Assignments in Mathematics Class IX (Term 2) **11. CONSTRUCTIONS**

SUMMATIVE ASSESSMENT

MULTIPLE CHOICE QUESTIONS

[1 Mark]

A. Important Questions

- 1. The construction of a triangle ABC, given that BC = 6 cm, $\angle B = 45^{\circ}$ is not possible when difference of AB and AC is equal to :
 - (a) 6.9 cm (b) 5.2 cm (d) 4.0 cm
 - (c) 5.0 cm
- 2. The construction of a triangle ABC, given that BC = 3 cm, $\angle C$ = 60° is possible when difference of AB and AC is equal to :

(a) 3.2 cm	(<i>b</i>) 3.1 cm
(c) 3 cm	(<i>d</i>) 2.8 cm

3. The construction of a triangle ABC in which AB = 4 cm, $\angle A = 60^{\circ}$ is not possible when difference of BC and AC is equal to :

(<i>a</i>) 3.5 cm	(b) 4.5 cm
(c) 3 cm	(<i>d</i>) 2.5 cm

4. Which of the following angles cannot be constructed with the help of a ruler and a compass ?

(a)
$$7\frac{1}{2}$$
 (b) $22\frac{1}{2}$ (c) $30\frac{1}{2}$ (d) $37\frac{1}{2}$

5. To construct the perpendicular bisector of a line segment AB, we draw two equal arcs taking as centres A and B with radius :



6. In the figure, a $\triangle ABC$ is constructed when its perimeter and two base angles are given. In this construction line segment XY is drawn equal to :



B. Questions From CBSE Examination Papers

- 1. With the help of a ruler and a compass, it is not possible to construct an angle of : [T-II (2011)] (b) 40° (*a*) 37.5° (*c*) 22.5° (*d*) 67.5°
- 2. With the help of ruler and compass, it is not pos-

sible to construct an angle of :		[T-II (2011)]	
(<i>a</i>) 60°	(<i>b</i>) 15°	(c) 38°	(<i>d</i>) 135°
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3. With the help of a ruler and a compass, it is possible [T-II (2011)] to construct an angle of : (b) 40° (c) 37.5° (d) 47.5° (*a*) 35°

[3 Marks]

A. Important Questions

- 1. Can we construct an angle of $67\frac{1}{2}^{\circ}$? Justify your answer.
- 2. Can we construct an angle of $52\frac{1}{2}^{\circ}$? Justify your answer.
- 3. Can we construct a $\triangle ABC$ in which BC = 6 cm, $\angle C = 30^{\circ}$ and AC - AB = 4 cm? Give reason for your answer.
- 4. A triangle ABC can be constructed in which $\angle B = 60^{\circ}$, $\angle C = 45^{\circ}$ and AB + BC + AC = 12 cm. Is this statement true ? Justify your answer.
- 5. Construct the perpendicular bisector of the line segment AB = 7.5 cm.

Construct an equilateral triangle and justify your construction.
 Draw a line segement AB and by ruler and

compass, obtain a line segment of length $\frac{3}{4}$ AB.

- **8.** Draw an obtuse angle. Bisect it. Measure each of the angles obtained.
- 9. Can we construct a triangle ABC in which $\angle A = 105^{\circ}$, $\angle B = 75^{\circ}$ and AB + BC + AC = 12 cm?
- **10.** Can we construct a triangle ABC in which $\angle B$ = 105°, $\angle C$ = 90° and AB + BC + AC = 10 cm?

B. Questions From CBSE Examination Papers

1. Construct an angle of 60° using a ruler and compass and bisect it. [T-II (2011)]

SHORT ANSWER TYPE QUESTIONS

A. Important Questions

- 1. Construct $\triangle ABC$ in which BC = 6.4 cm, $\angle B = 45^{\circ}$ and AB - AC = 3.5 cm.
- **2.** Draw a line segment AB of 5 cm in length. Draw a line perpendicular to AB through A and B respectively. Are these lines parallel ?
- 3. Construct the angles of the following measurements :
 - (i) 67.5° (ii) 52.5°
- 4. Construct $\triangle ABC$ in which BC = 4.5 cm, $\angle B = 45^{\circ}$ and AB + AC = 5.6 cm.
- Draw an angle of 80° with the help of a protractor. Then construct angles of (i) 40° (ii) 160° (iii) 120°

