ICSE Class 8 Maths Selina Solutions Chapter 12: ICSE Class 8 Maths Selina Solutions for Chapter 12, "Algebraic Identities," give clear explanations and answers to the problems in this chapter.

Algebraic identities deal with expressions that involve numbers and letters. This chapter teaches important identities like $(a+b)2(a+b)^2(a+b)2$, $(a-b)2(a-b)^2(a-b)2$, and $(a+b)(a-b)(a+b)(a-b)(a+b)(a-b)$, and shows how they work in different situations.

The solutions from Selina Publishers explain each step of solving these identities, making it easier for students to understand. These solutions are great for students studying for exams because they provide practice and help them learn key algebra concepts.

ICSE Class 8 Maths Selina Solutions Chapter 12 Algebraic Identities Overview

ICSE Class 8 Maths Selina Solutions for Chapter 12, "Algebraic Identities," are prepared by subject experts from Physics Wallah.

Algebraic identities involve expressions with both numbers and variables, focusing on key identities such as $(a+b)2(a+b)^2(a+b)2$, $(a-b)2(a-b)^2(a-b)2$, and $(a+b)(a-b)(a+b)(a-b)(a+b)(a-b)$. The solutions are created to help students understand each step of solving these identities effectively.

They are a valuable resource for students preparing for exams, offering clear guidance and practice to strengthen their grasp of algebraic concepts essential for higher studies in mathematics.

Algebraic Identities

Algebraic identities are fundamental equations in algebra that involve variables and constants. They are expressions that are true for any values of the variables involved. Some common algebraic identities include:

1. **Square of a Sum**: $(a+b)2=a2+2ab+b2(a + b)^2 = a^2 + 2ab + b^2(a+b)2=a2+2ab+b2$
2. **Square of a Difference**: $(a-b)2=a2-2ab+b2(a - b)^2 = a^2 - 2ab + b^2(a-b)2=a2-2ab+b2$
3. **Difference of Squares**: $a2-b2=(a+b)(a-b)a^2 - b^2 = (a + b)(a - b)a2-b2=(a+b)(a-b)$
4. **Cube of a Sum**: $(a+b)3=a3+3a2b+3ab2+b3(a + b)^3 = a^3 + 3a^2b + 3ab^2 + b^3(a+b)3=a3+3a2b+3ab2+b3$
5. **Cube of a Difference**: $(a-b)3=a3-3a2b+3ab2-b3(a - b)^3 = a^3 - 3a^2b + 3ab^2 - b^3(a-b)3=a3-3a2b+3ab2-b3$

These identities are important because they allow us to simplify and manipulate algebraic expressions efficiently.

They are used extensively in solving equations, factoring polynomials, and proving mathematical statements. Understanding and applying algebraic identities is essential for mastering algebra and for further studies in mathematics and related fields.

ICSE Class 8 Maths Selina Solutions Chapter 12 Algebraic Identities PDF

Here we have provided ICSE Class 8 Maths Selina Solutions Chapter 12 for the ease of students so that they can just download the pdf and use it easily without the internet. These ICSE Class 8 Maths Selina Solutions Chapter 12 will help students understand the chapter better.

ICSE Class 8 Maths Selina Solutions Chapter 12 Algebraic Identities PDF

ICSE Class 8 Maths Selina Solutions Chapter 12 Algebraic Identities

Below we have provided ICSE Class 8 Maths Selina Solutions Chapter 12 Algebraic Identities for the ease of the students –

ICSE Class 8 Maths Selina Solutions Chapter 12 Algebraic Identities Exercise 12A

Use direct method to evaluate the following products:

(i) (x+8)(x+3)

Solution:-

$(x+8)(x+3)=(x\times x)+(x\times 3)+(8\times x)+(8\times 3)=x^2+3x+8x+24=x^2+11x+24$

(ii) (y+5)(y-3)

Solution:-

$(y+5)(y-3)=(y\times y)+(y\times -3)+(5\times y)+(5\times -3)=y^2+(-3y)+(5y)-15$
$=y^2-3y+5y-15=y^2+2y-15$

(iii) (a-8)(a+2)

Solution:-

$(a-8)(a+2)=(a\times a)+(a\times 2)+(-8)\times a+(-8)(2)=a^2+2a-8a-16=a^2-6a-16$

(iv) (b-3)(b-5)

