

CHAPTER TEST: TRIANGLES (HOTS)

Mathematics | Class IX | (2026/TRI-HOTS/09/001)

Time: 1.5 Hours

Max. Marks: 40

General Instructions:

- All questions are compulsory.
 - Section A: 8 MCQs (1 mark each).
 - Section B: 4 Short Answer Questions (2 marks each).
 - Section C: 3 Short Answer Questions (3 marks each).
 - Section D: 3 Long Answer/HOTS questions (5 marks each).
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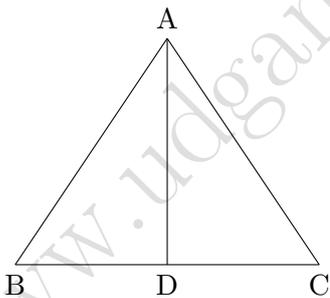
Section A: Multiple Choice Questions (1 Mark Each)

1. If the altitudes from two vertices of a triangle to the opposite sides are equal, then the triangle is:
 - (a) Scalene
 - (b) Equilateral
 - (c) Isosceles
 - (d) Right-angled
2. In $\triangle ABC$ and $\triangle PQR$, $AB = PQ$ and $BC = QR$. The triangles will be congruent by SAS if:
 - (a) $\angle A = \angle P$
 - (b) $\angle B = \angle Q$
 - (c) $\angle C = \angle R$
 - (d) $\angle B = \angle R$
3. In a right-angled triangle, if one acute angle is double the other, then the hypotenuse is:
 - (a) Equal to the smallest side
 - (b) Double the smallest side
 - (c) Triple the smallest side
 - (d) Half the smallest side
4. If the bisector of the vertical angle of a triangle bisects the base, then the triangle is:
 - (a) Scalene
 - (b) Isosceles
 - (c) Right-angled
 - (d) Obtuse-angled
5. In $\triangle ABC$, $AB = AC$ and $AD \perp BC$. Then:

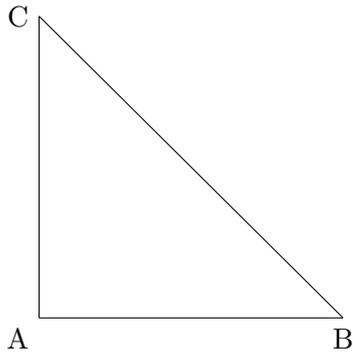
- (a) $BD = CD$
 (b) $AB = BD$
 (c) $AD = BC$
 (d) $AD = BD$
6. Which of the following is not a congruence criterion for triangles?
- (a) SAS
 (b) ASA
 (c) SSA
 (d) RHS
7. In $\triangle ABC$, $\angle A = 50^\circ$ and $\angle B = 60^\circ$. The shortest side is:
- (a) AB
 (b) BC
 (c) CA
 (d) Cannot be determined
8. If S is any point on the side QR of a $\triangle PQR$, then:
- (a) $PQ + QR + RP > 2PS$
 (b) $PQ + QR + RP < 2PS$
 (c) $PQ + QR + RP = 2PS$
 (d) None

Section B: Short Answer Questions (2 Marks Each)

1. In $\triangle ABC$, AD is the perpendicular bisector of BC .



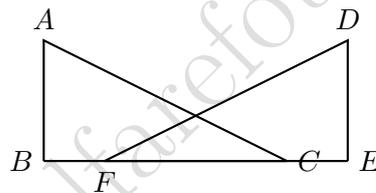
- Show that $\triangle ABC$ is an isosceles triangle in which $AB = AC$.
2. Prove that every equilateral triangle is equiangular.
3. If the bisector of an angle of a triangle also bisects the opposite side, prove that the triangle is isosceles.
4. ABC is a right-angled triangle in which $\angle A = 90^\circ$ and $AB = AC$.



Find $\angle B$ and $\angle C$.

Section C: Short Answer Questions (3 Marks Each)

- ABC is an isosceles triangle with $AB = AC$. Draw $AP \perp BC$ to show that $\angle B = \angle C$.
- AD is an altitude of an isosceles triangle ABC in which $AB = AC$. Show that AD bisects BC .
- In the given figure, $BA \perp AC$ and $DE \perp DF$ such that $BA = DE$ and $BF = EC$. Show that $\triangle ABC \cong \triangle DEF$.



Section D: Long Answer / HOTS Questions (5 Marks Each)

- Prove that the sum of any two sides of a triangle is greater than twice the median drawn to the third side.
- In $\triangle ABC$, D is the mid-point of BC . If AD is produced to E such that $AD = DE$, prove that:
 - $\triangle ABD \cong \triangle ECD$
 - $AB \parallel EC$
 - $AB = EC$
- ABC is a triangle. D is a point on AB such that $AD = \frac{1}{4}AB$ and E is a point on AC such that $AE = \frac{1}{4}AC$. If $DE = 3$ cm, find BC using the properties of congruence and mid-points (Hint: Mid-point theorem logic). *Alternatively, prove that if O is a point inside $\triangle ABC$, then $OA + OB + OC > \frac{1}{2}(AB + BC + CA)$.*

— End of Question Paper —