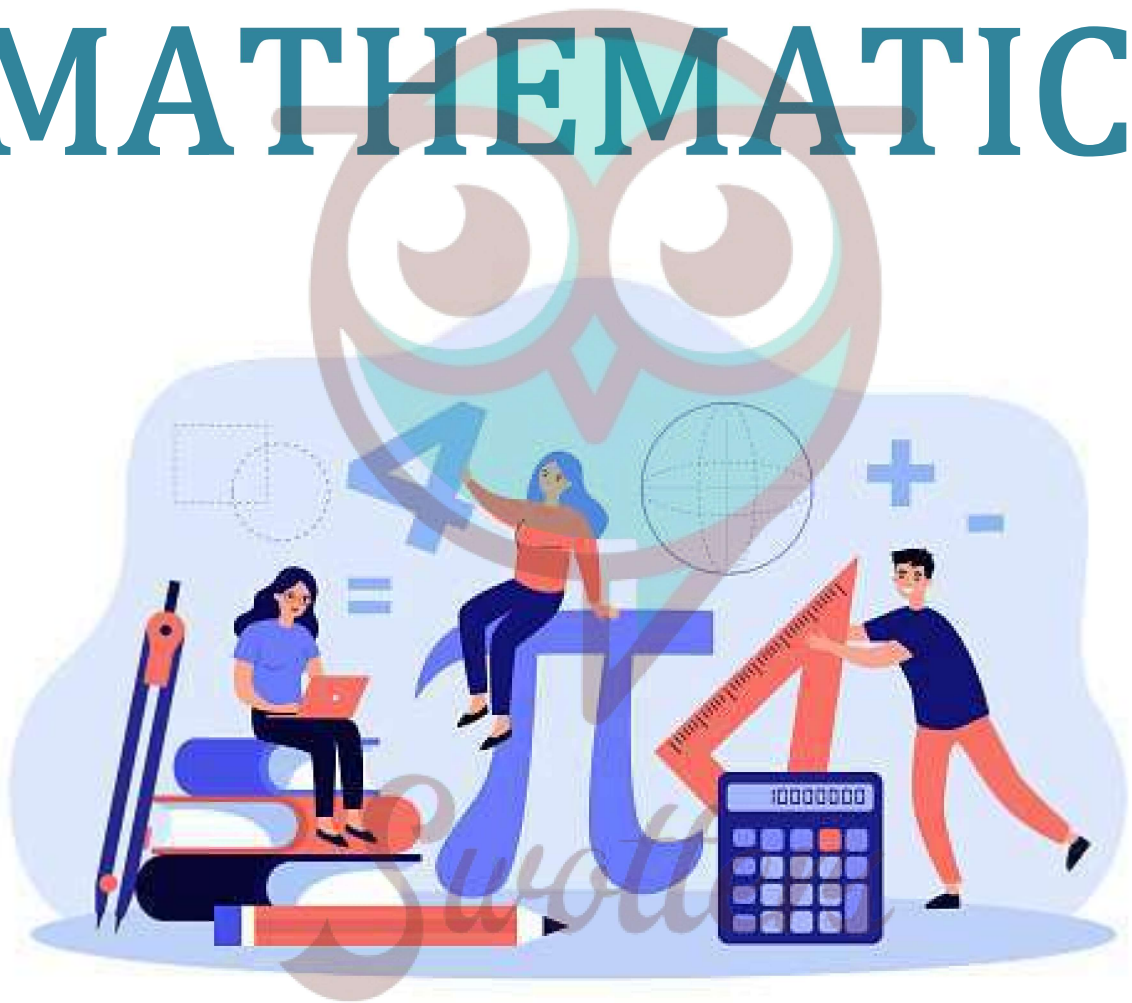# MATHEMATICS

Important Questions

Multiple Choice questions-

Question 1. If a, b and c are the lengths of the three sides of a triangle, then which of the following is true?

(a) a + b < c

(b) a – b < c

(c) a + b = c

Question 2. With the help of a ruler and compasses, which of the following is not possible to construct?

(a) 70°

(b) 60°

(c) 135°

Question 3. Which of the following sets of angles can be the angles of a triangle?

