

MATHEMATICS NOTES FOR 7TH CLASS (FOR ISLAMABAD)

Chapter 10

PRACTICAL GEOMETRY

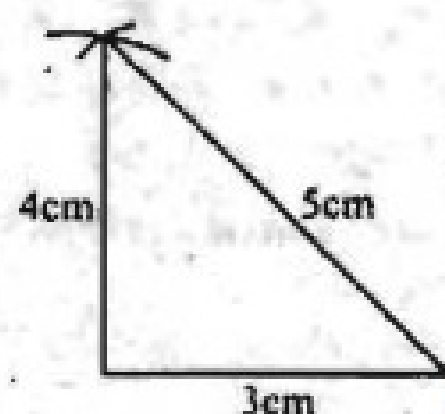
Exercise 10.1

1. Construct the triangles where possible.

(a) 3cm, 4cm, 5cm

Ans. Steps of Construction

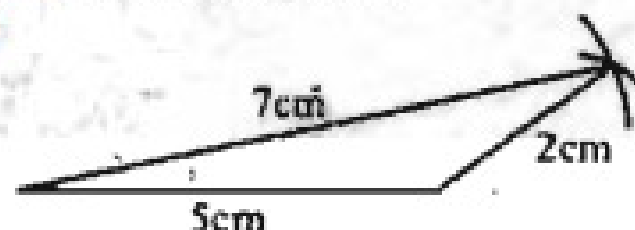
1. Draw line segment of length 3cm.
2. By considering one end of line, draw arc of radius 4cm.
3. By considering other end of line, draw arc of radius 5cm, intersecting the first arc at a point.
4. Join point of intersection to the ends of the line segment.



(b) 5cm, 7cm, 2cm

Ans. Steps of Construction

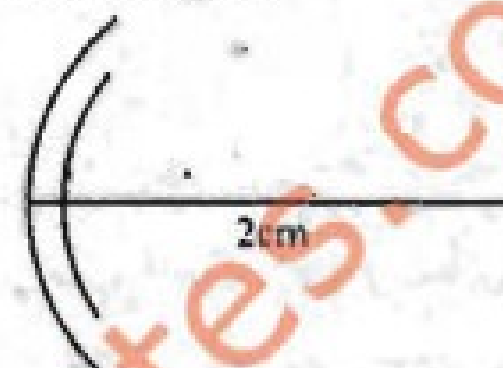
1. Draw line segment of length 5cm.
2. By considering one end of line draw arc of radius 7cm.
3. By considering other end of line, draw arc of radius 2cm intersecting the first arc at a point.
4. Join point of intersection to the ends of the line segment.



(c) 2cm, 4.2cm, 7.3cm

Ans. Steps of Construction

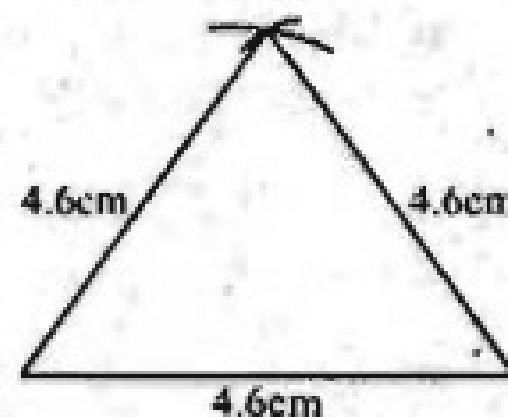
1. Draw line segment of length 2cm.
2. By considering one end of line draw arc of radius 4.2cm.
3. By considering other end of line, draw arc of radius 7.3cm.
4. They do not intersect, hence do not form a triangle.



(d) 4.6cm, 4.6cm, 4.6cm

Ans. Steps of Construction

1. Draw a line segment of length 4.6cm.
2. By considering one end of line, draw arc of length 4.6cm.
3. By considering other end of line, draw arc of length 4.6 intersecting the first arc at a point.
4. Join the point of intersection to two ends of the line segment.



