



Class 9 Maths – Ganita Manjari



Chapter 4: Exploring Algebraic Identities



Exercise Set 4.1 – Solutions

The textbook has **2 questions** in Exercise Set 4.1. Question 1 has six parts, followed by three numerical calculations in Question 2.



Identity Used

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



Q1. Expand the following

(i) $(7x + 4y)^2$

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

$$= (7x)^2 + 2(7x)(4y) + (4y)^2$$

$$= 49x^2 + 56xy + 16y^2$$



Answer: $49x^2 + 56xy + 16y^2$

(ii) $(7x/5 + 3y/2)^2$

$$= (7x/5)^2 + 2(7x/5)(3y/2) + (3y/2)^2$$

$$= 49x^2/25 + 21xy/5 + 9y^2/4$$



Answer: $49x^2/25 + 21xy/5 + 9y^2/4$

(iii) $(2.5p + 1.5q)^2$

$$= (2.5p)^2 + 2(2.5p)(1.5q) + (1.5q)^2$$

$$= 6.25p^2 + 7.5pq + 2.25q^2$$

✓ Answer: $6.25p^2 + 7.5pq + 2.25q^2$

(iv) $(3s/4 + 8t)^2$

$$= (3s/4)^2 + 2(3s/4)(8t) + (8t)^2$$

$$= 9s^2/16 + 12st + 64t^2$$

✓ Answer: $9s^2/16 + 12st + 64t^2$

(v) $(x + 1/2y)^2$

$$= x^2 + 2(x)(1/2y) + (1/2y)^2$$

$$= x^2 + x/y + 1/(4y^2)$$

✓ Answer: $x^2 + x/y + 1/(4y^2)$

(vi) $(1/x + 1/y)^2$

$$= (1/x)^2 + 2(1/x)(1/y) + (1/y)^2$$

$$= 1/x^2 + 2/(xy) + 1/y^2$$

✓ Answer: $1/x^2 + 2/(xy) + 1/y^2$

Q2. Find the following squares using the same identity

(i) 64^2

Write:

$$64 = 60 + 4$$

$$64^2 = (60 + 4)^2$$

$$= 60^2 + 2(60)(4) + 4^2$$

$$= 3600 + 480 + 16$$

$$= \mathbf{4096}$$

✓ Answer: 4096

(ii) 105^2

Write:

$$105 = 100 + 5$$

$$105^2 = (100 + 5)^2$$

$$= 100^2 + 2(100)(5) + 5^2$$

$$= 10000 + 1000 + 25$$

$$= \mathbf{11025}$$

✓ Answer: 11025

(iii) 205^2

Write:

$$205 = 200 + 5$$

$$205^2 = (200 + 5)^2$$

$$= 200^2 + 2(200)(5) + 5^2$$

$$= 40000 + 2000 + 25$$

$$= \mathbf{42025}$$

✓ Answer: 42025



QUICK ANSWER KEY

Q1.

(i) $49x^2 + 56xy + 16y^2$

(ii) $49x^2/25 + 21xy/5 + 9y^2/4$

(iii) $6.25p^2 + 7.5pq + 2.25q^2$

(iv) $9s^2/16 + 12st + 64t^2$

(v) $x^2 + x/y + 1/(4y^2)$

(vi) $1/x^2 + 2/(xy) + 1/y^2$

Q2.

(i) **4096**

(ii) **11025**

(iii) **42025**

 **Textbook note:** Exercise Set 4.1 specifically asks students to use the identity $(a+b)^2 = a^2 + 2ab + b^2$ for these expansions and calculations.