(a) 30°, 60°, 80°

(b) 40°, 60°, 70°

(c) 50°, 30°, 100°

Question 4. The construction of the triangle ABC is possible if it is given that BC = 4cm, ∠C = 60° and the difference of AB and AC is

(a) 3.5cm

(b) 4.5cm

(c) 3cm

(d) 2.5cm

Question 5. Which of the following can be the length of BC required to construct the triangle ABC such that AC = 7.4cm and AB = 5cm?

(a) 3.5cm

(b) 2.1cm

(c) 4.7cm

Question 6. If we want to construct a triangle, given its perimeter, then we need to know:

(a) Sum of two sides of triangle

(b) Difference between two sides of triangle

(c) One base angles

(d) Two base angles

Question 7. To construct a bisector of a given angle, we need:

(a) A ruler

(b) A compass

(c) A protractor

(d) Both ruler and compass

Question 8. Which of the following set of lengths can be the sides of a triangle?

(a) 2cm, 4cm, 1.9cm

(b) 1.6cm, 3.7cm, 5.3cm

(c) 5.5cm, 6.5cm, 8.9cm

(d) None of the above

Question 9. Which of these angles cannot be constructed using ruler and compasses?

(a) 120

(b) 60

(c) 140

(d) 135

Question 10. Which of the following angles can be constructed using ruler and compasses?

(a) 35

(b) 45

(c) 95

(d) 55

Very Short:

1. Draw a line segment AB = 8cm. Draw $\frac{1}{3}$ part of it. Measure the length of $\frac{1}{3}$ part of AB.

2. Why we cannot construct a ΔABC, if ∠A = 60°, AB = 6cm and AC + BC = 5cm but construction of ΔABC is possible if ∠A = 60°, AB = 6cm and AC - BC = 5cm?

3. Construct an angle of 90° at the initial point of the given ray.

4. Draw a straight angle. Using compass bisect it. Name the angles obtained.

5. Draw any reflex angle. Bisect it using compass. Name the angles so obtained.

Short Questions:

1. Construct a triangle whose sides are in the ratio 2 : 3 : 4 and whose perimeter is 18cm.
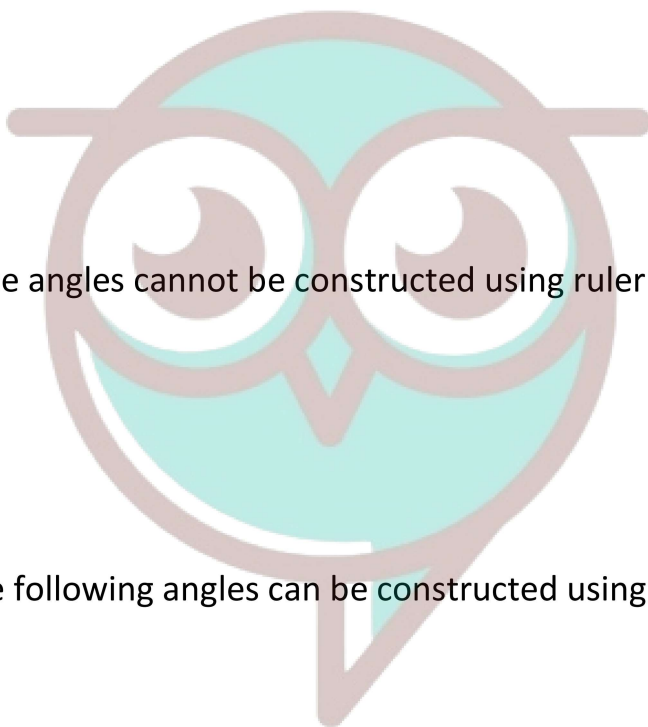
2. Construct a? ABC with BC = 8cm? B = 45° and AB - AC = 3.1cm.

3. Construct a ΔABC such that BC = 3.2cm, ∠B = 45° and AC – AB = 2.1cm.

4. Draw a line segment QR = 5 cm. Construct perpendiculars at point Q and R to it. Name them as QX and RY respectively. Are they both parallel?

5. Construct an isosceles triangle whose two equal sides measure 6cm each and whose base is 5cm. Draw the perpendicular bisector of its base and show that it passes through the opposite vertex.

