Mathematics — Ganita Manjari

Chapter 4 Test 2

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. Which equation is not an identity?

(A) $2(x+1) = 2x+2$ (B) $(x-1)^2 = x^2 - 2x + 1$

(C) $x^2 - 1 = 24$ (D) $(x+1)(x-1) = x^2 - 1$

2. For non-zero real a and b, $(a+b)^2 < a^2 + b^2$ exactly when:

(A) Both are positive

(B) Both are negative

(C) They are equal

(D) They have opposite signs

3. The constant term in $(2x-3)(5x+4)$ is:

(A) −12 (B) 8

(C) −15 (D) 12

4. The value of 103×97 is:

(A) 10009 (B) 9991

(C) 9901 (D) 10091

5. Complete: $x^3 + y^3 = (x+y)(\ ?\ )$.

(A) $x^2 + xy + y^2$ (B) $x^2 - y^2$

(C) $x^2 - xy + y^2$ (D) $x^2 + 2xy + y^2$

SECTION B

(4 questions × 2 marks = 8 marks)

6. Expand the following:

$$(2.5p + 1.5q)^2.$$

7. Factor the following completely:

$$50p^2 + 60pq + 18q^2.$$

8. Expand the following using the distributive property:

$$(2x + 3)(3x + 1).$$

9. Derive $(a - b)^2$ from the identity for $(a + b)^2$ by substitution.

SECTION C

(3 questions × 3 marks = 9 marks)

10. Factor the following:

$$4x^2 + 9y^2 + 36z^2 + 12xy - 24xz - 36yz.$$

11. Simplify the following and state all excluded values:

$$\frac{x^2 - 7x + 12}{5x^2 + 5x - 100}.$$

12. Two real numbers a and b satisfy $a + b = 9$ and $ab = 14$. Without finding either number, find:

$$a^3 + b^3.$$

SECTION D

(1 application question × 3 marks = 3 marks)

13. A square playground has side 40 m. A path of uniform width s m is built outside it. Find the path's area in terms of s, and then for $s = 2$.