# Mathematics — Ganita Manjari

## Chapter 9 Test 8

### 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.** A rule gives outputs 5, 7 and 9 for inputs 1, 2 and 3. Which claim about all its outputs is already disproved?
(A) All outputs are odd.
(B) All outputs are positive.
(C) All outputs are prime.
(D) All outputs exceed 3.

**2.** Which prime disproves the claim that reversing the digits of every two-digit prime gives another prime?
(A) 13 (B) 17
(C) 23 (D) 31

**3.** Which number disproves the claim that every integer greater than 4 is a sum of two prime numbers?

(A) 6 (B) 8
(C) 10 (D) 11

**4.** For which prime $p$ are all three numbers $p$, $p + 2$ and $p + 4$ prime?

(A) 3 (B) 5
(C) 7 (D) 11

**5.** Which block disproves the claim that every three consecutive positive integers contain a prime?

(A) 2, 3, 4 (B) 4, 5, 6
(C) 7, 8, 9 (D) 8, 9, 10

## SECTION B

(4 questions × 2 marks = 8 marks)

**6.** Disprove the claim that $n^2 + n + 11$ is prime for every positive integer $n$. Show a factorisation of your counterexample.

**7.** Find the smallest positive integer $n$ for which $4n + 3$ is composite. Explain why your value is the smallest.

**8.** Find a prime number $n$ for which $2n - 1$ is not prime. Explain how your example disproves a conditional proposition.

**9.** An even positive integer $n$ is chosen. Must $2n + 1$ be prime? Give a counterexample with $n > 4$.

## SECTION C

(3 questions × 3 marks = 9 marks)

**10.** A student claims, "The sum of any two prime numbers is prime."
(i) Give a pair for which the claim holds.
(ii) Give a pair for which the claim fails.
(iii) Explain which example settles the universal claim.

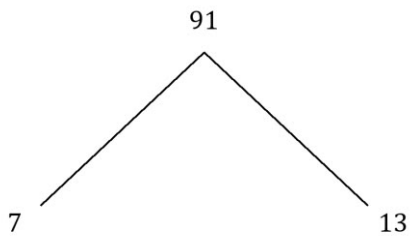
**11.** Let $p$ be a prime and $d$ a positive integer. A student claims that every number in $p, p + d, p + 2d, \ldots$ is prime. Examine the term $p + pd$ and decide the claim.

**12.** For an integer $n > 5$, consider: "If $n$ is prime, it is divisible by none of 2, 3 and 5." Justify the proposition, write its converse, and decide the converse using an example.

## SECTION D

(1 application question × 3 marks = 3 marks)

**13.** The factor tree in figure represents 91. Asha claims, "If a positive integer ends in 1, then it is prime."




(i) Use the figure to decide Asha's claim.
(ii) Write the converse.
(iii) Decide the converse with a counterexample.