Solution:-

$(b\times b)+(b\times -5)+(-3\times b)+(-3)(-5)=b^2-5b-3b+15=b^2-8b+15$

(v) (3 x-2 y)(2 x+y)

Solution:-

$(3x-2y)(2x+y)=(3x\times 2x)+(3x\times y)+(-2y\times 2x)+(-2y\times y)=6x^2+3xy-4xy-2y^2$
$=6x^2-xy-2y^2$

(vi) (5 a+16)(3 a-7)

Solution:-

(5 a+16)(3 a-7) = (5a×3a)+(5a×-7)+(16×3a)+(16×-7)

$=15a^2+(-35a)+48a+(-112)=15a^2-35a+48a-112=15a^2+13a-112$

(vii) (8-b)(3+b)

Solution:-

(8-b)(3+b) = (8×3)+(8×b)+(-b×3)+(-b×b)

$$= 24 + 8b - 3b - b^2 = 24 + 5b - b^2$$

Question 2.

Use direct method to evaluate:

(i) (x+1)(x-1)

Solution:-

$$(x + 1)(x - 1) = \left(x^2\right) - 1^2 = x^2 - 1$$

(ii) (2+a)(2-a)

Solution:-

$$(2+a)(2-a)=(2)^2-\left(a^2\right)=4-a^2$$

(iii) $(3b-1)(3b+1)$

Solution:-

$$(3b-1)(3b+1)=(3b)^2-(1)^2=9b^2-1$$

(iv) (4+5x)(4-5x)

Solution:-

$$(4+5x)(4-5x)=(4)^2-(5)^2=16-25x^2$$

(v) (2a+3)(2a-3)

Solution:-

$$(2a+3)(2a-3)=2a^2-3^2=4a^2-9$$

(vi) (xy+4)(xy-4)

Solution:-

$$(xy+4)(xy-4)=xy^2-4^2=x^2y^2-16$$

(vii) $\left(ab+x^2\right)\left(ab-x^2\right)$

Solution:-

$$\left(ab+x^2\right)\left(ab-x^2\right)=(ab)^2-\left(x^2\right)^2=a^2b^2-x^4$$

(viii) $\left(3x^2+5y^2\right)\left(3x^2-5y^2\right)$

Solution:-

$$\left(3x^2+5y^2\right)\left(3x^2-5y^2\right)=\left(3x^2\right)^2-\left(5y^2\right)^2=9x^4-25y^4$$

(ix) $\left(z-\frac{2}{3}\right)\left(z+\frac{2}{3}\right)$

Solution:-

$$\left(z-\frac{2}{3}\right)\left(z+\frac{2}{3}\right)=(z)^2-\left(\frac{2}{3}\right)^2=z^2-\frac{4}{9}$$

(x) $\left(\frac{3}{5}a+\frac{1}{2}\right)\left(\frac{3}{5}a-\frac{1}{2}\right)$

Solution:-

$$=\left(\frac{3}{5}a\right)^2-\left(\frac{1}{2}\right)^2=\frac{9}{25}a^2-\frac{1}{4}$$

(xi) (0·5-2a)(0·5+2a)

Solution:-

$$=(0\cdot 5)^2-(2a)^2=0\cdot 25-4a^2$$

(xii) $\left(\frac{a}{2}-\frac{b}{3}\right)\left(\frac{a}{2}+\frac{b}{3}\right)$

Solution:-

$=\frac{a^2}{4}-\frac{b^2}{9}$

Question 3.

Evaluate:

(i) $(a+1)(a-1)\left(a^2+1\right)$

Solution:-

$=\left[(a)^2-(1)^2\right]\left(a^2+1\right)=\left(a^2-1\right)\left(a^2+1\right)=\left(a^2\right)^2-(1)^2=a^4-1$

(ii) $(a+b)(a-b)\left(a^2+b^2\right)$

Solution:-

$=\left(a^2-b^2\right)\left(a^2+b^2\right)=\left(a^2\right)^2-\left(b^2\right)^2=a^4-b^4$

(iii) $(2a-b)(2a+b)\left(4a^2+b^2\right)$

Solution:-

$=\left[(2a)^2-(b)^2\right]\left(4a^2+b^2\right)=\left(4a^2-b^2\right)\left(4a^2+b^2\right)=\left(4a^2\right)^2-\left(b^2\right)^2=16a^4-b^4$