Long Questions:

1. Construct a triangle ABC in which BC = 4.7cm, AB + AC = 8.2cm and ∠C = 60°

2. Construct ΔXYZ, if its perimeter is 14cm, one side of length 5cm and ∠X = 45°

3. To construct a triangle, with perimeter 10cm and base angles 60° and 45°

4. Construct an equilateral triangle whose altitude is 6cm long

5. Construct a rhombus whose diagonals are 8 cm and 6 cm long. Measure the length of each side of the rhombus

Assertion and Reason Questions-

1. In these questions, a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.

 a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

 b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.

 c) Assertion is correct statement but reason is wrong statement.

 d) Assertion is wrong statement but reason is correct statement.

Assertion: a, b and c are the lengths of three sides of a triangle, then a+b > c.

Reason: The sum of two sides of a triangle is always greater than the third side.

2. In these questions, a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.

 a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

 b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.

 c) Assertion is correct statement but reason is wrong statement.

 d) Assertion is wrong statement but reason is correct statement.

Assertion: The side lengths 4cm, 4cm and 4cm can be sides of equilateral triangle.

Reason: Equilateral triangle has all its three sides equal.
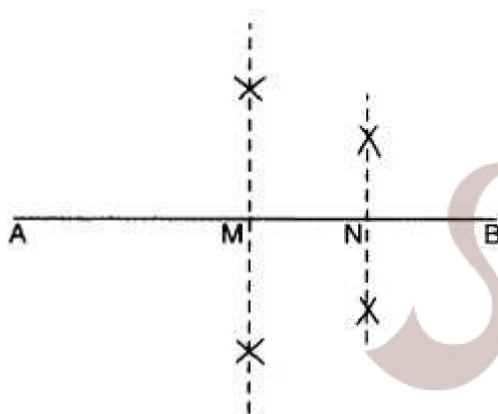
Answer Key:

MCQ:

1. (b) a - b < c

2. (a) 70°

3. (c) 50°, 30°, 100°

4. (b) 4.5cm

5. (b) 2.1cm

6. (c) One base angles

7. (d) Both ruler and compass

8. (c) 5.5cm, 6.5cm, 8.9cm

9. (c) 140

10. (b) 45
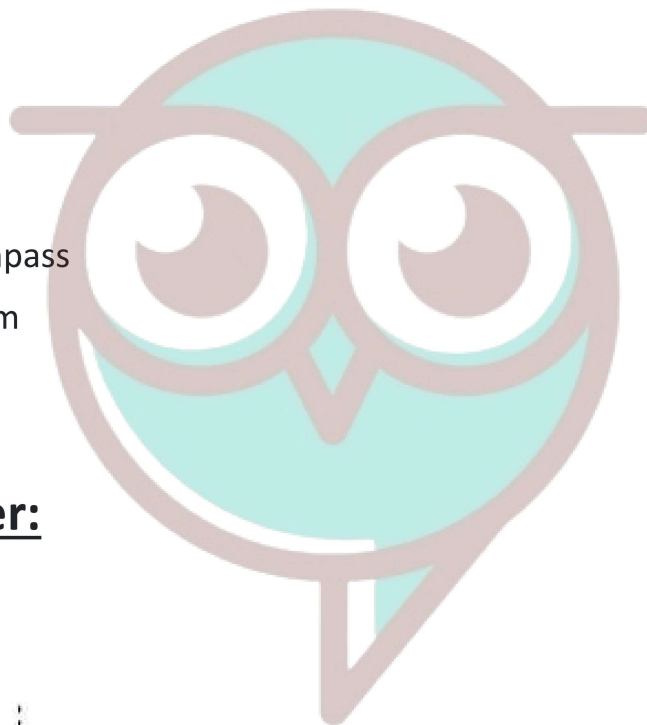
Very Short Answer:

1.

Steps of Construction:

1. Draw a line segment AB = 8cm.

2. Draw its perpendicular bisector and let it intersect AB in M.

3. Draw the perpendicular bisector of MB and let it intersect AB in N. Thus, AN = 13 of AB = 6cm.

2. We know that, by triangle inequality property, construction of triangle is possible if sum of two sides of a triangle is greater than the third side. Here, AC + BC = 5cm which is less than AB (6cm) Thus, ΔABC is not possible.