B. Questions From CBSE Examination Papers

- **1.** Construct a triangle XYZ in which $\angle Y = 30^{\circ}$, $\angle Z = 90^{\circ}$ and XY + YZ + ZX = 11 cm. **[T-II (2011)]**
- 2. Construct a triangle ABC in which BC = 7 cm, $\angle B = 75^{\circ}$ and AB + AC = 13 cm. [T-II (2011)]
- **3.** Construct a $\triangle ABC$ in which BC = 5 cm, $\angle B = 75^{\circ}$ and AB + AC = 9 cm. **[T-II (2011)]**
- 4. Construct a triangle ABC in which BC = 5.5 cm

- 6. Construct a square of side 3.6 cm.
- 7. Construct a rectangle whose adjacent sides are 6.3 cm and 4.2 cm.
- 8. Construct a rhombus whose side is of length 3.4 cm and one of its angles is 45°.
- **9.** Construct a triangle whose sides are 4.2 cm, 3.9 cm and 6.1 cm. Bisect its greatest angle and measure each part.
- **10.** Construct a right angled triangle in which the base is 3 cm and the difference of hypotenuse and perpendicular is 1 cm.
 - and $\angle B = 60^{\circ}$ given that AB + AC = 8 cm. [T-II (2011)]
- 5. Construct a triangle ABC in which BC = 4 cm, $\angle B = 30^{\circ}$ and AB + AC = 6 cm. [T-II (2011)]
- 6. Construct a \triangle PQR with its perimeter = 10.4 cm and base angles of 75° and 30°. [T-II (2011)]
- 7. Construct a $\triangle ABC$ whose perimeter is 12 cm, $\angle B = 60^{\circ}$ and $\angle C = 45^{\circ}$. Justify the construction. [T-II (2011)]

- 8. Construct an equilateral triangle, given its one side
 = 5 cm. [T-II (2011)]
- 9. Construct $\triangle XYZ$ in which $\angle Y = 90^{\circ}$, $\angle Z = 30^{\circ}$ and perimeter is 13 cm. [T-II (2011)]
- 10. Construct a right triangle whose base is 6 cm and the difference of its hypotenuse and the other side is 8 cm. [T-II (2011)]
- **11.** Construct $\triangle ABC$ such that $\angle B = 60^\circ$, $\angle C = 45^\circ$ and AB + BC + CA = 10 cm. **[T-II (2011)]**
- 12. Construct a triangle PQR in which PQ = 5 cm, $\angle P = 60^{\circ}$ and PR + RQ = 9 cm. [T-II (2011)]
- 13. Construct a right triangle whose base is 12 cm and sum of its hypotenouse and other side is 18 cm.[T-II (2011)]
- 14. Construct a triangle PQR with base PQ = 8.4 cm, $\angle P = 45^{\circ}$ and PR - QR = 2.8 cm. [T-II (2011)]

LONG ANSWER TYPE QUESTIONS

- **15.** Construct a triangle ABC in which $\angle B = 60^{\circ}$, $\angle C = 45^{\circ}$ and the perimeter of the triangle is 11 cm. [T-II (2011)]
- **16.** Construct a right angled triangle PQR right angled at Q where base QR is 4 cm and the sum of other side and hypotenuse is 8 cm. **[T-II (2011)]**
- 17. With the help of ruler and compass, draw an angle of 75° and bisect it. Write its steps of construction also. [T-II (2011)]
- **18.** Construct a triangle PQR in which $\angle Q = 60^\circ$, $\angle R = 30^\circ$ and its perimeter is 12.5 cm. **[T-II (2011)]**
- **19.** Construct a triangle ABC in which BC = 5 cm $\angle B = 45^{\circ}$ and AB AC = 2.8 cm. **[T-II (2011)]**
- **20.** Construct a $\triangle ABC$ in which BC = 5.7 cm, $\angle B = 30^{\circ}$ and AB - AC = 3 cm. [T-II (2011)]
- **21.** Construct a $\triangle ABC$ in which AB = 5.8 cm BC + CA = 8.4 cm and $\angle B = 60^{\circ}$. **[T-II (2011)]**