(iv) $(3-2x)(3+2x)\left(9+4x^2\right)$

Solution:-

$=\left[(3)^2-(2x)^2\right]\left(9+4x^2\right)=\left(9-4x^2\right)\left(9+4x^2\right)=(9)^2-\left(4x^2\right)^2=81-16x^4$

(v) $(3x-4y)(3x+4y)\left(9x^2+16y^2\right)$

Solution:-

$=\left[(3x)^2-(4y)^2\right]\left(9x^2+16y^2\right)=\left(9x^2-16y^2\right)\left(9x^2+16y^2\right)=\left(9x^2\right)^2-\left(16y^2\right)^2$
$=81x^4-256y^4$

Question 4.

Use the product $(a+b)(a-b)=a^2-b^2$ to evaluate:

(i) (21×19)

Solution:-

$=21\times 19=(20+1)(20-1)=(20)^2-(1)^2=400-1=399$

(ii) (33×27)

Solution:-

$= 33 \times 27 = (30 + 3)(30 - 3) = (30)^2 - (3)^2 = 900 - 9 = 891$

(iii) (103×97)

Solution:-

$(103 \times 97 = (100 + 3)(100 - 3) = (100)^2 - (3)^2 = 10000 - 9 = 9991$

(iv) (9.8×10.2)

Solution:-

$= 9.8 \times 10.2 = (10 - .2)(10 + .2) = (10)^2 - (.2)^2 = 100 - .04 = 99.96$

(v) (7.7×8.3)

Solution:-

$= 7.7 \times 8.3 = (8 - .3)(8 + .3) = (8)^2 - (.3)^2 = 64 - .09 = 63.91$

(vi) (4.6×5.4)

Solution:-

$= 4.6 \times 5.4 = (5 - .4)(5 + .4) = (5)^2 - (.4)^2 = 25 - .16 = 24.84$

Question 5.

Evaluate:

(i) (6-xy)(6+xy)

Solution:-

(6-xy)(6+xy)=6(6+xy)-xy(6+xy)

$= 36 + 6xy - 6xy + (xy)^2 = 36 - x^2y^2$

(ii) $\left(7x + \frac{2}{3}y\right)\left(7x - \frac{2}{3}y\right)$

Solution:-

$= 7x\left(7x - \frac{2}{3}y\right) + \frac{2}{3}y\left(7x - \frac{2}{3}y\right) = 49x^2 - \frac{14}{3}xy + \frac{14}{3}xy - \frac{4}{9}y^2 = 49x^2 - \frac{4}{9}y^2$

(iii) $\left(\frac{a}{2b} + \frac{2b}{a}\right)\left(\frac{a}{2b} - \frac{2b}{a}\right)$

Solution:-

$= \frac{a}{2b}\left(\frac{a}{2b} - \frac{2b}{a}\right) + \frac{2b}{a}\left(\frac{a}{2b} - \frac{2b}{a}\right) = \frac{a^2}{4b^2} - 1 + 1 - \frac{4b^2}{a^2} = \frac{a^2}{4b^2} - \frac{4b^2}{a^2}$

(iv) $\left(3x - \frac{1}{2y}\right)\left(3x + \frac{1}{2y}\right)$

Solution:-

$= 3x\left(3x + \frac{1}{2y}\right) - \frac{1}{2y}\left(3x + \frac{1}{2y}\right) = 9x^2 + \frac{3x}{2y} - \frac{3x}{2y} - \frac{1}{4y^2} = 9x^2 - \frac{1}{4y^2}$

(v) $(2a+3)(2a-3)\left(4a^2+9\right)$

Solution:-

$= \left[(2a)^2 - (3)^2\right]\left(4a^2+9\right)\left[(a+b)(a-b) = a^2 - b^2\right] = \left(4a^2-9\right)\left(4a^2+9\right)$
$= \left(4a^2\right)^2 - (9)^2\left[(a+b)(a-b) = a^2 - b^2\right] = 16a^4 - 81$

