

NEXT Educator

Mathematics Worksheet - Class 8

Chapter: Algebraic Expressions and Identities

Total Marks: 30

Time: 1 hour 30 minutes

Student Name: _____

Date: _____

Roll No: _____

Instructions

- All questions are compulsory
 - Read each question carefully before answering
 - Show all your working clearly
 - Marks are indicated against each question
-

Section A: Multiple Choice Questions (1 mark each)

1. The value of $(x + y)^2$ is:

- (a) $x^2 + y^2$
- (b) $x^2 + 2xy + y^2$
- (c) $x^2 - 2xy + y^2$
- (d) $x^2 + xy + y^2$

2. The factors of $x^2 - 16$ are:

- (a) $(x - 4)(x - 4)$
- (b) $(x + 4)(x - 4)$
- (c) $(x + 4)(x + 4)$
- (d) $(x - 8)(x + 2)$

3. Which of the following is a binomial?

- (a) $3x^2$
- (b) $2x + 5$
- (c) $x^2 + 2x + 1$
- (d) 5

4. The coefficient of x^2 in the expression $5x^3 - 3x^2 + 7x - 2$ is:

- (a) 5
- (b) -3

- (c) 7
(d) -2
-

Section B: Very Short Answer Questions (2 marks each)

5. Expand using identity: $(3x + 4y)^2$
6. Factorise: $x^2 - 9y^2$
7. Add the following algebraic expressions:
 $5x^2 + 3xy - 2y^2$ and $2x^2 - xy + 4y^2$
8. Multiply: $(2x + 3)(x - 5)$
-

Section C: Short Answer Questions (3 marks each)

9. Using suitable identity, evaluate:
- (i) 103^2
(ii) 98×102
10. Factorise the following expressions:
- (i) $4x^2 + 12x + 9$
(ii) $9a^2 - 16b^2$
11. Simplify the following algebraic expression:
 $3(2x^2 + 5x - 4) - 2(x^2 - 3x + 7) + 4x^2$
12. Using identity $(x + a)(x + b) = x^2 + (a + b)x + ab$, find the product:
 $(x + 5)(x + 7)$
-

Section D: Long Answer Questions (4 marks each)

13. Factorise completely using identities:
- (a) $x^4 - y^4$
(b) $27x^3 - 8y^3$ (Hint: Use $a^3 - b^3 = (a - b)(a^2 + ab + b^2)$)
14. Simplify the following algebraic expression and find its value when $x = 2$ and $y = -1$:
 $4(x^2 - 2xy + y^2) - 3(x^2 + xy - 2y^2) + 2xy$
15. Using suitable identities, evaluate:
- (a) $105^2 - 95^2$
(b) $(4.9)^2$

Show all steps clearly.

Section E: Case Study Based Question (5 marks)

16. Garden Design and Algebraic Patterns

A landscape architect is designing a square garden with algebraic dimensions:

A landscape architect is designing gardens for a residential complex. The main garden is square-shaped with each side measuring $(x + 5)$ meters. Inside this garden, there is a square fountain with each side measuring $(x - 3)$ meters.

Feature	Dimension (meters)
Side of main garden	$x + 5$
Side of fountain	$x - 3$
Width of walking path	2

The architect also designs rectangular flower beds with dimensions $(2x + 3)$ meters by $(2x - 3)$ meters.

Based on the above information, answer the following:

1. Find the area of the main garden using algebraic identity. Express your answer in expanded form. (1 mark)
2. Find the area of the fountain using algebraic identity. Express your answer in expanded form. (1 mark)
3. Find the area available for planting (excluding the fountain area). Simplify your answer completely. (1 mark)
4. Find the area of one rectangular flower bed using suitable identity. (1 mark)
5. If $x = 10$ meters, calculate the actual area available for planting in the main garden (excluding fountain). (1 mark)

Answer Key (For Teacher's Reference)

Section A:

1. (b) $x^2 + 2xy + y^2$
2. (b) $(x + 4)(x - 4)$
3. (b) $2x + 5$
4. (b) -3

Section B:

5. $9x^2 + 24xy + 16y^2$
6. $(x + 3y)(x - 3y)$
7. $7x^2 + 2xy + 2y^2$
8. $2x^2 - 7x - 15$

Section C:

9. (i) 10609, (ii) 9996
10. (i) $(2x + 3)^2$, (ii) $(3a + 4b)(3a - 4b)$

11. $8x^2 + 21x - 26$

12. $x^2 + 12x + 35$

Section D:

13. (a) $(x^2 + y^2)(x + y)(x - y)$, (b) $(3x - 2y)(9x^2 + 6xy + 4y^2)$

14. Simplified expression: $x^2 - 11xy + 10y^2$; Value = 33

15. (a) 2000, (b) 24.01

Section E:

16. (1) Area of main garden = $x^2 + 10x + 25 \text{ m}^2$

(2) Area of fountain = $x^2 - 6x + 9 \text{ m}^2$

(3) Area for planting = $16x + 16 \text{ m}^2$ or $16(x + 1) \text{ m}^2$

(4) Area of flower bed = $4x^2 - 9 \text{ m}^2$

(5) When $x = 10$: Area for planting = 176 m^2

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