Mathematics — Ganita Manjari

Chapter 4 Test 6

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 bc in $(a + b + c)^2$ is:

(A) 1 (B) 3

(C) 2 (D) 6

2. Complete: $a^3 - b^3 = (a - b)(\ ?\ )$.

(A) $a^2 - ab + b^2$

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

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

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

3. A square has area $9x^2 - 12x + 4$ and $x > \frac{2}{3}$. Its side is:

(A) $9x - 4$ (B) $3x + 2$

(C) $2 - 3x$ (D) $3x - 2$

4. Which identity calculation gives 19^2 correctly?

(A) $400 - 40 + 1$ (B) $400 - 1$

(C) $400 + 40 + 1$ (D) $400 - 20 + 1$

5. The equality $\frac{x}{x} = 1$ is valid:

(A) Only at x = 0 (B) For every real x

(C) For every real x except 0 (D) Only for positive x

SECTION B

(4 questions × 2 marks = 8 marks)

6. Expand the following:

$$(\frac{7x}{5}+\frac{3y}{2})^2.$$

7. Factor the following:

$$x^2+\frac{5x}{6}+\frac{1}{6}.$$

8. Treat y + z as one term and simplify:

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

9. Find $(n+1)^2-n^2$ and explain why the difference of consecutive integer squares is odd.

SECTION C

(3 questions × 3 marks = 9 marks)

10. For every natural n, prove that the following is divisible by 6:

$$n^3-n.$$

11. Simplify the following and give all restrictions:

$$\frac{3p^2-3pq-18q^2}{p^2+3pq-10q^2}.$$

12. Three real numbers have sum 7, sum of squares 21 and product 8. Find their sum of cubes using identities.

SECTION D

(1 application question × 3 marks = 3 marks)

13. A cube has volume $x^3+6x^2+12x+8$ cubic units, where $x>0$. Find its edge. Then find its surface area when $x=3$.