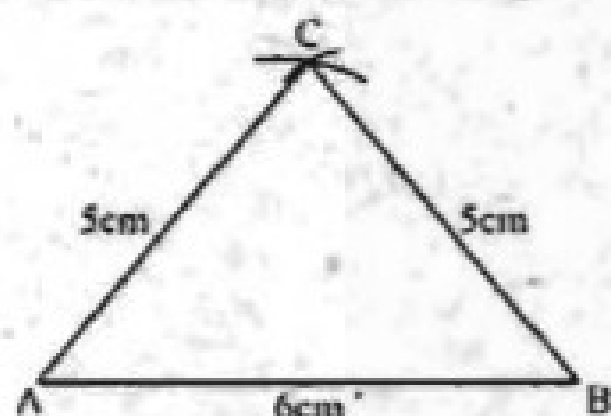
2. Construct triangle ABC such that: $AB = 6cm$, $BC = AC = 5cm$. Name the triangle so formed, with respect to its sides.

Ans. Steps of Construction

1. Draw a line segment $\overline{AB}$ of length 6cm.
2. By considering point A, draw arc length 5cm.

MATHEMATICS NOTES FOR 7TH CLASS (FOR ISLAMABAD)

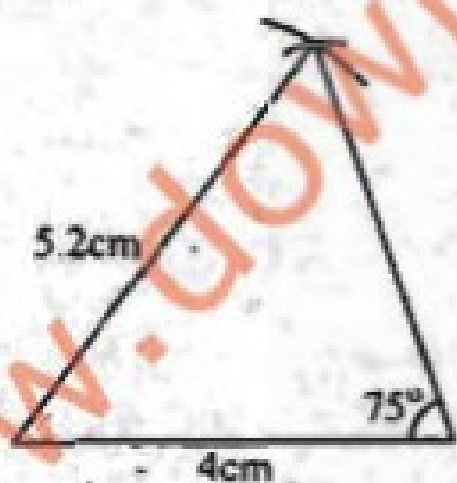
3. By considering point B, draw arc length of the intersections the first arc at point C.
4. Join C to A and C to B.
5. ABC is the required triangle.



3. **Construct the triangles when:**
(a) Measures of two sides are 4cm and 5.2cm and included angle is 75° .

Ans. Construction Steps

1. Draw line segment of length 4cm.
2. By considering one end of line, construct arc of length 5.2cm.
3. Construct an angle of 75° at the other end of line segment with help of compass, draw a line intersecting the first arc at a point.
4. Join intersection to the other end of line. This is the required triangle.

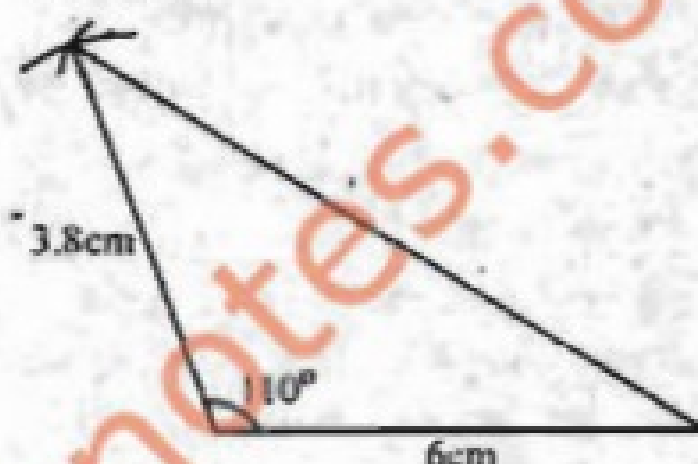


- (b) Measure of two sides are 6cm, 3.8cm and included angle is 120° . Name the triangles so formed with respect to its angles.

Ans. Steps of Construction

1. Draw line segment of length 6cm.

2. By considering one end the line, construct arc of length 3.8cm.
3. Construct an angle of 120° at the same end of the line, draw a line from that end of line to the arc making 120° angle.
4. Join the point to the other end of line. This is the required obtuse angle triangle.