(vi) $(a+bc)(a-bc)\left(a^2+b^2c^2\right)$

Solution:-

$= \left[(a)^2 - (bc)^2\right]\left(a^2+b^2c^2\right) = \left[(a+b)(a-b) = a^2 - b^2\right] = \left(a^2-b^2c^2\right)\left(a^2+b^2c^2\right)$
$= \left(a^2\right)^2 - \left(b^2c^2\right)^2\left[\because \quad (a+b)(c-b) = a^2 - b^2\right] = \left(a^2\right)^2 - \left(b^2c^2\right)^2\left[\because (a+b)(c-b) = a^2 - b^2\right]$
$= a^4 - b^4c^4$

(vii) (5x+8y)(3x+5y)

Solution:-

=5x(3x+5y)+8y(3x+5y)

$= 15x^2 + 25xy + 24xy + 40y^2 = 15x^2 + 49xy + 40y^2$

(viii)(7x+15y)(5x-4y)

Solution:-

=7x(5x-4y)+15y(5x-4y)

$= 35x^2 - 28xy + 75xy - 60y^2 = 35x^2 + 47xy - 60y^2$

(ix)(2a-3b)(3a+4b)

Solution:-

=2a(3a+4b)-3b(3a+4b)

$= 6a^2 + 8ab - 9ab - 12b^2 = 6a^2 - ab - 12b^2$

(x)(9a-7b)(3a-b)

Solution:-

=9a(3a-b)-7b(3a-b)

$$= 27a^2 - 9ab - 21ab + 7b^2 = 27a^2 - 30ab + 7b^2$$

Exercise 12B

Question 1.

Expand:

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

Solution:-

$(2a + b)^2 = (2a)^2 + (b)^2 + 2 \times 2a \times b \left[(a + b)^2 = a^2 + b^2 + 2ab\right] = 4a^2 + b^2 + 4ab$

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

Solution:-

$(a - 2b)^2 = (a)^2 + (2b)^2 - 2 \times a \times 2b \left[(a - b)^2 = a^2 + b^2 - 2ab\right] = a^2 + 4b^2 - 4ab$

(iii) $\left(a + \frac{1}{2a}\right)^2$

Solution:-

$= (a)^2 + \left(\frac{1}{2a}\right)^2 + 2 \times a \times \frac{1}{2a} = a^2 + \frac{1}{4a^2} + \frac{2a}{2a} = a^2 + \frac{1}{4a^2} + 1$

(iv) $\left(2a - \frac{1}{a}\right)^2$

Solution:-

$= (2a)^2 + \left(\frac{1}{a}\right)^2 - 2 \times 2a \times \frac{1}{a} = 4a^2 + \frac{1}{a^2} - 4$

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

Solution:-

$= (a)^2 + (b)^2 + (-c)^2 \;(+2 \times a \times b + 2 \times b \times (-c) + 2 \times (-c) \times (a)$

$= a^2 + b^2 + c^2 + 2ab - 2bc - 2ca$

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

Solution:-

$= (a)^2 + (-b)^2 + (c)^2 + 2 \times a \times -b + 2(-b)(c) + 2 \times c \times a = a^2 + b^2 + c^2 - 2ab - 2bc + 2ca$

(vii) $\left(3x + \frac{1}{3x}\right)^2$

Solution:-

$= (3x)^2 + \left(\frac{1}{3x}\right)^2 + 2 \times 3x \times \frac{1}{3x} = 9x^2 + \frac{1}{9x^2} + 2$

(viii) $\left(2x - \frac{1}{2x}\right)^2$

Solution:-

$= (2x)^2 + \left(\frac{1}{2x}\right)^2 - 2 \times 2x \times \frac{1}{2x} = 4x^2 + \frac{1}{4x^2} - 2$

Question 2.

Find the square of:

(i) x+3y

Solution:-

$(x + 3y)^2 = (x)^2 + (3y)^2 + 2 \times x \times 3y = x^2 + 9y^2 + 6xy$

(ii) 2x-5y

Solution:-

$(2x– 5y)^2 = (2x)^2 + (5y)^2 - 2 \times 2x \times 5y = 4x^2 + 25y^2 - 20xy$

(iii) $(a + \frac{1}{5a})$

Solution:-

$(a + \frac{1}{5a})^2 = (a)^2 + \left(\frac{1}{5a}\right)^2 + 2 \times a \times \frac{1}{5a}\ (a^2 + \frac{1}{25a^2} + \frac{2}{5})$