Also, by triangle inequality property, construction of triangle is possible, if difference of two sides of a triangle is less than the third side

Here, AC – BC = 5cm, which is less than AB (6cm)
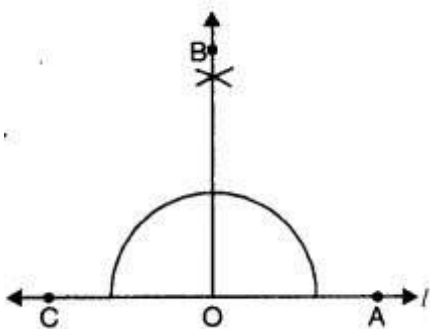
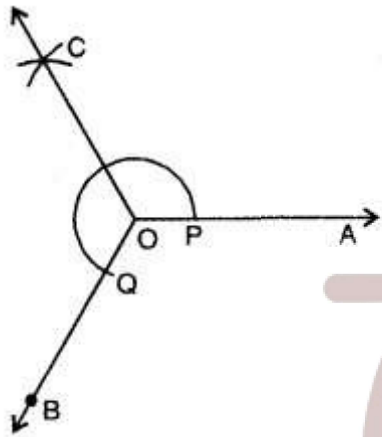Thus, ΔABC is possible.

3.
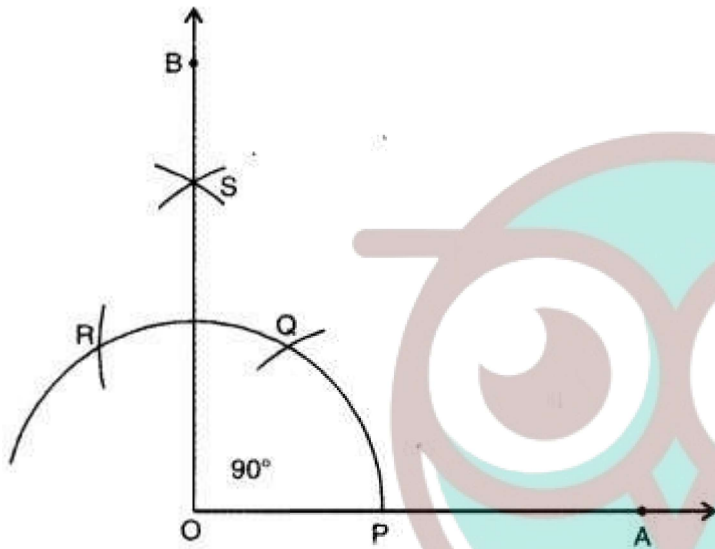
Steps of Construction :

1. Draw a ray OA.

2. With O as centre and any convenient radius, draw an arc, cutting OA at P.

3. With P as centre and same radius, draw an arc cutting the arc drawn in step 2 at Q.

4. With Q as centre and the same radius as in steps 2 and 3, draw an arc, cutting the arc drawn in step 2 at R.

5. With Q and R as centres and same radius, draw two arcs, cutting each other in S.

6. Join OS and produce to B. Thus, ∠AOB is the required angle of 90°

4.

Steps of Construction:

1. Draw any straight angle (say ∠AOC).

2. Bisect ∠AOC and join BO.

3. ∠AOB is the required bisector of straight angle AOC.

5.

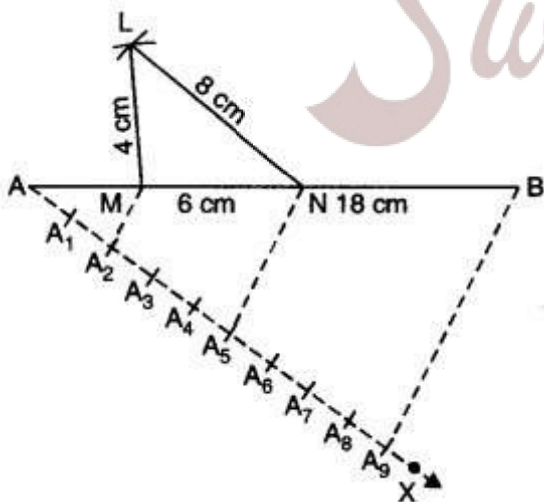**Steps of Construction:**

a. Let ∠AOB be any reflex angle.

b. With O as Centre and any convenient radius, draw an arc cutting OA in P and OB in Q.

c. With P and Q as centers, draw two arcs of radius little more than half of it and let they intersect each other in C. Join OC. Thus, OC is the required bisector. Angles so obtained are ∠AOC and ∠COB.