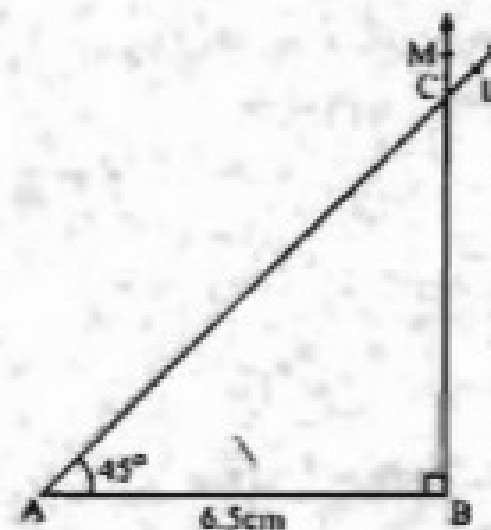


4. **Construct triangle ABC in which $\angle A = 45^\circ$, $\angle B = 90^\circ$ and $AB = 6.5$ cm. What is measure of third angle?**

Ans. Steps of Construction

1. Draw a line segment $\overline{AB}$ of length 6.5cm.
2. Construct $\angle ABC = 90^\circ$, draw $\overrightarrow{BM}$.
3. Construct $\angle BAC = 45^\circ$, draw $\overrightarrow{AC}$.
4. Intersecting $\overrightarrow{BM}$ at C.
ABC is the required triangle.

$$\begin{aligned} \text{Measure of third angle} &= 180 - 90 - 45 \\ &= 45^\circ \end{aligned}$$



MATHEMATICS NOTES FOR 7TH CLASS (FOR ISLAMABAD)

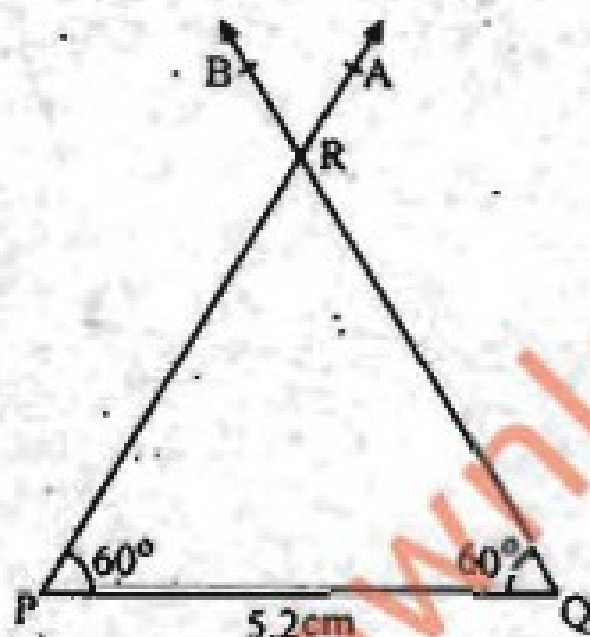
5. Construct triangle PQR in which $\angle P = \angle Q = 60^\circ$ and $PQ = 5.2\text{cm}$.

Ans. Steps of Construction

1. Draw a line segment $\overline{PQ}$ of length 5.2cm.
2. Construct an angle of 60° at P using compass, draw $\overrightarrow{PA}$.
3. Construct an angle at 60° at Q using compass, draw $\overrightarrow{QB}$, intersections $\overrightarrow{PA}$ at PR.
4. $\triangle PQR$ is the required triangle.

Measure at third angle = $180 - 60 - 60$
 $= 60^\circ$

This is an equilateral triangle.