(iv) $(2a - \frac{1}{a})$

Solution:-

$(2a - \frac{1}{a})^2 = (2a)^2 + \left(\frac{1}{a}\right)^2 - 2 \times 2a \times \frac{1}{a} = 4a^2 + \frac{1}{a^2} - 4$

(v) x-2y+1

Solution:-

$(x - 2y + 1)^2 = (x)^2 + (-2y)^2 + (1)^2 + 2 \times x\ (x - 2y + 2 \times (-2y) \times 1 + 2 \times 1 \times x$
$= x^2 + 4y^2 + 1 - 4xy - 4y + 2x$

(vi) 3a-2b-5c

Solution:-

$(3a-2b-5c)^2=(3a)^2+(-2b)^2+(-5c)^2\ (+2\times 3a\times -2b+2\times(-2b)(-5c)\ (+2x-5c\times 3a)$

(vii) $(2x+\frac{1}{x}+1)$

Solution:-

$(2x+\frac{1}{x}+1)^2=(2x)^2+\left(\frac{1}{x}\right)^2+(1)^2+2x=(2x\times\frac{1}{x}+2\times\frac{1}{x}\times 1+2\times 1\times 2x$

$=4x^2+\frac{1}{x^2}+1+4+\frac{2}{x}+4x=4x^2+\frac{1}{x^2}+5+\frac{2}{x}+4x$

(viii) $(5-x+\frac{2}{x})$

Solution:-

$(5-x+\frac{2}{x})^2=(5)^2+(-x)^2+\left(\frac{2}{x}\right)^2\ (+2\times 5\times(-x)+2(-x)\times\frac{2}{x}+2\times\frac{2}{x}\times 5$

$=25+x^2+\frac{4}{x^2}-10x-4+\frac{20}{x}=21+x^2+\frac{4}{x^2}-10x+\frac{20}{x}$

(ix) 2x-3y+z

Solution:-

$(2x-3y+z)^2=(2x)^2+(-3y)^2+(z)^2+2\times 2xx\ (-3y+2(-3y)\times z+2\times z\times 2x$

$=4x^2+9y^2+z^2-12xy-6yz+4zx$

(x) $(x+\frac{1}{x}-1)$

Solution:-

$(x+\frac{1}{x}-1)^2=(x)^2+\left(\frac{1}{x}\right)^2+(-1)^2\ (+2\times x\times\frac{1}{x}+2\times\frac{1}{x}\times(-1)+2(-1)\times x$

$=x^2+\frac{1}{x^2}+1+2-\frac{2}{x}-2x=x^2+\frac{1}{x^2}+3-\frac{2}{x}-2x$

Question 3.

Evaluate:

Using expansion of $(a+b)^2$ or $(a-b)^2$

(i) $(208)^2$

Solution:-

$=(200+8)^2=(200)^2+(8)^2+2(200)(8)=40000+64+3200=43264$

(ii) $(92)^2$

Solution:-

$=(100-8)^2=(100)^2+(8)^2-2(100)(8)$

=10000+64-1600=10064-1600=8464

(iii) $(415)^2$

Solution:-

$(400+15)^2=(400)^2+(15)^2+2(400)(15)=160000+225+12000=172225$

(iv) $(188)^2$

Solution:-

$(200-12)^2=(200)^2+(12)^2-2(200)(12)=40000+144-4800$

=40144-4800=35344

(v) $(9.4)^2$

Solution:-

$=(10-.6)^2=(10)^2+(.6)^2-2(10)(.6)=100+.36-12$

=88+.36=88.36

(vi) $(20.7)^2$

Solution:-

$=(20+.7)^2=(20)^2+(.7)^2+2(20)(.7)$

=400+.49+28=428+.49=428.49

Question 4.

Expand:

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

Solution:-

$=(2a)^3+(b)^3+3\times 2a\times b(2a+b)\ \left[(a+b)^3=a^3+b^3+3ab(a+b)\right]=8a^3+b^3+6ab(2a+b)$

$=8a^3+b^3+12a^2b+6ab^2$

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

Solution:-

$=(a)^3-(2b)^3-3\times a\times 2b(a-2b)\ \left[(a-b)^3=a^3-b^3-3ab(a-b)\right]=a^3-8b^3-6ab(a-2b)$

