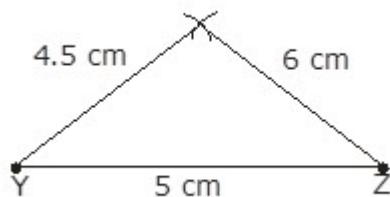


Step 3: Now, taking Y as a center and radius 4.5 cm mark another arc intersecting the previous arc at X .



Step 4: Join Z to X and Y to X

Hence $\triangle XYZ$ is the required triangle.



2. Construct an equilateral triangle of side 5.5 cm.

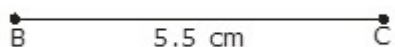
Answer:

Here,

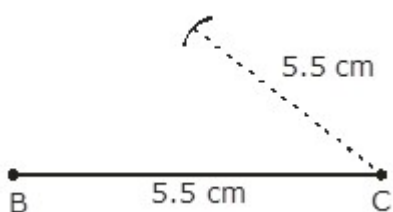
According to the question,

We have to draw figure using following steps of construction:

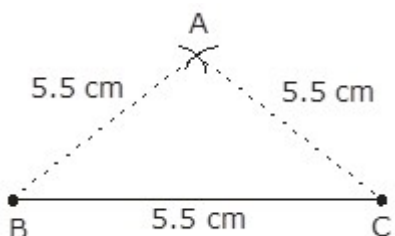
Step 1: Draw a line segment BC of 5.5cm



Step 2: Taking B as a center and radius 5.5 cm mark an arc.

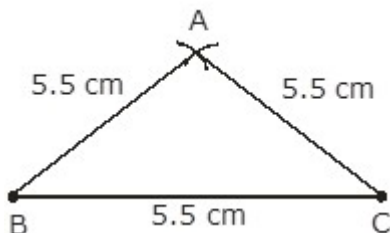


Step 3: Now, taking C as a center and radius 5.5 cm mark another arc intersecting the previous arc at A.



Step 4: Now, join B to A and A to C.

Hence, $\triangle ABC$ is the required triangle.



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

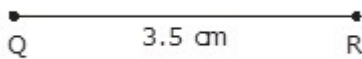
Answer:

Here,

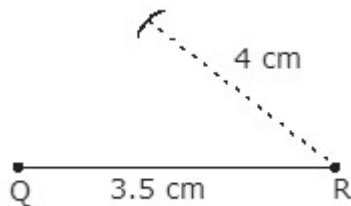
According to the question,

We have to draw figure using following steps of construction:

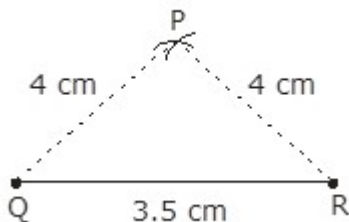
Step 1: Draw a line segment QR of 3.5 cm.



Step 2: Taking Q as a center and radius 4 cm mark an arc.



Step 3: Now, taking R as a center and radius 4 cm mark another arc intersecting the previous arc at P.

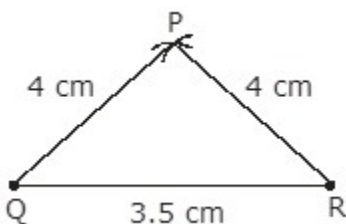


Step 4: Join Q to P and R to P

Hence $\triangle PQR$ is the required triangle.

Since the two sides (PQ and PR) have same length i.e. 4cm.

Thus, $\triangle PQR$ is an isosceles triangle.



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

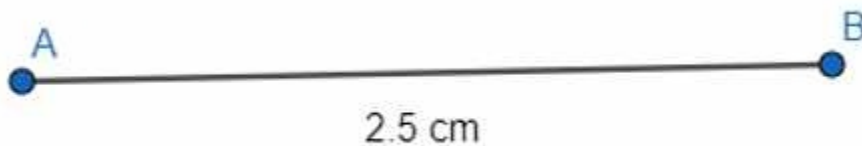
Answer:

Here,

According to the question,

We have to draw figure using following steps of construction:

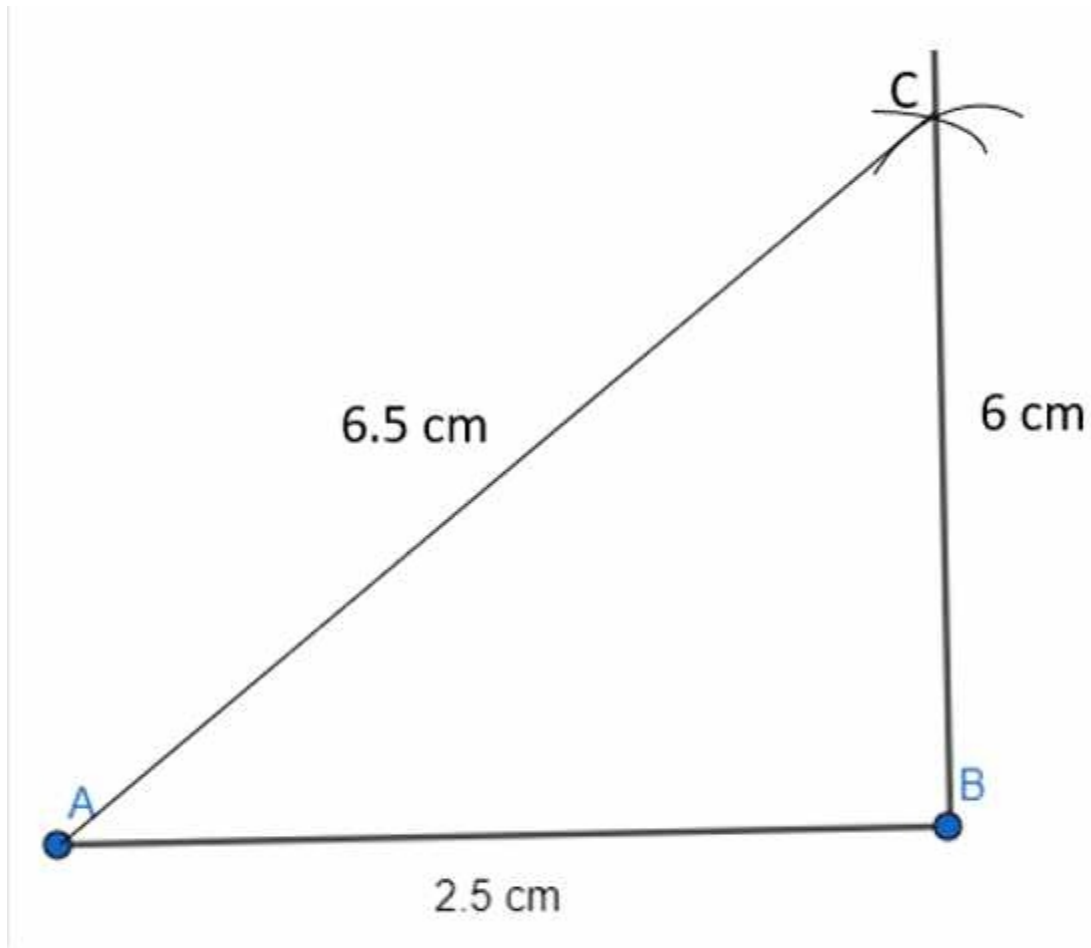
Step 1: Draw a line segment AB of 2.5 cm.



Step 2: Taking B as a center and radius 6 cm mark an arc and from A an arc of 6.5 cm.



Step 3: Join CA and CB .



Hence $\triangle ABC$ is the required triangle.

On measuring we can see

$$\angle ABC = 90^\circ.$$

Exercise 10.3

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

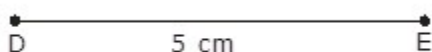
Answer:

Here,

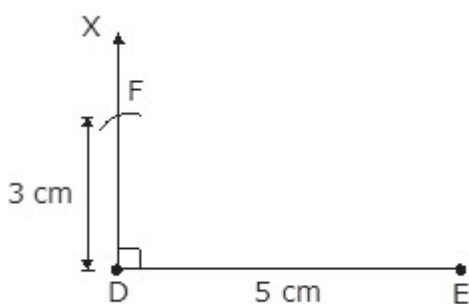
According to the question,

We have to draw figure using following steps of construction:

Step 1: Draw a line segment DE of 5 cm

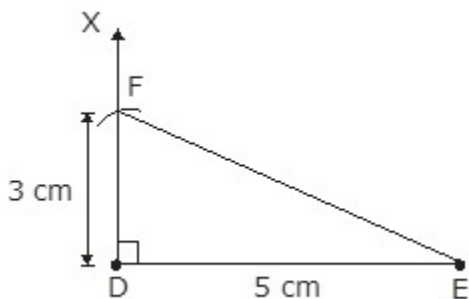


Step 2: Now, from point D draw a ray DX making an angle of 90° from DE and taking D as a center and radius 3 cm mark an arc intersecting DX at F .