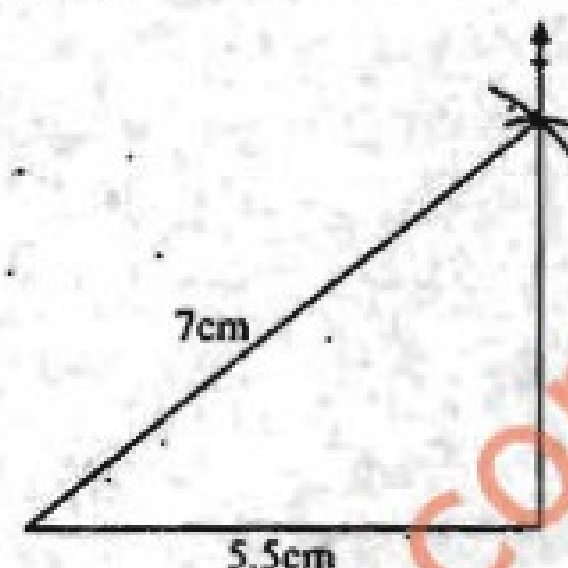
6. Construct a right angled triangle in which the lengths of the hypotenuse and the side are 7cm and 5.5cm respectively.

(a) Measure the length of third side.

Ans. Construction Steps

1. Draw a line segment of length 5.5cm.
2. Draw an arc of length 7cm at one end of line.
3. Draw a line at the other end with 90° angle, intersect the arc at a point.

4. Join the intersecting point to first end of line.



- (b) Name the triangle with respect to its sides.

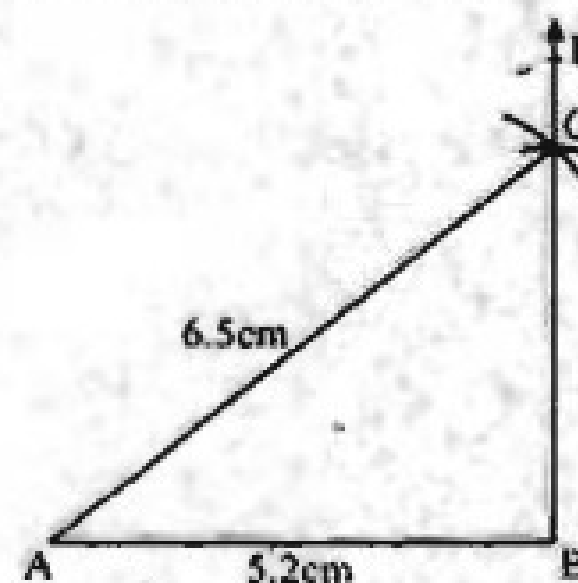
Ans. This is the required triangle:

- (i) Measure of third length = 4cm.
- (ii) This is a scalene triangle.

7. Construct a triangle ABC in which $AB = 5.2\text{cm}$, $\angle B = 90^\circ$ and $AC = 6.5\text{cm}$. What type of triangle has been constructed w.r.t. its angles?

Ans. Construction Steps

1. Draw a line segment $\overline{AB}$ of length 5.2cm.
2. Construct an angle of 90° at B using compass, draw line $\overrightarrow{BP}$.



3. By constructing the point at A, construct an arc of length 6.5cm, intersecting $\overrightarrow{BP}$ at C.

MATHEMATICS NOTES FOR 7TH CLASS (FOR ISLAMABAD)

4. Join A to C.

You have constructed the required triangle and it is a right angle triangle.