$=a^3-8b^3-6a^2b+12ab^2$

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

Solution:-

$=(3x)^3-(2y)^3-3\times 3x\times 2y(3x-2y)=27x^3-8y^3-18xy(3x-2y)$

$=27x^3-8y^3-54x^2y+36xy^2$

(iv) $(x+5y)^3$

Solution:-

$= (x)^3 + (5y)^3 + 3 \times x \times 5y(x + 5y) = x^3 + 125y^3 + 15xy(x + 5y)$
$= x^3 + 125y^3 + 15x^2y + 75y^2$
(v) $\left(a + \frac{1}{a}\right)^3$

Solution:-

$= a^3 + \left(\frac{1}{a}\right)^3 + 3 \times a \times \frac{1}{a} \times \left(a + \frac{1}{a}\right) = a^3 + \frac{1}{a^3} + 3\left(a + \frac{1}{a}\right) = a^3 + \frac{1}{a^3} + 3a + \frac{3}{a}$
(vi) $\left(2a - \frac{1}{2a}\right)^3$

Solution:-

$= (2a)^3 - \left(\frac{1}{2a}\right)^3 - 3 \times 2a \times \frac{1}{2a}\left(2a - \frac{1}{2a}\right) = 8a^3 - \frac{1}{8a^3} - 3\left(2a - \frac{1}{2a}\right) = 8a^3 - \frac{1}{8a^3} - 6a + \frac{3}{2a}$
Question 5.

Find the cube of:

(i) a+2

Solution:-

$(a + 2)^3 = (a)^3 + (2)^3 + 3 \times a \times 2(a + 2) = a^3 + 8 + 6a(a + 2) = a^3 + 8 + 6a^2 + 12a$
$= a^3 + 6a^2 + 12a + 8$
(ii) 2a-1

Solution:-

$(2a - 1)^3 = (2a)^3 - (1)^3 - 3 \times 2a \times 1(2a - 1) = 8a^3 - 1 - 6a(2a - 1) = 8a^3 - 1 - 12a^2 + 6a$
$= 8a^3 - 12a^2 + 6a - 1$
(iii) 2a+3b

Solution:-

$(2a + 3b)^3 = (2a)^3 + (3b)^3 + 3 \times 2a \times 3b$
$(2a + 3b)^3$
$= 8a^3 + 27b^3 + 18ab(2a + 3b) = 8a^3 + 27b^3 + 36a^2b + 54ab^2 = 8a^3 + 36a^2b + 54ab^2 + 27b^3$
(iv) 3b-2a

Solution:-

$(3b - 2a)^3 = (3b)^3 - (2a)^3 - 3 \times 3b \times 2a(3b - 2a) = 27b^3 - 8a^3 - 18ab(3b - 2a)$
$= 27b^3 - 8a^3 - 54ab^2 + 36a^2b = 27b^3 - 8a^3 - 54ab^2 + 36a^2b = 27b^3 - 54b^2a + 36ba^2 - 8a^3$
(v) $\left(2x + \frac{1}{x}\right)^3$

Solution:-

$$\left(2x+\frac{1}{x}\right)^3=(2x)^3+\left(\frac{1}{x}\right)^3+3\times 2x\times\frac{1}{x}\left(2x+\frac{1}{x}\right)=8x^3+\frac{1}{x^3}+6\left(2x+\frac{1}{x}\right)$$
$$=8x^3+\frac{1}{x^3}+12x+\frac{6}{x}=8x^3+12x+\frac{6}{x}+\frac{1}{x^3}$$

(vi) $\left(x-\frac{1}{2}\right)^3$

Solution:-

$$\left(x-\frac{1}{2}\right)^3=(x)^3-\left(\frac{1}{2}\right)^3-3\times x\times\frac{1}{2}\left(x-\frac{1}{2}\right)=x^3-\frac{1}{8}-\frac{3x}{2}\left(x-\frac{1}{2}\right)=x^3-\frac{1}{8}-\frac{3x^2}{2}+\frac{3x}{4}$$
$$=x^3-\frac{3x^2}{2}+\frac{3x}{4}-\frac{1}{8}$$

ICSE Class 8 Maths Selina Solutions Chapter 12 Algebraic Identities Exercise 12C

Question:1

If a+b=5 and ab=6;find (a^2+b^2)

