# CHAPTER TEST: TRIANGLES (SET-B)

**Mathematics — Class IX (2026/TRIANG/09/002)**

**Time: 1.5 Hours** **Max. Marks: 40**

## General Instructions:

- All questions are compulsory.
- Section A: 8 MCQs (1 Mark each).
- Section B: 4 Very Short Questions (2 Marks each).
- Section C: 3 Short Questions (3 Marks each).
- Section D: 2 Long Questions (5 Marks each).
- Section E: 1 Case Study (5 Marks).

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## Section A: Multiple Choice Questions ($8 \times 1 = 8$ Marks)

1. In $\triangle ABC$ and $\triangle PQR$, if $AB = PQ$, $BC = QR$ and $\angle B = \angle Q$, then the triangles are congruent by:

   (a) SSS Rule
   (b) SAS Rule
   (c) ASA Rule
   (d) RHS Rule

2. If the altitudes from two vertices of a triangle to the opposite sides are equal, then the triangle is:

   (a) Scalene
   (b) Isosceles
   (c) Right-angled
   (d) Equilateral

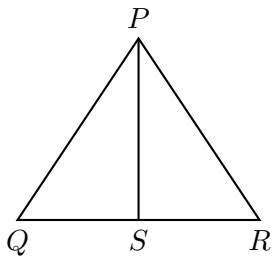
3. In $\triangle ABC$, $AB = AC$ and $\angle B = 50^\circ$. Then $\angle C$ is:

   (a) $40^\circ$
   (b) $50^\circ$
   (c) $80^\circ$
   (d) $130^\circ$

4. In a $\triangle ABC$, if $AB = 5$ cm and $BC = 7$ cm, then the third side $AC$ must satisfy:

   (a) $AC < 2$ cm
   (b) $AC > 12$ cm
   (c) $2$ cm $< AC < 12$ cm
   (d) $AC = 12$ cm

5. In the given figure, $PS$ is the bisector of $\angle QPR$ and $PQ = PR$. Then $\triangle PQS \cong \triangle PRS$ by:




   (a) SAS
   (b) SSS
   (c) RHS
   (d) ASA

6. If the angles of a triangle are in the ratio $1 : 2 : 3$, the triangle is:

   (a) Isosceles
   (b) Equilateral
   (c) Right-angled
   (d) Obtuse-angled

7. In $\triangle PQR$, if $\angle R > \angle Q$, then:

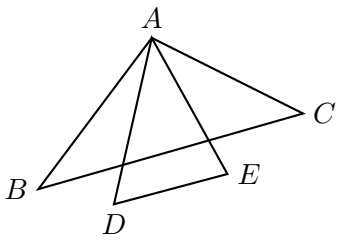
   (a) $QR > PR$
   (b) $PQ > PR$
   (c) $PQ < PR$
   (d) $QR < PR$

8. The perimeter of a triangle is _____ the sum of its three medians.

   (a) Equal to
   (b) Less than
   (c) Greater than
   (d) Half of

## Section B: Very Short Answer Questions ($4 \times 2 = 8$ Marks)

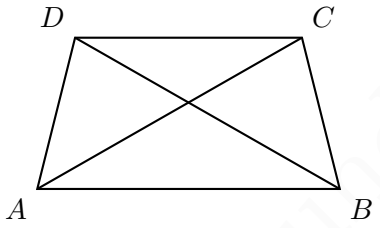
1. In the given figure, $AC = AE$, $AB = AD$ and $\angle BAD = \angle EAC$. Show that $BC = DE$.



2. If two sides of a triangle are 8 cm and 11 cm, and the perimeter is 32 cm, find the third side. Is it possible for this triangle to be a right-angled triangle?
3. Prove that each angle of an equilateral triangle is $60°$.
4. In $\triangle ABC$, $\angle A = 100°$ and $AB = AC$. Calculate $\angle B$ and $\angle C$.

## Section C: Short Answer Questions ($3 \times 3 = 9$ Marks)

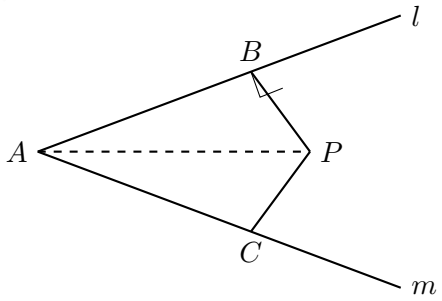
1. $ABCD$ is a quadrilateral in which $AD = BC$ and $\angle DAB = \angle CBA$. Prove that:
   (a) $\triangle ABD \cong \triangle BAC$
   (b) $BD = AC$
   (c) $\angle ABD = \angle BAC$




2. Prove that the sum of any two sides of a triangle is greater than the third side.
3. In $\triangle ABC$, $AD$ is the bisector of $\angle A$. If $AB > AC$, prove that $\angle ADB > \angle ADC$.

## Section D: Long Answer Questions ($2 \times 5 = 10$ Marks)

1. $P$ is a point equidistant from two lines $l$ and $m$ intersecting at point $A$. Show that the line $AP$ bisects the angle between them.




2. $ABC$ is a triangle in which $\angle B = 2\angle C$. $D$ is a point on $BC$ such that $AD$ bisects $\angle BAC$ and $AB = CD$. Prove that $\angle BAC = 72°$.

## Section E: Case Study Based Question ($1 \times 5 = 5$ Marks)

**Case Study:**
A civil engineer is designing a pedestrian bridge across a small stream. The structural support of the bridge is based on a triangular truss system. The main support is an isosceles triangle $ABC$ with $AB = AC$. To strengthen the bridge, the engineer adds two points $D$ and $E$ on the base $BC$ such that $AD \perp BC$ and $AE$ is a median to the side $BC$. During a safety audit,

the inspector needs to verify the congruence of various triangles to ensure the load is balanced. The total length of the base $BC$ is 20 meters, and the height of the apex $A$ from the base is 10 meters. The engineer claims that the symmetry of the design reduces material costs while maintaining maximum safety.

1. In the isosceles $\triangle ABC$, if $\angle B = 65°$, find the measure of the vertex angle $\angle A$.
   (a) $65°$
   (b) $130°$
   (c) $50°$
   (d) $60°$
2. Since $AD \perp BC$ in an isosceles triangle $ABC$ (where $AB = AC$), what is the relationship between $BD$ and $DC$?
   (a) $BD > DC$
   (b) $BD < DC$
   (c) $BD = DC$
   (d) No fixed relation
3. Which congruence rule proves $\triangle ABD \cong \triangle ACD$?
   (a) SSS
   (b) RHS
   (c) AAA
   (d) SAS only
4. If the engineer moves point $A$ such that $AB \neq AC$, which property will be lost?
   (a) The sum of interior angles is $180°$
   (b) The triangle inequality $AB + BC > AC$
   (c) Symmetry and equality of base angles
   (d) None of the above
5. If a new support is added joining the midpoint of $AB$ to the midpoint of $AC$, this line will be:
   (a) Perpendicular to $BC$
   (b) Parallel to $BC$
   (c) Intersecting $BC$ at $45°$
   (d) Equal to $BC$