8. Construct triangle ABC when:

$$AB = 6\text{cm}, BC = 5.3\text{cm},$$

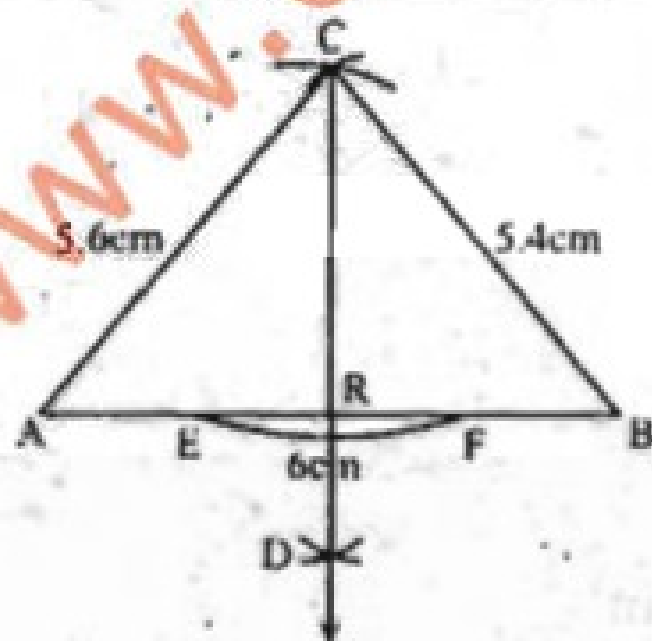
$$AC = 5.6\text{cm}$$

From C draw perpendicular on $\overline{AB}$. Measure length of this perpendicular.

Ans. Construction Steps

1. Draw line segment $\overline{AB} = 6\text{cm}$.
2. Considering point A, draw an arc of length 5.6cm.
3. Considering point B, draw an arc of length 5.3, intersecting the first arc and C.
4. Considering point C, draw an arc of radius more than the distance of point from $\overline{AB}$.
5. The arc intersect $\overline{AB}$ at E and F.
6. By considering F and F draw an arc of length more than half the distance of E and F.
7. Both arc intersect at point D.
8. Join C to D passing through R on line AB.

$$\text{Length of perpendicular } \overline{CD} = 6.1\text{cm}$$



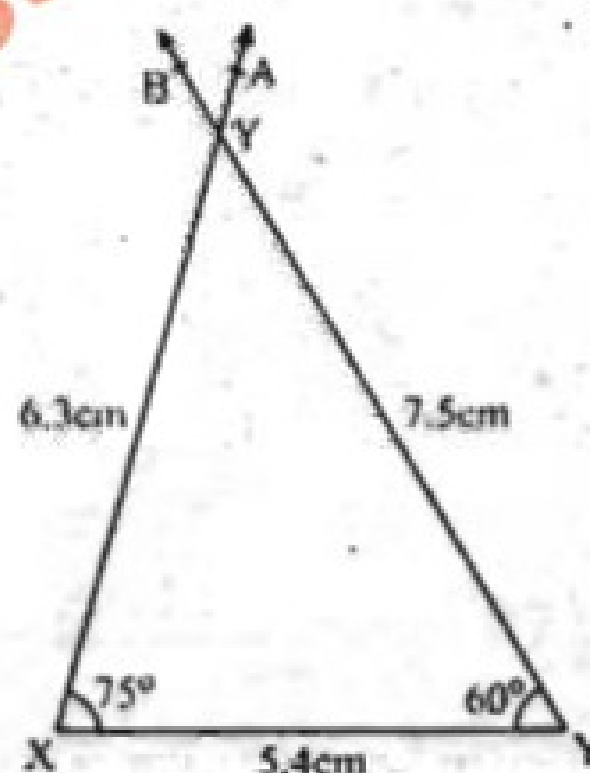
9. Construct a triangle XYZ such that $XY = 5.4\text{cm}$, $\angle X = 75^\circ$ and $\angle Y = 60^\circ$. Measure the length of sides $\overline{YZ}$ and $\overline{XZ}$.

Ans. Construction Steps

1. Draw $\overline{XY} = 5.4\text{cm}$.
2. Draw $\angle X = 75^\circ$, draw $\overline{XA}$.
3. Draw $\angle Y = 60^\circ$, draw $\overline{YB}$ intersecting $\overline{XA}$ at Z.
4. Join Z to X and Y to Z. $\triangle XYZ$ is the required triangle.

$$\overline{XZ} = 6.8\text{cm}$$

$$\overline{YZ} = 7.5\text{cm}$$



10. Construct a triangle in which measure of each side is 6cm. Measure the three angles of triangle. What did you notice?