Solution:-

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

$$\Rightarrow (5)^2=a^2+b^2+2\times 6$$

$$\Rightarrow 25=a^2+b^2+12$$

$$\Rightarrow 25-12=a^2+b^2$$

$$\Rightarrow 13=a^2+b^2$$

$$\therefore a^2+b^2=13$$

Question:2

If a-b=6 and ab=16; find(a^2+b^2)

Solution:

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

$$\Rightarrow (6)^2=a^2+b^2-2\times 16$$

$$\Rightarrow 36=a^2+b^2-32$$

$$\Rightarrow 36 + 32 = a^2 + b^2$$

$$\Rightarrow 68 = a^2 + b^2$$

$$\therefore a^2 + b^2 = 68$$

Question:3

If $(a^2 + b^2) = 29 and ab = 10$; find :

(i) a+b

Solution:-

$$(a \Rightarrow +b)^2 = 29 + 2 \times 10$$

$\Rightarrow (a+b)^2 = 29 + 20$

$\Rightarrow (a+b)^2 = 49$

$\Rightarrow \quad a + b = \sqrt{49}$
⇒ a+b=7

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

$\Rightarrow (a-b)^2 = 29 - 2 \times 10$

$\Rightarrow (a-b)^2 = 29 - 20$

$\Rightarrow (a-b)^2 = 9$

$\Rightarrow a - b = \sqrt{9}$
⇒ a-b=3

Question:4

If $(a^2 + b^2) = 10$ andab=3; find

(i)a-b

Solution:-

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

$\Rightarrow (a-b)^2 = 10 - 2 \times 3$

$\Rightarrow (a-b)^2 = 10 - 6$

$\Rightarrow (a-b)^2 = 4$

$\Rightarrow (a-b) = \sqrt{4} \Rightarrow$ a-b=2

(ii) a+b

Solution:-

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

$\Rightarrow (a+b)^2 = 10 + 2 \times 3$

$\Rightarrow (a+b)^2 = 10 + 6$

$\Rightarrow (a+b)^2 = 16$

$\mathrm{m}(a+b) = \sqrt{16}$
⇒ (a+b)=4

Question:5

If $\left(a+\frac{1}{a}\right) = 3;\ \text{find } a^2 + \frac{1}{a^2}$

Solution:-

$\left(a+\frac{1}{a}\right)^2 = a^2 + \frac{1}{a^2} + 2$

$\Rightarrow (3)^2 = a^2 + \frac{1}{a^2} + 2$

$\Rightarrow \quad 9 = a^2 + \frac{1}{a^2} + 2$

$\Rightarrow 7 = a^2 + \frac{1}{a^2}$

$\therefore a^2 + \frac{1}{a^2} = 7$

Alternative Method:

$a + \frac{1}{a} = 3$

$\Rightarrow \left(a+\frac{1}{a}\right)^2 = (3)^2$

$$\Rightarrow a^2 + \frac{1}{a^2} + 2 = 9$$

$$\Rightarrow \quad a^2 + \frac{1}{a^2} = 9 - 2$$

$$\Rightarrow a^2 + \frac{1}{a^2} = 7$$

Benefits of ICSE Class 8 Maths Selina Solutions Chapter 12 Algebraic Identities

The benefits of ICSE Class 8 Maths Selina Solutions Chapter 12, "Algebraic Identities," include:

Clear Explanations: The solutions provide clear, step-by-step explanations for each problem, helping students understand how to apply algebraic identities effectively.

Comprehensive Coverage: They cover all the important algebraic identities like (a+b)2(a+b)^2(a+b)2, (a−b)2(a-b)^2(a−b)2, and (a+b)(a−b)(a+b)(a-b)(a+b)(a−b), ensuring students grasp the concepts thoroughly.

Practice Problems: The solutions include a variety of practice problems that allow students to reinforce their understanding and apply the identities in different scenarios.

Exam Preparation: By practicing with these solutions, students become familiar with the types of questions they may encounter in exams, improving their confidence and performance.

Expert Guidance: Prepared by subject experts, the solutions ensure accuracy and reliability, providing correct answers and guidance to help students learn effectively.

Enhanced Problem-Solving Skills: Regular practice with these solutions enhances students' ability to solve algebraic problems efficiently, building their problem-solving skills.

Foundation for Higher Studies: Mastering algebraic identities lays a strong foundation for advanced mathematical concepts and courses in the future.

Accessible Format: Available in a structured format, these solutions are easy to access and use, making learning more convenient for students.