Mathematics — Ganita Manjari

Chapter 4 Test 10

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 quadratic factor paired with $x + 2$ in $x^3 + 8$ is:

(A) $x^2 + 2x + 4$ (B) $x^2 - 2x + 4$

(C) $x^2 - 4$ (D) $x^2 + 4x + 4$

2. Factorisation rewrites an algebraic expression as:

(A) A sum only

(B) A single numerical value

(C) An equation with one solution

(D) A product of factors

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

(A) −4 (B) 4

(C) −2 (D) 2

4. Can two real numbers have sum 4 and product 5?

(A) Yes, 2 and 2 (B) Yes, 1 and 3

(C) No such real numbers exist (D) Yes, 5 and −1

5. The expression $(x + 4)(x - 4) + 16$ simplifies to:

(A) $x^2 + 32$ (B) x^2

(C) $x^2 - 32$ (D) $2x$

SECTION B

(4 questions × 2 marks = 8 marks)

6. Simplify the following and explain why the result does not depend on n:

$$n^2 - (n+1)^2 - (n+2)^2 + (n+3)^2.$$

7. Factor the following:

$$8n^3 - 60n^2m + 150nm^2 - 125m^3.$$

8. Use an identity to evaluate 9.8×10.2.

9. Find a and b so that the following is an identity:

$$x^2 + ax + b = (x-5)(x+2).$$

SECTION C

(3 questions × 3 marks = 9 marks)

10. Simplify the following and state all restrictions:

$$\frac{s^3 + 125t^3}{s^2 - 2st - 35t^2}.$$

11. Find

(i) $x^3 + y^3 - 12xy + 64$ when $x + y = -4$;

(ii) $x^3 - 8y^3 - 36xy - 216$ when $x = 2y + 6$.

12. Factor the following using a three-variable identity:

$$p^3 + q^3 + 27r^3 - 9pqr.$$

SECTION D

(1 application question × 3 marks = 3 marks)

13. A square has side x m. A rectangle has sides $x + 4$ m and $x - 4$ m, where $x > 4$. Compare their perimeters and areas. Find both areas when their common perimeter is 80 m.