Step 3: Join F to E .

Hence $\triangle DEF$ is the required triangle.



2. Construct an isosceles triangle in which the length of each of its equal sides is 6.5 cm and the angle between them is 110° .

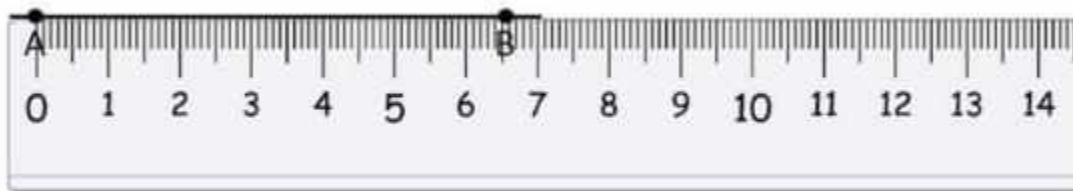
Answer:

Here,

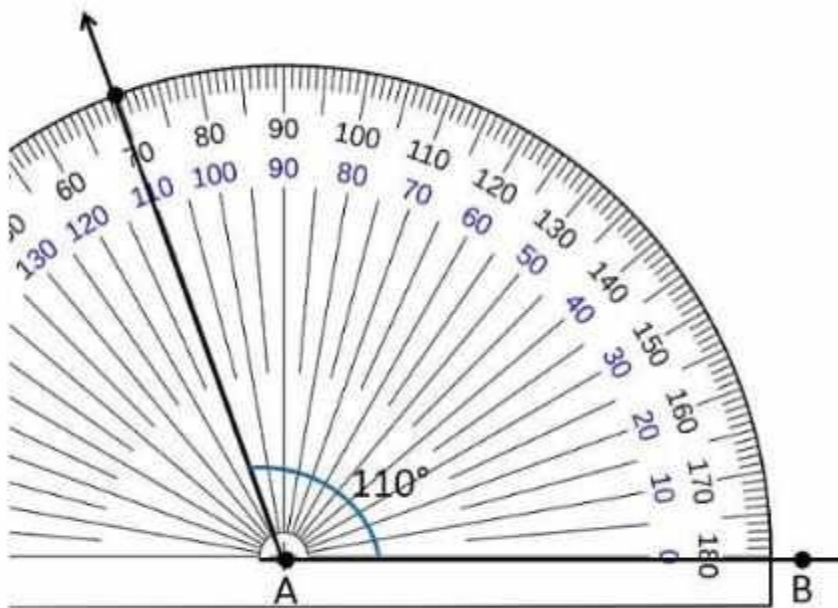
According to the question,

We have to draw figure using following steps of construction:

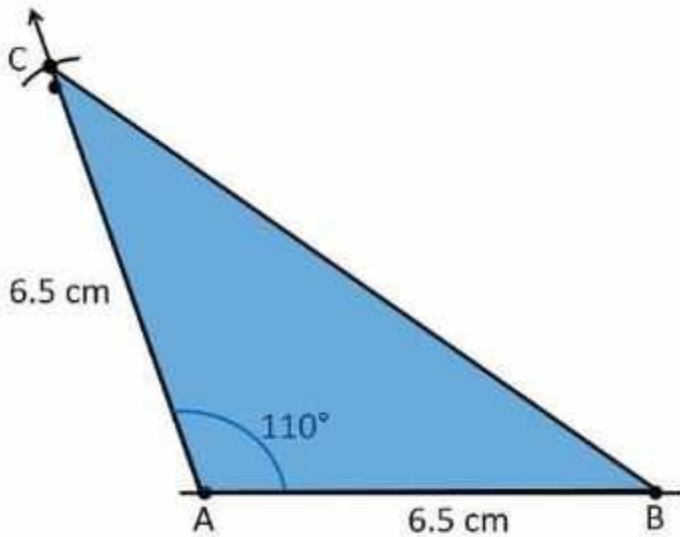
Step 1: Draw a line segment AB of 6.5 cm



