Mathematics — Ganita Manjari

Chapter 9 Test 10

Propositions and their Converses

Class IX | 2026–27

Time Allowed: 45 Minutes | Maximum Marks: 25

General Instructions

1. All 13 questions are compulsory. The paper has four sections: A, B, C and D.
2. Section A: 5 × 1 = 5 marks; Section B: 4 × 2 = 8 marks; Section C: 3 × 3 = 9 marks; Section D: 1 × 3 = 3 marks.
3. Select one correct option in Section A. Give reasons or counterexamples wherever asked.
4. Use of calculators is not allowed. Figures are not necessarily drawn to scale.

SECTION A

(5 questions × 1 mark = 5 marks)

1. In triangle ABC, $AB = 5$, $BC = 12$ and $AC = 13$. Which angle is a right angle?

(A) $\angle A$ (B) $\angle B$
(C) $\angle C$ (D) No angle

2. Positive side lengths satisfy $a^2 + b^2 = c^2$. Which side must be the longest?

(A) a (B) b
(C) c (D) All three are equal

3. Which set of lengths cannot form a nondegenerate triangle, so calling it a right triangle is already impossible?

(A) 2, 3, 5 (B) 3, 4, 5
(C) 4, 4, 5 (D) 5, 5, 6

4. A right triangle has hypotenuse 10 cm and one perpendicular side 6 cm. What is its other perpendicular side?

(A) 4 cm (B) 6 cm
(C) 16 cm (D) 8 cm

5. Which triangle is a counterexample to "Every isosceles triangle is right-angled"?

(A) Angles $45°, 45°, 90°$ (B) Angles $30°, 60°, 90°$
(C) Angles $70°, 70°, 40°$ (D) Angles $40°, 50°, 90°$

SECTION B

(4 questions × 2 marks = 8 marks)

6. It is known that $\triangle ABC \cong \triangle YZX$, with vertices written in corresponding order, and $\angle Z = 90°$. Identify the right angle in ABC and explain your answer.

7. For $k > 0$, a triangle has sides $9k$, $12k$ and $15k$. Is it right-angled for every allowed k? Justify without choosing a particular value of k.

8. A triangle's side lengths round to 3, 4 and 5 cm to the nearest centimetre. Do these rounded measurements prove that it is right-angled? Justify using possible exact lengths.

9. A student says, "In a right triangle, the squares of any two sides add to the square of the third." Identify the faulty word and demonstrate the error using sides 3, 4 and 5.

SECTION C

(3 questions × 3 marks = 9 marks)

10. A right triangle has two equal sides of length $u > 0$. Explain why these must be its perpendicular sides, and find its hypotenuse. Then decide whether a triangle with sides $u, u, u\sqrt{2}$ is always right-angled.

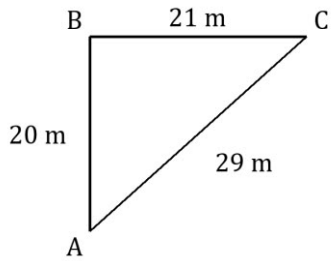
11. Consider: "If a triangle has the same perimeter as a right triangle, it is also right-angled." Test this using a 3–4–5 triangle and a 4–4–4 triangle. State clearly why the example settles the claim.

12. Let a, b, c be triangle side lengths, with c longest. Leela argues, "Assume the triangle is right-angled. Then $a^2 + b^2 = c^2$. Therefore, whenever this equality holds, the triangle is right-angled." Identify the direction she actually established, explain the gap, and state what would complete her argument.

SECTION D

(1 application question × 3 marks = 3 marks)

13. In figure, two paths from A to C are A–B–C and the straight path AC. The lengths are $AB = 20$ m, $BC = 21$ m and $AC = 29$ m.



(i) How much shorter is AC?
(ii) Prove that the turn at B is a right angle.
(iii) Does a shorter direct path alone prove a right angle? Give a counterexample.