Mathematics — Ganita Manjari

Chapter 4 Test 7

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. The coefficient of x in $(-3x + 4)^2$ is:

(A) 24 (B) −12

(C) 12 (D) −24

2. If $x + y = 0$, then $x^3 + y^3$ equals:

(A) 1 (B) 0

(C) $3xy$ (D) x^3

3. The complete factorisation of $15a^2 - 60b^2$ is:

(A) $15(a - 2b)(a + 2b)$

(B) $15(a - 4b)(a + 4b)$

(C) $15(a - 2b)^2$

(D) $5(3a - 6b)(3a + 6b)$

4. In $(x + a)(x + b)$, the coefficient of x is:

(A) ab (B) $a - b$

(C) $a + b$ (D) $2ab$

5. For which x is $\frac{x+1}{x+1}$ undefined?

(A) 0 (B) 1

(C) All real x (D) −1

SECTION B

(4 questions × 2 marks = 8 marks)

6. Find the following using an identity:

$$(-107)^3.$$

7. Factor the following:

$$64u^2 + 121v^2 + 4w^2 - 176uv - 32uw + 44vw.$$

8. Use distributivity to express the following as a polynomial in x:

$$(px + a)(qx + b).$$

9. To expand $(a - b)^2(a + b)$, compare expanding the square first with using $(a - b)(a^2 - b^2)$. Are both methods valid? Find the final expansion.

SECTION C

(3 questions × 3 marks = 9 marks)

10. Find k and l so that the following is an identity:

$$(2x - 3)^3 = 8x^3 + kx^2 + lx - 27.$$

11. Simplify the following and state the restriction:

$$\frac{a^3 + b^3 + c^3 - 3abc}{a + b + c}.$$

12. Prove that $x - y$ is a factor of the following by finding and verifying the other factor:

$$x^5 - y^5.$$

SECTION D

(1 application question × 3 marks = 3 marks)

13. Increasing the side of a square by 3 cm increases its area by 57 cm^2. Find the original side and the new area.