



Class 9 Maths – Ganita Manjari



Chapter 4: Exploring Algebraic Identities



Exercise Set 4.4 – Solutions

Exercise Set 4.4 contains **3 questions** covering factorisation by splitting the middle term, quick calculations using identities, and factorisation of algebraic expressions.



Q1. Fill in the blanks

(i) $s^2 - 11s + 24$

We need two numbers whose:

$$\text{Sum} = -11$$

$$\text{Product} = 24$$

The numbers are **-3 and -8**.

Therefore:

$$s^2 - 11s + 24 = (s - 3)(s - 8)$$

✓ Answer: $(s - 3)(s - 8)$

(ii) (_____) $(x + 1) = 3x^2 - 4x - 7$

Factorise:

$$3x^2 - 4x - 7$$

$$= (3x - 7)(x + 1)$$

Therefore:

✓ Answer: $(3x - 7)(x + 1)$

(iii) $10x^2 - 11x - 6 = (2x -)(+ 2)$

We need:

$$(2x - 3)(5x + 2)$$

Expanding:

$$= 10x^2 + 4x - 15x - 6$$

$$= 10x^2 - 11x - 6$$

Therefore:

✓ Answer: $(2x - 3)(5x + 2)$

(iv) $6x^2 + 7x + 2$

Find two factors:

$$6x^2 + 7x + 2$$

$$= 6x^2 + 4x + 3x + 2$$

$$= 2x(3x + 2) + 1(3x + 2)$$

$$= (2x + 1)(3x + 2)$$

✓ Answer: $(2x + 1)(3x + 2)$

Q2. Find the products without multiplying directly

(i) 41^2

$$41 = 40 + 1$$

$$41^2 = (40 + 1)^2$$

$$= 1600 + 80 + 1$$

$$= \mathbf{1681}$$

✓ Answer: **1681**

(ii) 27^2

$$27 = 30 - 3$$

$$27^2 = (30 - 3)^2$$

$$= 900 - 180 + 9$$

$$= \mathbf{729}$$

✓ Answer: **729**

(iii) 23×17

Use:

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

$$23 \times 17$$

$$= (20 + 3)(20 - 3)$$

$$= 20^2 - 3^2$$

$$= 400 - 9$$

$$= \mathbf{391}$$

✓ Answer: **391**

(iv) 135^2

$$135 = 100 + 35$$

$$135^2 = (100 + 35)^2$$

$$= 10000 + 7000 + 1225$$

$$= \mathbf{18225}$$

✓ Answer: **18225**

(v) 97^2

$$97 = 100 - 3$$

$$97^2 = (100 - 3)^2$$

$$= 10000 - 600 + 9$$

$$= \mathbf{9409}$$

✓ Answer: **9409**

(vi) 18×29

$$18 \times 29 = 18 \times (30 - 1)$$

$$= 540 - 18$$

$$= \mathbf{522}$$

✓ Answer: **522**

(vii) 34×43

$$= 34 \times (40 + 3)$$

$$= 1360 + 102$$

$$= \mathbf{1462}$$

✓ Answer: **1462**

(viii) 205^2

$$205 = 200 + 5$$

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

$$= 40000 + 2000 + 25$$

$$= \mathbf{42025}$$

✓ Answer: **42025**

Q3. Factorise

(i) $9a^2 + b^2 + 4c^2 - 6ab + 12ac - 4bc$

Compare with:

$$(a + b + c)^2$$

Take:

$$a \rightarrow 3a$$

$$b \rightarrow -b$$

$$c \rightarrow 2c$$

Therefore:

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

✓ Answer: $(3a - b + 2c)^2$

(ii) $16s^2 + 25t^2 - 40st$

$$= (4s)^2 - 2(4s)(5t) + (5t)^2$$

$$= (4s - 5t)^2$$

✓ Answer: $(4s - 5t)^2$

(iii) $r^2 - r - 42$

We need two numbers whose:

$$\text{Product} = -42$$

$$\text{Sum} = -1$$

The numbers are **-7 and +6**.

Therefore:

$$r^2 - r - 42$$

$$= (r - 7)(r + 6)$$

✓ Answer: $(r - 7)(r + 6)$

(iv) $49g^2 + 14gh + h^2$

$$= (7g)^2 + 2(7g)(h) + h^2$$

$$= (7g + h)^2$$

✓ Answer: $(7g + h)^2$

(v) $64u^2 + 121v^2 + 4w^2 - 176uv - 32uw + 44vw$

Take:

$$a = 8u$$

$$b = -11v$$

$$c = -2w$$

Using:

$$(a + b + c)^2$$

Therefore:

$$= (8u - 11v - 2w)^2$$

✓ Answer: $(8u - 11v - 2w)^2$

The expressions in Question 3 are exactly the factorisation problems given in the textbook.



QUICK ANSWER KEY

Q1

(i) $(s - 3)(s - 8)$

(ii) $(3x - 7)(x + 1)$

(iii) $(2x - 3)(5x + 2)$

(iv) $(2x + 1)(3x + 2)$

Q2

(i) 1681

(ii) 729

(iii) 391

(iv) 18225

(v) 9409

(vi) 522

(vii) 1462

(viii) 42025

Q3

(i) $(3a - b + 2c)^2$

(ii) $(4s - 5t)^2$

(iii) $(r - 7)(r + 6)$

(iv) $(7g + h)^2$

(v) $(8u - 11v - 2w)^2$