Short Answer:

Ans: 1.

Steps of Construction:

1. Draw a line segment AB = 18cm.

2. At A, construct an acute angle $\angle BAX$ (< 90°).

3. Mark 9 points on AX, such that $AA_1 = A_1A_2 = A_2A_3 = A_3A_4 = A_4A_5 = A_5A_6$

   $= A_6A_7 = A_7A_8 = A_8A_9$.

4. Join A_9B.

5. From A_2 and A_5, draw $A_2M \parallel A_5N \parallel A_9B$, intersecting AB in M and N respectively.

6. With M as Centre and radius AM, draw an arc.

7. With N as Centre and radius NB, draw another arc intersecting the previous arc at L.
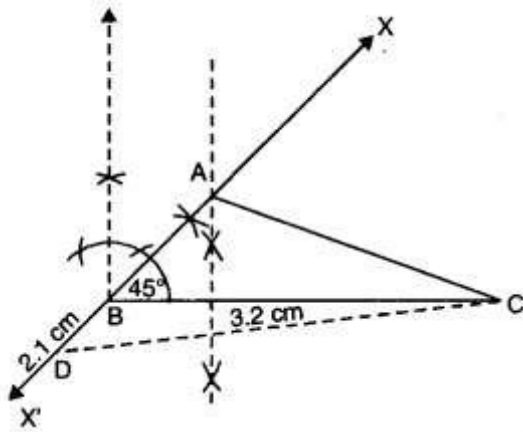
8. Join LM and LN. Thus, ΔLMN is the required triangle.

Ans: 2.
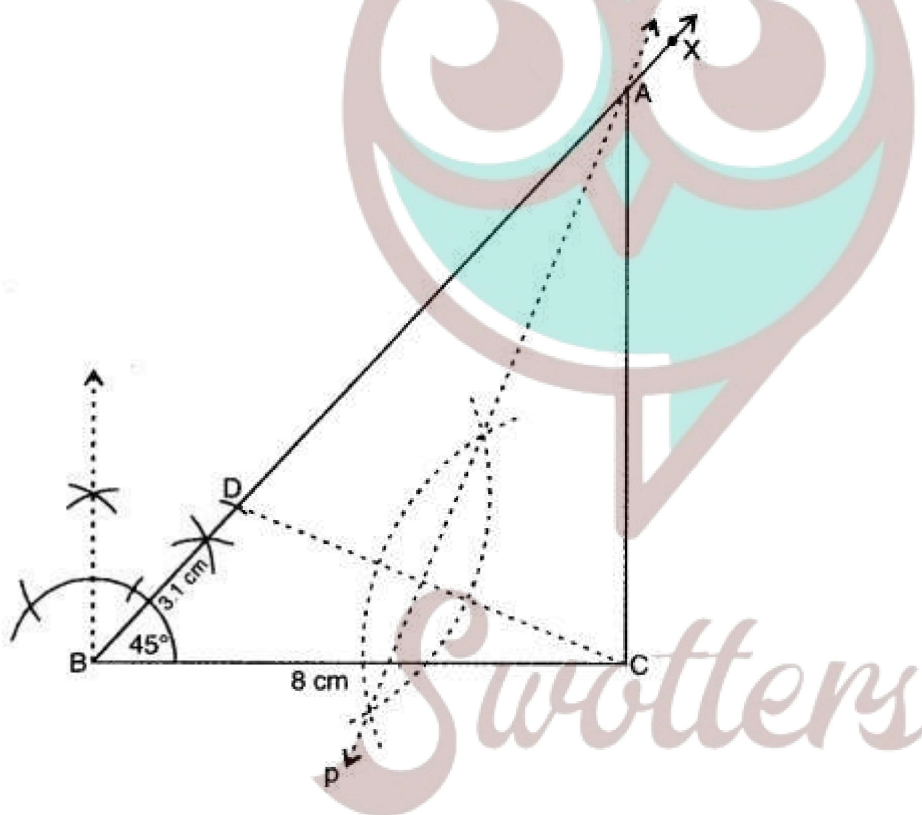
Steps of Construction:

1. Draw any line segment BC = 8cm.

2. At B, construct an angle $\angle CBX = 45°$.

3. From BX, cut off BD = 3.1cm.

4. Join DC.

5. Draw the perpendicular bisector 'p' of DC and let it intersect BX in A.
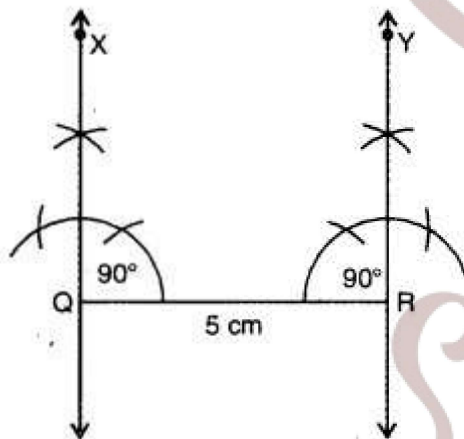
6. Join AC. Thus, ΔABC is the required triangle.

Ans: 3.

Steps of Construction:

1. Draw a line segment BC = 3.2cm.

2. At B, construct an angle ∠CBX = 45° and produce it to point X'.

3. Cut-off BD = 2.1cm and join CD.

4. Draw the perpendicular bisector of CD and let it intersect X'BX in A.
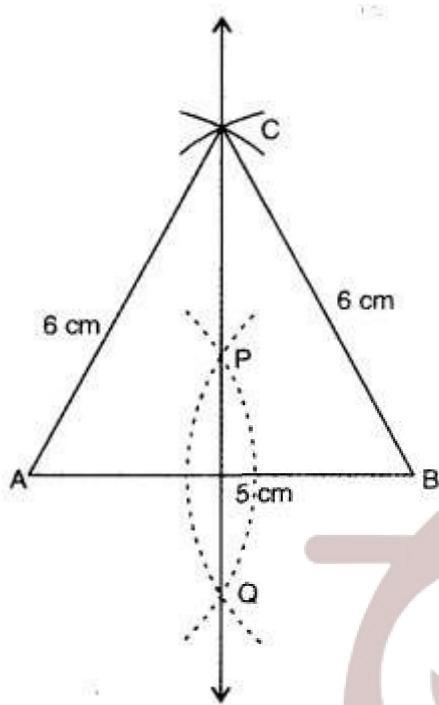
5. Join AC. Thus, ΔABC is the required triangle.

Ans: 4.

Steps of Construction:

1. Draw a line segment QR = 5cm.

2. With Q as Centre, construct an angle of 90° and let this line through Q is QX.

3. With R as Centre, construct an angle of 90° and let this line through R is RY. Yes, the perpendicular lines QX and RY are parallel.
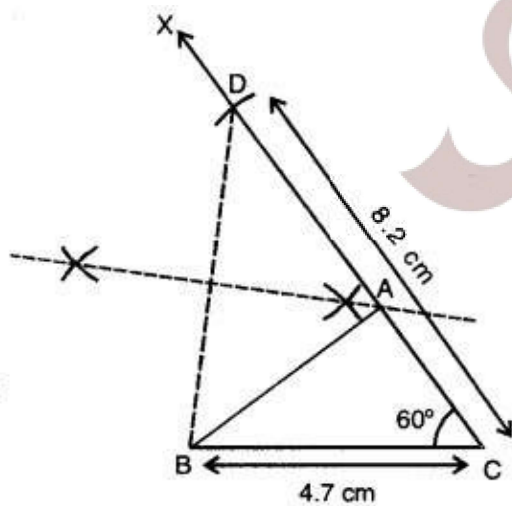
Ans: 5.

Steps of Construction:

1. Draw a line segment AB = 5cm.

2. With A and B as centers, draw two arcs of radius 6 cm and let they intersect each other in C.

3. Join AC and BC to get ΔABC.

4. With A and B as canters, draw two arcs of radius little more than half of AB. Let they intersec
   each other in P and Q. Join PQ and produce, to pass through C.

Long Answer:

Ans: 1

Given: In ΔABC, BC = 4.7cm, AB + AC = 8.2cm and ∠C = 60°.