Ans. Construction Steps

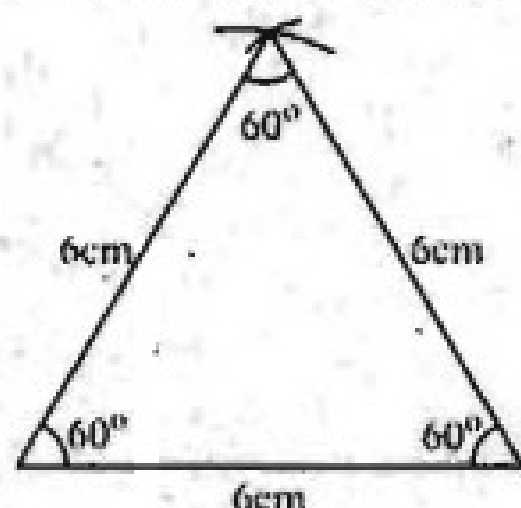
1. Draw a line of length 6cm.
2. Draw arc from both ends of line segment 6cm in length intersecting at a point.

MATHEMATICS NOTES FOR 7TH CLASS (FOR ISLAMABAD)

3. Joint the point of intersection to both ends of line segment.

The triangle is the required triangle.

All angles are measured equal and are 60° . hence it is an equilateral triangle.



Review Exercise 10

- I. Tick the correct answer in the following:

- (i) In a triangle ABC, $AB = AC$. The triangle is:

- (a) equiangular (b) scalene
(c) equilateral ✓(d) isosceles

- (ii) Choose the correct statement.

- (a) a triangle has two right angles.
✓(b) a triangle can have only one right angle.
(c) all the angles of triangle are greater than 60° .
(d) all the angles of a triangle are less than 60° .

- (iii) Sum of measures of two sides of a triangle is _____ the measure of third side.

- (a) equal to ✓(b) greater than
(c) less than (d) none of these

- (iv) Sum of measures of three angles of a triangle is _____.

- (a) 45° (b) 160°
✓(c) 180° (d) 360°

- (v) A triangle having all the sides equal is called _____ triangle.

- ✓(a) equilateral (b) scalene
(c) isosceles (d) right angled

- (vi) Which type of angle is present in all types of triangles?

- ✓(a) acute (b) right
(c) obtuse (d) straight

- (vii) a and b are angles opposite to equal sides of a triangles. Which of the following is true?

- (a) $a < b$ (b) $a > b$
✓(c) $a = b$ (d) $a + b = 180^\circ$

- (viii) Interior angle of an equilateral triangle is:

- (a) 180° (b) 120°
(c) 90° ✓(d) 60°

- (ix) Sides opposite to right angle in a triangle is called:

- (a) base ✓(b) hypotenuse
(c) perpendicular (d) altitude

- (x) In a triangle ABC, if $AB = 5\text{cm}$, $BC = 8\text{cm}$ then AC cannot be:

- (a) 5.2cm (b) 4.3cm
(c) 3.2cm ✓(d) 2.9cm

2. Construct the following triangles.

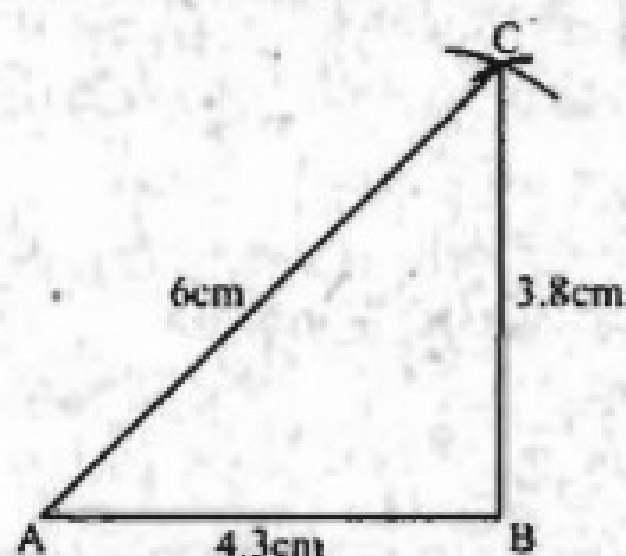
- (a) Triangle ABC when length of sides are 4.3cm, 6cm and 3.8cm.