[4 Marks]

A. Important Questions

- **1.** Construct an equilateral triangle if its altitude is 4 cm. Give justification of your construction.
- 2. Construct a triangle ABC in which $\angle A = 45^{\circ}$, $\angle B = 120^{\circ}$ and AB + BC + AC = 10.4 cm.
- **3.** Construct a right triangle in which one side is 3.5 cm and sum of other side and hypotenuse is 5.5 cm.

B. Questions From CBSE Examination Papers

- Construct a triangle with perimeter 10 cm and base angles 60° and 45°. [T-II (2011)]
- 2. Construct a triangle ABC in which BC = 7.5 cm, $\angle B = 45^{\circ}$ and AC – AB = 2.5 cm. [T-II (2011)]

- 4. Construct a triangle ABC, given that perimeter is 12.5 cm, $\angle B = 60^{\circ}$ and $\angle C = 75^{\circ}$.
- 5. Construct a rhombus whose diagonals are 4 cm and 6 cm in lengths.
- 6. Construct a triangle ABC such that AB = BC = 6 cm and median AD = 4 cm.
- **3.** Construct a $\triangle ABC$ in which $\angle B = 30^{\circ}$ and $\angle C = 90^{\circ}$ and the perimeter of the triangle is 11 cm. [T-II (2011)]

FORMATIVE ASSESSMENT

Activity-1

Objective : To construct (by paper folding) a triangle whose perimeter and two base angles are given.

Materials Required : Tracing paper, geometry box, etc.

- **Procedure :** Let the perimeter of the triangle be 10 cm and two base angles be 70° and 40° .
 - 1. On a tracing paper, draw a line segment XY = 10 cm. At X, draw an angle of 70° and at Y, draw an angle of 40° (using protractor) to get the triangle XYZ.



2. Using paper folding method, find the bisectors of $\angle X$ and $\angle Y$. Let these bisectors meet at A.

3. Again, using paper folding method, draw the perpendicular bisectors of AX and AY. Let the perpendicular bisectors of AX and AY meet XY at B and C respectively.

4. Join A to B and A to C to get the required triangle.

Objective : To find the centre of a circle using a $30^{\circ}-60^{\circ}-90^{\circ}$ set square. **Materials Required :** A bangle, a thick sheet of paper, geometry box, etc. **Procedure :**

1. Draw a circle using a bangle.







Activity-2

2. Take any point A on the circumference of the given circle.

- 3. Place the 30°–60°–90° set square over the circle so that its vertex G falls at A. Note that $\angle EGF = 30^\circ$.
- **4.** Draw lines along GF and GE which intersect the circle at B and C respectively.
- 5. Join B to C.
- **6.** Now place the 30°–60°–90° set square so that the side EF falls along CB.

Note that $\angle FEG = 60^{\circ}$

- 7. Draw a line along EG.
- 8. Now place the 30°-60°-90° set square such that its side EG falls along BC. Note that \angle GEF = 60°

9. Draw a line along EF, which intersects the line drawn in step 7 at O.

Observations :

- **1.** $\angle BAC = 30^{\circ}$.
- **2.** $\angle OBC = \angle OCB = \angle BOC = 60^\circ$, So, $\triangle OBC$ is an equilateral triangle.
- **3.** $\angle BOC = 2 \angle BAC$ [From **1.** and **2.**]
 - \Rightarrow O is the centre of the circle. [The angle subtended by an arc at the centre of a circle is twice the angle subtended by the arc at any point on the remaining part of the circle.]

Conclusions :

- 1. We can find the centre of a circle using only a 30°-60°-90° set square.
- **2.** The angle subtended by an arc at the centre of a circle is twice the angle subtended by the arc at any point on the remaining part of the circle.

Do Yourself :

- 1. Using ruler and compass only, find the centre of a circle.
- **2.** A part of a circle (an arc) is given. Using ruler and compasses, find the centre of the circle whose part is the given arc.



Figure-6