Required: To construct ΔABC.

Steps of Construction:

1. Draw BC = 4.7cm.

2. Draw

3. From ray CX, cut off CD = 8.2cm.

4. Join BD.

5. Draw the perpendicular bisector of BD meeting CD at A.

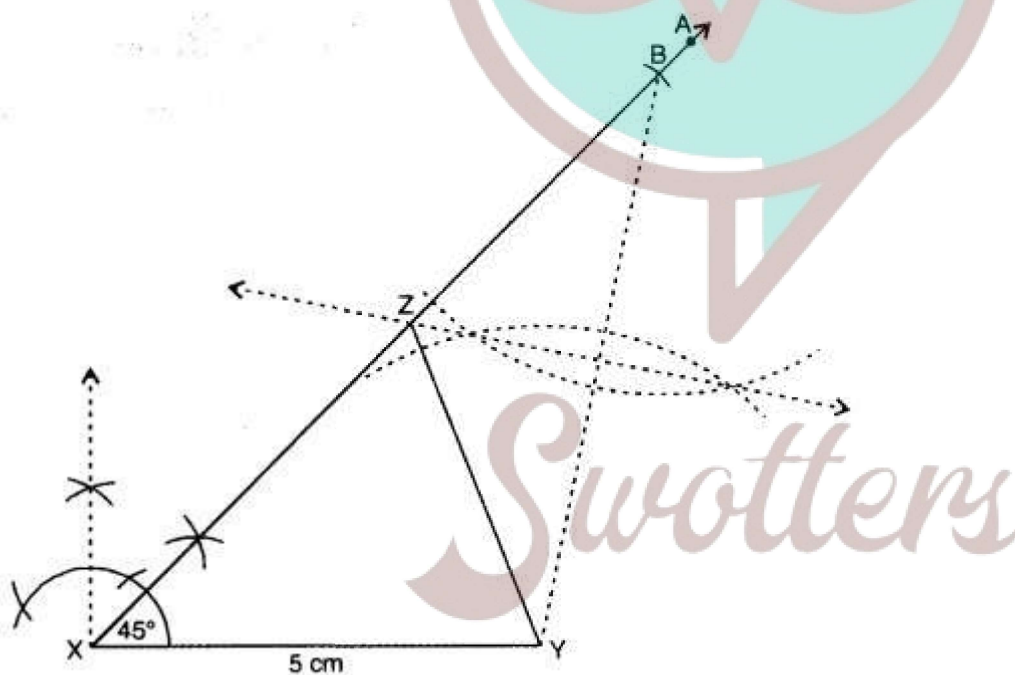6. Join AB to obtain the required triangle ABC.

Justification:

∵ A lies on the perpendicular bisector of BD, therefore, AB = AD

Now, CD = 8.2cm

⇒ AC + AD = 8.2cm

⇒ AC + AB = 8.2cm

Ans: 2.

Here, perimeter of ΔXYZ = 14cm and one side XY = 5cm

∴ YZ + XZ = 14 - 5 = 9cm and ∠X = 45°.

Steps of Construction:

1. Draw a line segment XY = 5cm.

2. Construct an ∠YXA = 45° with the help of compass and ruler.

3. From ray XA, cut off XB = 9cm.

4. Join BY.

5. Draw perpendicular bisector of BY and let it intersect XB in Z.

6. Join ZY. Thus, ΔXYZ is the required triangle.
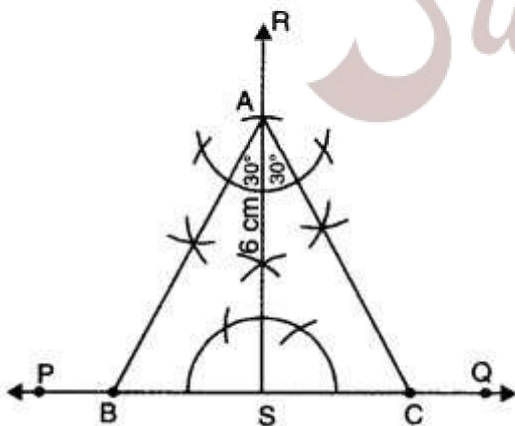
Ans: 3.
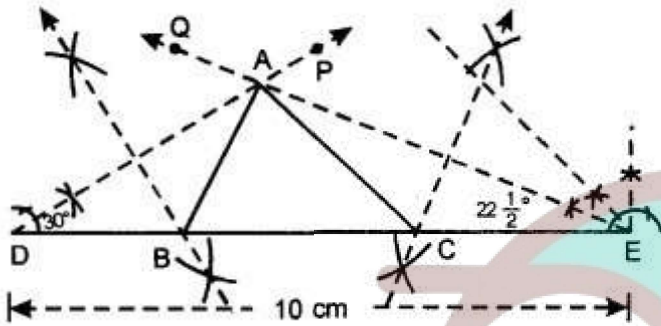
Given: In ΔABC,

