

You're right — the contents page you uploaded confirms the correct order. **Chapter 4 is “Exploring Algebraic Identities”**, starting on page 68.

I also checked the actual new textbook/syllabus. Chapter 4 includes **visualising identities geometrically, factorisation using identities, algebra tiles, finding new identities, and simplifying rational expressions.**

So the previous Chapter 4 worksheet I gave you was **wrong** because I used the content of a different chapter.

Here is the **correct FREE WORKSHEET**:



CLASS 9 MATHEMATICS



CHAPTER 4 – EXPLORING ALGEBRAIC IDENTITIES



FREE WORKSHEET | New NCERT Ganita Manjari | 2026–27

Name: _____

Class: IX Section: _____

Date: _____



Instructions

- Attempt all questions.
 - Show your working.
 - Use identities wherever appropriate.
 - For geometry/algebra-tile questions, draw neat diagrams where required.
 - **Total Marks: 30**
-



SECTION A – MCQs

1 × 6 = 6 marks

1. Which identity represents the square of the sum of two terms?

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

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

- C. $(a + b)^2 = a^2 - 2ab + b^2$
D. $(a + b)^2 = a^2 - b^2$
-

2. The expansion of $(x - 5)^2$ is:

- A. $x^2 - 25$
B. $x^2 + 10x + 25$
C. $x^2 - 10x + 25$
D. $x^2 - 5x + 25$
-

3. Which identity is represented by the difference of two squares?

- A. $(a+b)^2$
B. $(a-b)^2$
C. $(a+b)(a-b)$
D. $(a+b)^3$
-

4. The factorisation of:

$$x^2 - 25$$

is:

- A. $(x-5)^2$
B. $(x+5)^2$
C. $(x-5)(x+5)$
D. $x(x-25)$
-

5. Which expression is equal to:

$$a^2 + 2ab + b^2?$$

- A. $(a-b)^2$
B. $(a+b)^2$

C. $(a+b)(a-b)$

D. a^2-b^2

6. The identity

$(a+b)^3$

is:

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



SECTION B – FILL IN THE BLANKS

1 × 5 = 5 marks

7.

$(a+b)^2 = \text{-----}$

8.

$(a-b)^2 = \text{-----}$

9.

$(a+b)(a-b) = \text{-----}$

10.

$$a^3 + b^3 = \text{-----}$$

11.

$$a^3 - b^3 = \text{-----}$$

SECTION C – EXPAND AND SIMPLIFY

2 × 4 = 8 marks

12. Expand:

$$(x + 7)^2$$

13. Expand:

$$(2x - 3)^2$$

14. Simplify using an identity:

$$(3a + 2b)(3a - 2b)$$

15. Expand:

$$(x + 2)^3$$

SECTION D – FACTORISATION

2 × 3 = 6 marks

16. Factorise:

$$x^2 + 10x + 25$$

17. Factorise:

$$9a^2 - 16b^2$$

18. Factorise:

$$8x^3 + 27$$

SECTION E – VISUALISING IDENTITIES

1 × 3 = 3 marks

19. A square has side length $(a+b)$.

It is divided into:

- one square of area a^2
- one square of area b^2
- two rectangles, each of area ab

Write the total area of the large square in two different ways.

Answer:

$$(a+b)^2 = \text{-----}$$

Therefore:

$$(a+b)^2 = \text{-----}$$

20. Explain geometrically why:

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

21. The area of a square of side x is x^2 .

If a smaller square of side y is removed from it, what expression represents the remaining area?

SECTION F – COMPETENCY-BASED QUESTION

2 marks

22.  Smart Calculation

Without directly multiplying:

$$103 \times 97$$

use an algebraic identity to find the answer.

Working:

Answer: _____

BONUS CHALLENGE

23.  Find the Identity

A student writes:

$$(x+3)^2 - (x-3)^2$$

Simplify the expression **without expanding both squares completely**.

Hint: Think about a suitable identity.



ANSWER KEY



SECTION A

1. B
 2. C
 3. C
 4. C
 5. B
 6. B
-



SECTION B

7.

$$a^2 + 2ab + b^2$$

8.

$$a^2 - 2ab + b^2$$

9.

$$a^2 - b^2$$

10.