Ans. Steps of Construction

1. Draw $\overline{AB} = 4.3$.
2. By considering point A, draw an arc of 6cm.
3. By considering point B, draw an arc of 3.8cm. It will intersect the previous arc at point C.
4. Join C to A and C to B.

MATHEMATICS NOTES FOR 7TH CLASS (FOR ISLAMABAD)

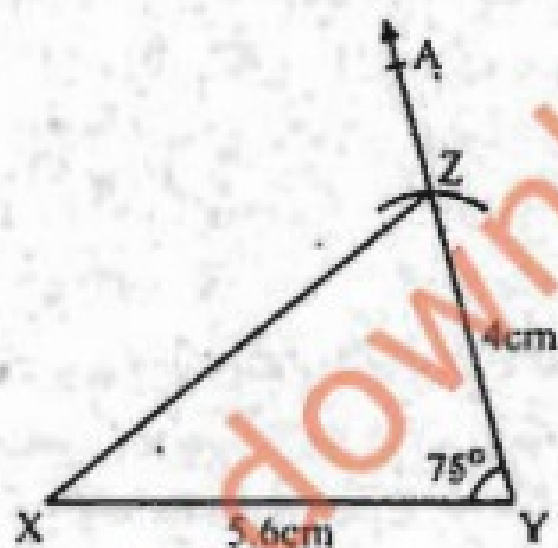
$\triangle ABC$ is the required triangle.



(b) Triangle XYZ when $XY = 5.6\text{cm}$, $YZ = 4\text{cm}$, $\angle Y = 75^\circ$.

Ans. Steps of Construction

1. Draw $\overline{XY} = 5.6\text{cm}$.
 2. By considering Y, draw an arc of length 4cm.
 3. Draw an angle of 75° with compass at Y. Draw $\overrightarrow{YA}$. It will intersect the arc at point Z.
 4. Join Z to X.
- $\triangle XYZ$ is the required triangle.



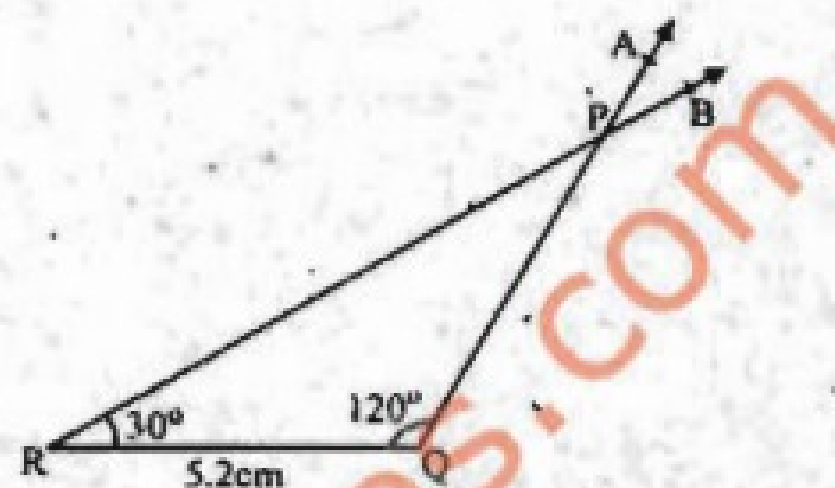
(c) Triangle PQR when $RQ = 5.2\text{cm}$, $\angle R = 30^\circ$, $\angle Q = 120^\circ$.

Ans. Steps of Construction

1. Draw $\overline{PQ} = 5.2\text{cm}$.
2. By considering point R, draw $\overrightarrow{RB}$ at an angle of 30° using compass.

3. By considering point Q, draw $\overrightarrow{QA}$ at an angle of 120° . It will intersect $\overrightarrow{RB}$ at point.

