# CHAPTER TEST: TRIANGLES
## Mathematics — Class IX (2026/TRIANG/09/001)

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

## General Instructions:

- All questions are compulsory.

- Section A contains 8 MCQs of 1 mark each.

- Section B contains 4 Questions of 2 marks each.

- Section C contains 3 Questions of 3 marks each.

- Section D contains 2 Questions of 5 marks each.

- Section E contains 1 Case Study of 5 marks.

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

1. Which of the following is not a criteria for congruence of triangles?

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

2. If $AB = QR$, $BC = PR$ and $CA = PQ$, then:

   (a) $\triangle ABC \cong \triangle PQR$
   (b) $\triangle CBA \cong \triangle PRQ$
   (c) $\triangle BAC \cong \triangle RPQ$
   (d) $\triangle PQR \cong \triangle BCA$

3. In $\triangle ABC$, if $\angle C > \angle B$, then:

   (a) $BC > AC$
   (b) $AB > AC$
   (c) $AB < AC$
   (d) $BC < AC$

4. It is given that $\triangle ABC \cong \triangle FDE$ and $AB = 5$ cm, $\angle B = 40°$ and $\angle A = 80°$. Then which of the following is true?

   (a) $DF = 5$ cm, $\angle F = 60°$
   (b) $DE = 5$ cm, $\angle E = 60°$
   (c) $DF = 5$ cm, $\angle E = 60°$
   (d) $DE = 5$ cm, $\angle D = 40°$

5. In an isosceles triangle, if the vertex angle is twice the sum of the base angles, then the measure of the vertex angle is:

   (a) $120°$

   (b) $60°$

   (c) $90°$

   (d) $100°$

6. In $\triangle PQR$, $\angle P = 70°$ and $\angle Q = 30°$. The longest side of the triangle is:

   (a) $PQ$

   (b) $QR$

   (c) $PR$

   (d) None of these

7. Which of the following sets of side lengths can form a triangle?

   (a) 2 cm, 3 cm, 5 cm

   (b) 3 cm, 4 cm, 8 cm

   (c) 5 cm, 6 cm, 10 cm

   (d) 1 cm, 2 cm, 4 cm

8. Two sides of a triangle are of lengths 5 cm and 1.5 cm. The length of the third side $x$ cannot be:

   (a) 3.6 cm

   (b) 4.1 cm

   (c) 3.8 cm

   (d) 4.8 cm

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

1. In $\triangle ABC$, $AD$ is the perpendicular bisector of $BC$. Show that $\triangle ABC$ is an isosceles triangle in which $AB = AC$.
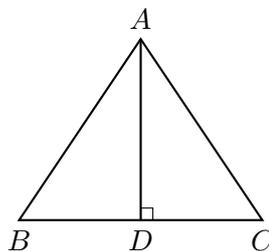


2. $\triangle ABC$ is an isosceles triangle in which altitudes $BE$ and $CF$ are drawn to equal sides $AC$ and $AB$ respectively. Show that these altitudes are equal.

3. In $\triangle PQR$, $\angle P = 100°$ and $PQ = PR$. Find $\angle Q$ and $\angle R$.

4. If the exterior angle of a triangle is $115°$ and one of the interior opposite angles is $45°$, find the other interior opposite angle and the third angle of the triangle.

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

1. Line $l$ is the bisector of an angle $\angle A$ and $B$ is any point on $l$. $BP$ and $BQ$ are perpendiculars from $B$ to the arms of $\angle A$. Show that:

   (a) $\triangle APB \cong \triangle AQB$

   (b) $BP = BQ$
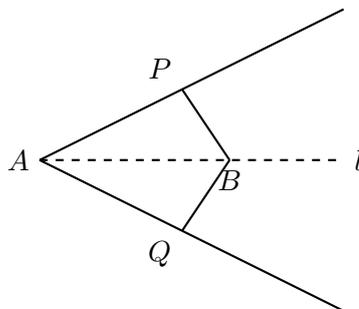


2. In $\triangle ABC$, the bisector $AD$ of $\angle A$ is perpendicular to side $BC$. Show that $AB = AC$ and $\triangle ABC$ is isosceles.

3. Show that in a right angled triangle, the hypotenuse is the longest side.

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

1. $ABC$ is an isosceles triangle with $AB = AC$. $D$ and $E$ are points on $BC$ such that $BE = CD$. Show that $AD = AE$.
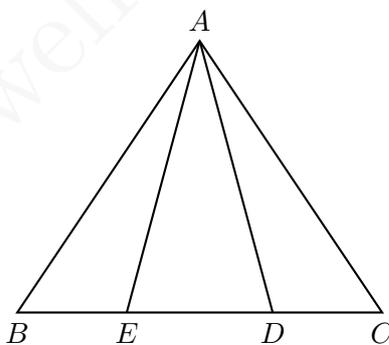


2. State and prove the RHS (Right angle-Hypotenuse-Side) congruence rule. Use this theorem to prove that the medians drawn to the equal sides of an isosceles triangle are equal.

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

**Case Study:**
An architectural firm is designing a roof truss for a community center. A truss is a structure that consists of members organized into connected triangles so that the overall assembly behaves as a single object. For the main support, the engineer uses a large isosceles triangle $PQR$ where $PQ = PR$. To provide additional stability, a central vertical strut $PS$ is added, connecting the apex $P$ to the midpoint $S$ of the base $QR$. The engineer must ensure that the two smaller triangles formed, $\triangle PQS$ and $\triangle PRS$, are perfectly identical to distribute the load of the roof evenly. Any deviation in the lengths of the members or the angles could lead to structural

failure. The design specifies that the angle $\angle QPS$ must be $35°$ and the length of the base $QR$ is 12 meters.

1. Which congruence criteria best proves $\triangle PQS \cong \triangle PRS$?

   (a) SSA

   (b) SSS or SAS

   (c) AAA

   (d) None of these

2. What is the measure of $\angle PRS$ if $\angle PQR = 55°$?

   (a) $35°$

   (b) $45°$

   (c) $55°$

   (d) $90°$

3. What is the length of $QS$?

   (a) 12 m

   (b) 6 m

   (c) 24 m

   (d) 8 m

4. What is the measure of $\angle PSQ$?

   (a) $45°$

   (b) $60°$

   (c) $90°$

   (d) $180°$

5. In $\triangle PQR$, the sum of angles $\angle P + \angle Q + \angle R$ is:

   (a) $90°$

   (b) $180°$

   (c) $270°$

   (d) $360°$