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

11.

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



SECTION C

12.

$$(x+7)^2$$

Using:

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

$$= x^2 + 14x + 49$$

✓ **Answer: $x^2 + 14x + 49$**

13.

$$(2x-3)^2$$

Using:

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

$$= (2x)^2 - 2(2x)(3) + 3^2$$

$$= 4x^2 - 12x + 9$$

14.

$$(3a+2b)(3a-2b)$$

Using:

$$(a+b)(a-b)=a^2-b^2$$

$$= (3a)^2 - (2b)^2$$

$$= 9a^2 - 4b^2$$

15.

$$(x+2)^3$$

Using:

$$\begin{aligned}
 (a+b)^3 &= a^3+3a^2b+3ab^2+b^3 \\
 &= x^3 + 3x^2(2) + 3x(2^2) + 2^3 \\
 &= x^3 + 6x^2 + 12x + 8
 \end{aligned}$$

SECTION D

16.

$$x^2 + 10x + 25$$

Recognise:

$$x^2 + 2(x)(5) + 5^2$$

Therefore:

$$= (x+5)^2$$

17.

$$9a^2 - 16b^2$$

$$= (3a)^2 - (4b)^2$$

Using:

$$a^2-b^2=(a+b)(a-b)$$

$$= (3a+4b)(3a-4b)$$

18.

$$8x^3 + 27$$

$$= (2x)^3 + 3^3$$

Using:

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

$$= (2x+3)(4x^2 - 6x + 9)$$

SECTION E

19.

Area of large square:

$$(a+b)^2$$

Area using smaller parts:

$$a^2 + ab + ab + b^2$$

$$= a^2 + 2ab + b^2$$

Therefore:

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

The textbook introduces this identity precisely through a square divided into smaller squares and rectangles.

20.

A square of side $(a+b)$ has area:

$$(a+b)^2$$

After dividing it into:

$$a^2 + ab + ab + b^2$$

its area is:

$$a^2 + 2ab + b^2$$

Therefore:

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

21.

Original area:

$$x^2$$

Removed square:

$$y^2$$

Remaining area:

$$x^2 - y^2$$

SECTION F

22.

$$103 \times 97$$

Write:

$$103 = 100+3$$

$$97 = 100-3$$

Therefore:

$$103 \times 97$$

$$= (100+3)(100-3)$$

Using:

$$(a+b)(a-b)=a^2-b^2$$

$$= 100^2 - 3^2$$

$$= 10000 - 9$$

$$\checkmark = 9991$$

BONUS

23.

$$(x+3)^2 - (x-3)^2$$

Use:

$$A^2-B^2 = (A+B)(A-B)$$

Here:

$$A = x+3$$

$$B = x-3$$

Therefore:

$$= [(x+3)+(x-3)][(x+3)-(x-3)]$$

$$= (2x)(6)$$

$$\checkmark = 12x$$

CHAPTER 4 QUICK REVISION

Identity 1

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

★ Identity 2

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

★ Identity 3

$$(a+b)(a-b) = a^2 - b^2$$

★ Identity 4

$$(a+b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$$

★ Identity 5

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

★ Identity 6

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

★ Identity 7

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



WHAT YOU SHOULD BE ABLE TO DO

- ☐ Expand algebraic expressions using identities.
- ☐ Recognise which identity to use.
- ☐ Factorise expressions using identities.
- ☐ Visualise identities using squares and rectangles.
- ☐ Understand quadratic expressions geometrically.
- ☐ Use algebra tiles to understand factorisation.
- ☐ Simplify rational expressions.
- ☐ Discover and verify algebraic patterns.

These are directly aligned with the new Chapter 4 syllabus, which specifically includes **visualisation, factorisation, algebra tiles, new identities and rational expressions.**



MY SCORE: _____ / 30

25–30: 🌟 Algebra Expert!

20–24: 👏 Very Good!

15–19: 👍 Good – practise the identities more!

Below 15: 📖 Revise Chapter 4 and try again!