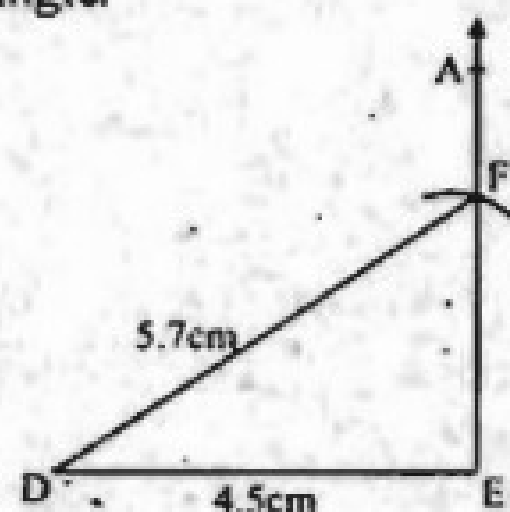
4. $\triangle PQR$ is the required triangle.



(d) Triangle DEF when hypotenuse and one side are 5.7cm and 4.5cm long respectively.

Ans. Steps of Construction

1. Draw $\overline{DE} = 4.5\text{cm}$.
 2. By considering D, draw an arc of length 5.7cm.
 3. By considering E, draw $\overrightarrow{EA}$ perpendicular to DE. It will intersect the arc at F.
 4. Join F to D.
- $\triangle DEF$ is the required right angle triangle.

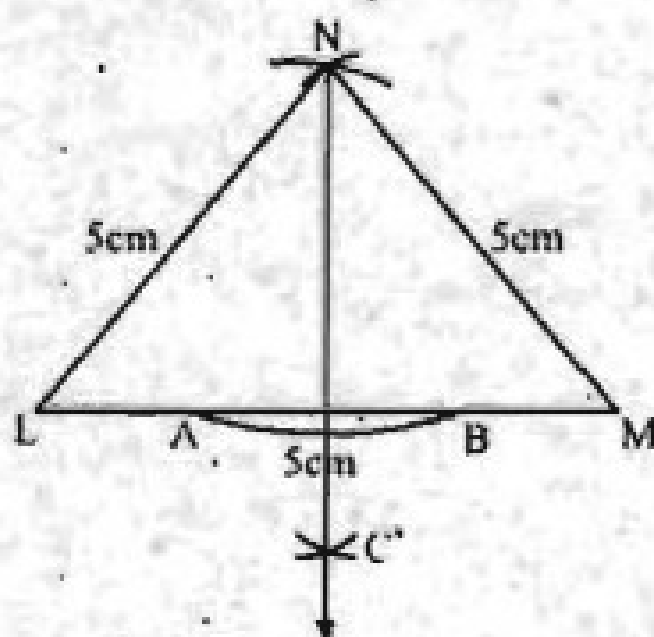


3. Construct a triangle LMN of suitable measurement. Draw a perpendicular from N to $\overline{LM}$. Measure its length.

MATHEMATICS NOTES FOR 7TH CLASS (FOR ISLAMABAD)

Ans. Steps of Construction

1. Draw $\triangle LMN$.
2. Considering N, draw an arc of radius more than of point N from $\overline{LM}$. The arc will cut $\overline{LM}$ at A and B.
3. By considering A and B draw an arc of radius more than half of $\overline{AB}$. They will intersect at C.
4. Join N to C.
 $\overline{NC}$ is perpendicular to $\overline{LM}$.



4. Draw $\overline{AB} = 5\text{cm}$. Mark a point P outside the segment, and draw perpendicular from P to $\overline{AB}$. Prove that this perpendicular distance is the shortest distance from P to $\overline{AB}$.

Ans. Steps of Construction

1. Draw $\overline{AB} = 5\text{cm}$.
2. Take a point P outside the segment.
3. Considering P draw arc of radius more than distance of P from $\overline{AB}$. It will cut AB at X and Y.
4. Consider X and Y, draw arcs of radius more than half of $\overline{XY}$. They will intersect at Z.

5. Join P to Z through C at $\overline{AB}$, $\overline{PZ}$ is perpendicular to $\overline{AB}$.

Measure $\overline{PC}$ and measure distance from P to any other point on line AB.

You will find $\overline{PC}$ is the shortest distance from P to $\overline{AB}$.

