Mathematics — Ganita Manjari

Chapter 4 Test 1

Exploring Algebraic Identities

Class IX | 2026–27

Time Allowed: 45 Minutes | Maximum Marks: 25

General Instructions

1. All 13 questions are compulsory. Choose one option in A; show working in B–D.
2. Use suitable identities and show the main steps. Calculators are not allowed.
3. In rational expressions, state all restrictions from the original denominator.

SECTION A

(5 questions × 1 mark = 5 marks)

1. An algebraic identity is an equation that is true:

(A) For one value only

(B) For all permitted values

(C) Only for positive integers

(D) Only when each variable is zero

2. The coefficient of xy in $(3x + 2y)^2$ is:

(A) 6

(B) 9

(C) 12

(D) 4

3. Which is a factor of $x^2 - 25$?

(A) $x - 25$

(B) $x + 25$

(C) $x^2 + 5$

(D) $x + 5$

4. If $x^2 + 7x + 12 = (x + a)(x + b)$, then a and b can be:

(A) 3 and 4

(B) 2 and 6

(C) 1 and 12

(D) −3 and −4

5. Which expansion equals $(a + b)^3$?

(A) $a^3 + b^3$

(B) $a^3 + 3a^2b + 3ab^2 + b^3$

(C) $a^3 + 2ab + b^3$

(D) $a^3 - 3a^2b + 3ab^2 - b^3$

SECTION B

(4 questions × 2 marks = 8 marks)

6. Expand the following using an identity:

$$(7x + 4y)^2.$$

7. Calculate the following using a suitable identity:

$$105^2.$$

8. Factor the following completely:

$$16y^2 - 24y + 9.$$

9. Simplify the following and state its restriction:

$$\frac{x^2 - 9}{x + 3}.$$

SECTION C

(3 questions × 3 marks = 9 marks)

10. Prove the following identity for every real n:

$$(n - 1)^2 + (n + 1)^2 - 2n^2 = 2.$$

11. Factor the following by splitting the middle term:

$$6x^2 + 7x + 2.$$

12. Expand the following, showing all mixed terms:

$$(2x - y + 3z)^2.$$

SECTION D

(1 application question × 3 marks = 3 marks)

13. A rectangular pool has area 96 m^2. Its breadth is 4 m less than its length. Find both dimensions using factorisation.