Step 2: Now, from point A draw a ray AC making an angle of 110° from AB (with the help of protractor)



Step 3: Now, taking A as a centre and radius 6.5 cm mark an arc intersecting the line drawn in previous step. Mark the intersecting point as C. Final figure is



Hence $\triangle ABC$ is the required triangle.

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

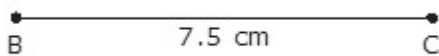
Answer:

Here,

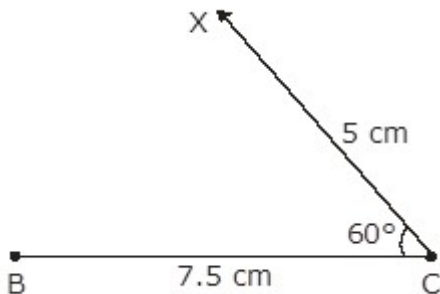
According to the question,

We have to draw figure using following steps of construction:

Step 1: Draw a line segment BC of 7.5 cm

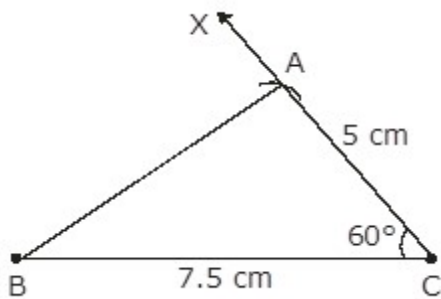


Step 2: Now, from point C draw a ray CX making an angle of 60° from BC .



Step 3: Now, taking C as a center and radius 5 cm mark an arc intersecting CX at A. Then, join A to B.

Hence $\triangle ABC$ is the required triangle.



Exercise 10.4

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

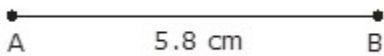
Answer:

Here,

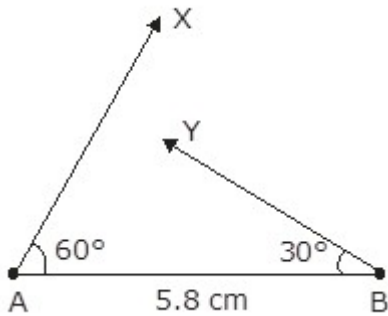
According to the question,

We have to draw figure using following steps of construction:

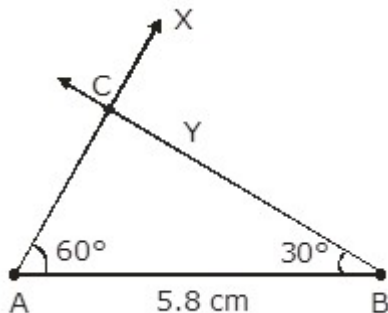
Step 1: Draw a line segment AB of 5.8 cm



Step 2: Now, from point A draw a ray AX making an angle of 60° from AB . And, from B, draw a ray BY from AB making 30° angle.



Step 3: The rays YB and XA will intersect at point C. Hence $\triangle ABC$ is the required triangle.



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

Answer:

Here,

According to the question,

In $\triangle PQR$,

Using angle sum property of triangle,

$$\angle RPQ = 180 - (\angle PQR + \angle QRP)$$

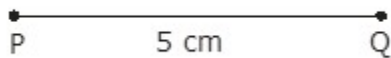
$$= 180 - (105 + 40)$$

$$= 180 - 145$$

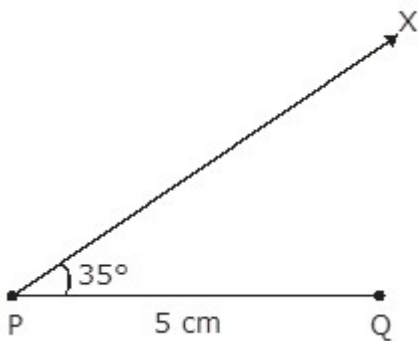
$$\angle RPQ = 35^\circ$$

We have to draw figure using following steps of construction:

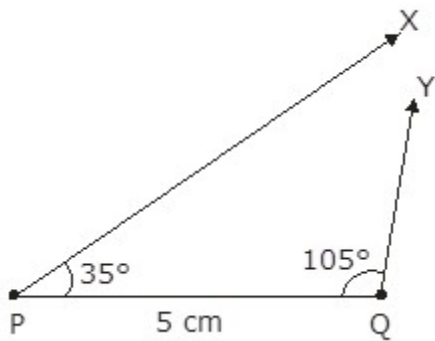
Step 1: Draw a line segment PQ of 5 cm



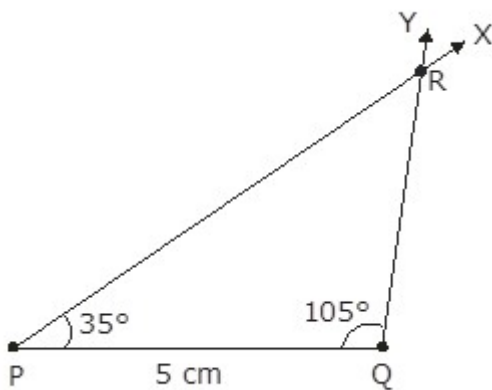
Step 2: Now, from point P draw a ray PX making an angle of 35° from PQ.



Step 3: From Q, draw a ray QY from PQ making 105° angle. and intersecting PX at R



Step 4: The ray QY will intersect with PX at point R. Hence $\triangle ABC$ is the required triangle.



3. 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:

Here,

According to the question,

It is given that,

$$\angle E = 110^\circ \text{ and } \angle F = 80^\circ$$

$$\begin{aligned} \text{That shows that } \angle E + \angle F &= 110 + 80 \\ &= 190^\circ \end{aligned}$$

This is greater than 180°

And, we know that,

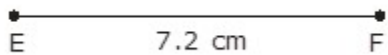
The sum of interior angles of triangle is 180°

Hence,

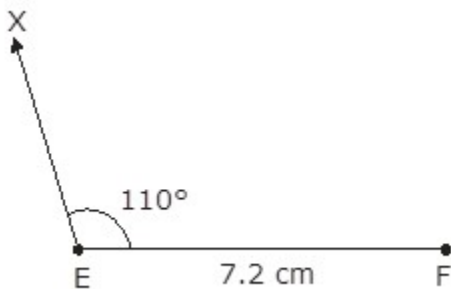
The given measurements cannot form a triangle.

We have to draw figure using following steps of construction:

Step 1: Draw a line segment EF of 7.2 cm



Step 2: Now, from point E draw a ray EX making an angle of 110° from EF.

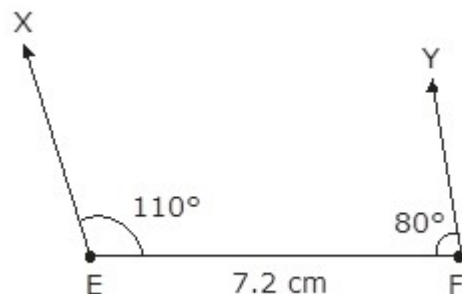


Step 3: From F, draw a ray FY from EF making 80° angle

Now, we can observe that EX and FY does not intersect.

Hence,

The $\triangle DEF$ is not possible.



Exercise 10.5

1. Construct the right-angled ΔPQR , where $m \angle Q = 90^\circ$, $QR = 8\text{cm}$ and $PR = 10\text{cm}$.

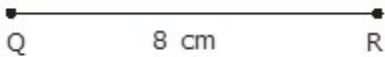
Answer:

Here,

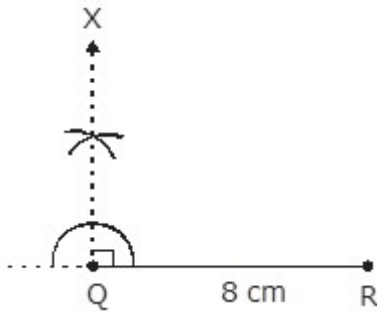
According to the question,

We have to draw figure using following steps of construction:

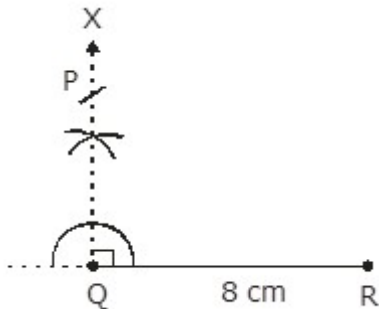
Step 1: Draw a line segment QR of 8 cm



Step 2: Now, From Q construct a ray QX making an angle of 90° with QR.

