Mathematics — Ganita Manjari

Chapter 4 Test 4

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 expression equals $(-a-b)^3$?

(A) a^3+b^3

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

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

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

2. The constant term in $(x-4)(x+7)$ is:

(A) −28 (B) 28

(C) 3 (D) −3

3. In the expansion of $(a+b+c)^2$, how many distinct mixed terms occur?

(A) One (B) Two

(C) Six (D) Three

4. The difference $(a+b)^3-(a^3+b^3)$ equals:

(A) $3ab(a-b)$ (B) $3ab(a+b)$

(C) ab (D) 0

5. If $9x^2+kxy+16y^2=(3x-4y)^2$ is an identity, k equals:

(A) 12 (B) 24

(C) −24 (D) −12

SECTION B

(4 questions × 2 marks = 8 marks)

6. Expand the following and state the restrictions:

$$(\frac{1}{x}+\frac{1}{y})^2.$$

7. Factor the following completely over integer coefficients:

$$x^4-81.$$

8. Calculate the following using the identity for $(x+a)(x+b)$:

$$34\times 43.$$

9. Simplify the following and state the restrictions:

$$\frac{4y^2-20yz+25z^2}{25z^2-4y^2}.$$

SECTION C

(3 questions × 3 marks = 9 marks)

10. Derive the identity for the cube of a sum by expanding this product:

$$(a+b)(a+b)^2.$$

11. Factor the following:

$$27u^3-\frac{27u^2}{5}+\frac{9u}{25}-\frac{1}{125}.$$

12. If $p+q+r=0$, prove the following result:

$$p^3+q^3+r^3=3pqr.$$

Hence evaluate $17^3+8^3-25^3$.

SECTION D

(1 application question × 3 marks = 3 marks)

13. A rectangular pool has area $2x^2+7x+3$ m^2 and width $2x+1$ m, where $x>0$. Find its length and perimeter in terms of x.