AB + BC + CA = 10 cm, ∠B = 60° and ∠C = 45°.

Required: To construct ΔABC.

Steps of Construction:

1. Draw DE = 10cm.

2. At D, construct ∠EDP= 5 of 60°= 30° and at E, construct DEQ = 1 of 45o = 22°

3. Let DP and EQ meet at A.

4. Draw perpendicular bisector of AD to meet DE at B.

5. Draw perpendicular bisector of AE to meet DE at C.

6. Join AB and AC. Thus, ABC is the required triangle.

Ans: 4.

Steps of Construction:

1. Draw a line PQ and take any point S on it.

2. Construct the perpendicular SR on PQ.

3. From SR, cut a line segment SA = 6cm.

4. At the initial point A of the line segment AS, construct ∠SAB = 30° and ∠SAC = 30°.

5. The arms AB and AC of the angles ∠SAB and ∠SAC meet PQ in B and C respectively. Then, ΔABC is the required equilateral triangle with altitude of length 6cm.

Ans: 5.
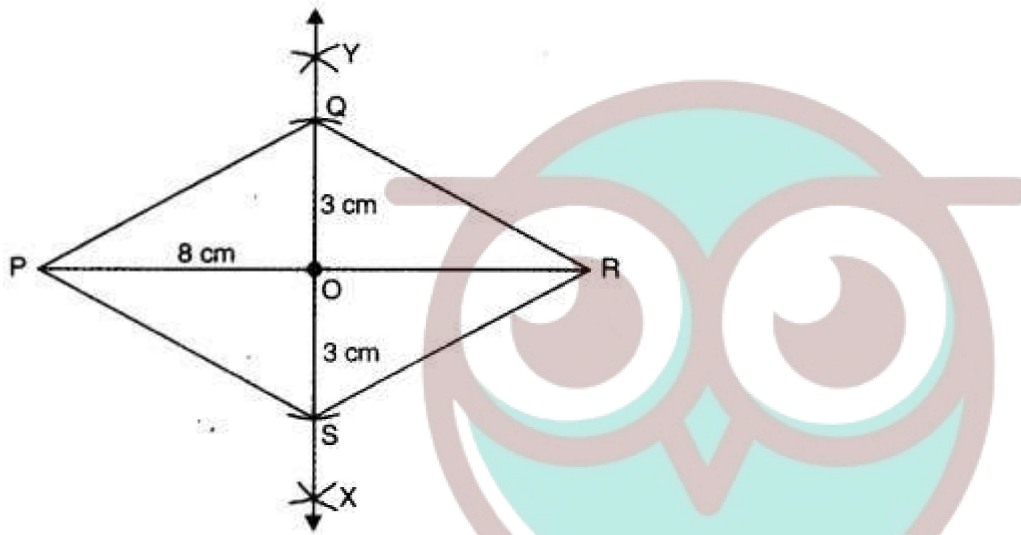
Steps of Construction:

1. Draw a line segment PR = 8cm.

2. Draw the perpendicular bisector XY of the line segment PR. Let O be the point of intersection of PR and XY, so that O is the 8 cm mid-point of PR.

3. From OX, cut a line segment OS = 3cm and from OY, cut a line segment OQ = 3cm.

4. Join PS, SR, RQ and QP, then PQRS is the required rhombus.

5. Measure the length of segments PQ, QR, RS and SP, each is found to be 5cm long.

Assertion and Reason Answers-

1. a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

2. a) Assertion and reason both are correct statements and reason is correct explanation for assertion.