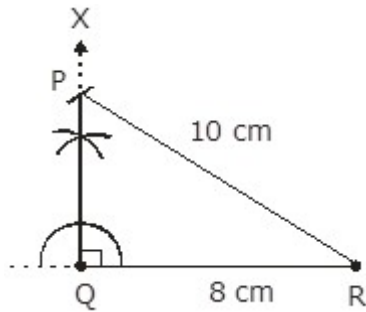


Step 3: Take R as a center and radius of 10 cm draw an arc intersecting QX at P



Step 4: Now, join RP

Hence, ΔPQR is the required triangle.



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

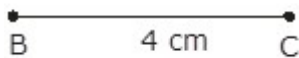
Answer:

Here,

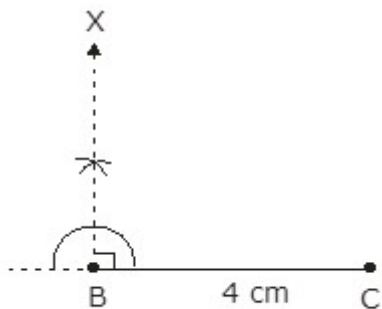
According to the question,

We have to draw figure using following steps of construction:

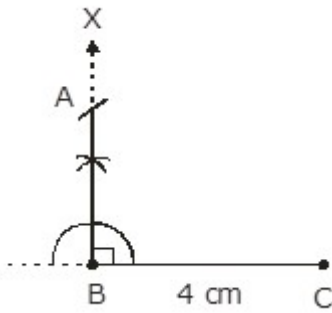
Step 1: Draw a line segment BC of 4 cm



Step 2: Now, From B construct a ray BX making an angle of 90° with BC.

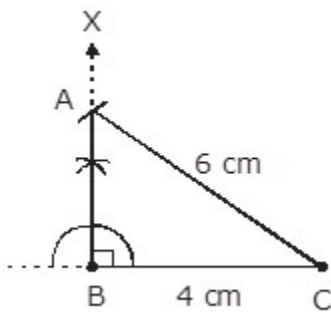


Step 3: Take C as a center and radius of 6 cm draw an arc intersecting BX at A



Step 4: Now, join AC

Hence, $\triangle ABC$ is the required triangle.



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

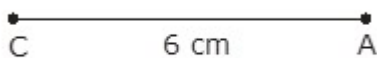
Answer:

Here,

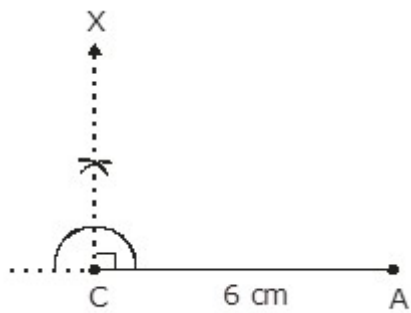
According to the question,

We have to draw figure using following steps of construction:

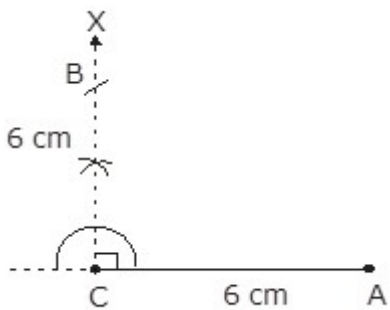
Step 1: Draw a line segment AC of 6cm



Step 2: Now, From C construct a ray CX making an angle of 90° with AC.



Step 3: Take C as a centre and radius of 6cm draw an arc intersecting CX at B



Step 4: Now, join AB

Hence, $\triangle ABC$ is the required triangle.

