

CBSE Class –VIII Mathematics

NCERT Solutions

CHAPTER - 9

Algebraic Expressions and Identities (Ex. 9.3)

1. Carry out the multiplication of the expressions in each of the following pairs:

(i) $4p, q+r$ (ii) $ab, a-b$ (iii) $a+b, 7a^2b^2$

(iv) $a^2-9, 4a$

(v) $pq+qr+rp, 0$

Ans.

(i) $4p \times (q+r) = 4p \times q + 4p \times r$

$= 4pq + 4pr$

(ii) $ab \times (a-b) = ab \times a - ab \times b$

$= a^2b - ab^2$

(iii) $(a+b) \times 7a^2b^2 = a \times 7a^2b^2 + b \times 7a^2b^2 = 7a^3b^2 + 7a^2b^3$

(iv) $(a^2-9) \times 4a = a^2 \times 4a - 4a \times 9 = 4a^3 - 36a$

(v) $(pq+qr+rp) \times 0 = pq \times 0 + qr \times 0 + rp \times 0$

$= 0 + 0 + 0 = 0$

2. Complete the table:

	First expression	Second expression	Product

(i)	a	$b + c + d$
(ii)	$x + y - 5$	$5xy$
(iii)	p	$6p^2 - 7p + 5$
(iv)	$4p^2q^2$	$p^2 - q^2$
(v)	$a + b + c$	abc

Ans.

	First expression	Second expression	Product
(i)	a	$b + c + d$	$a(b + c + d)$ $= a \times b + a \times c + a \times d$ $= ab + ac + ad$
(ii)	$x + y - 5$	$5xy$	$5xy(x + y - 5)$ $= 5xy \times x + 5xy \times y - 5xy \times 5$ $= 5x^2y + 5xy^2 - 25xy$
(iii)	p	$6p^2 - 7p + 5$	$p(6p^2 - 7p + 5)$ $= p \times 6p^2 - p \times 7p + p \times 5$ $= 6p^3 - 7p^2 + 5p$
(iv)	$4p^2q^2$	$p^2 - q^2$	$4p^2q^2(p^2 - q^2)$ $= 4p^2q^2 \times p^2 - 4p^2q^2 \times q^2$ $= 4p^4q^2 - 4p^2q^4$
(v)	$a + b + c$	abc	$abc(a + b + c)$ $= abc \times a + abc \times b + abc \times c$ $= a^2bc + ab^2c + abc^2$

3. Find the product:

(i) $(a^2) \times (2a^{22}) \times (4a^{26})$

(ii) $\left(\frac{2}{3}xy\right) \times \left(\frac{-9}{10}x^2y^2\right)$

(iii) $\left(\frac{-10}{3}pq^3\right) \times \left(\frac{6}{5}p^3q\right)$

(iv) $x \times x^2 \times x^3 \times x^4$

Ans.

(i) $(a^2) \times (2a^{22}) \times (4a^{26})$

$$= (2 \times 4)(a^2 \times a^{22} \times a^{26})$$

$$= 8 \times a^{2+22+26} = 8a^{50}$$

(ii) $\left(\frac{2}{3}xy\right) \times \left(\frac{-9}{10}x^2y^2\right)$

$$= \left(\frac{2}{3} \times \frac{-9}{10}\right)(x \times x^2 \times y \times y^2)$$

$$= \frac{-3}{5}x^3y^3$$

(iii) $\left(\frac{-10}{3}pq^3\right) \left(\frac{6}{5}p^3q\right)$

$$= \left(\frac{-10}{3} \times \frac{6}{5}\right)(p \times p^3 \times q^3 \times q)$$

$$= -4p^4q^4$$

(iv) $x \times x^2 \times x^3 \times x^4 = x^{1+2+3+4} = x^{10}$

4. (a) Simplify: $3x(4x-5)+3$ and find values for

(i) $x=3$

(ii) $x=\frac{1}{2}$.

(b) Simplify: $a(a^2+a+1)+5$ and find its value for

(i) $a=0$

(ii) $a=1$

(iii) $a=-1$.

Ans. (a) $3x(4x-5)+3$

$$= 3x \times 4x - 3x \times 5 + 3$$

$$= 12x^2 - 15x + 3$$

(i) For $x=3$, $12x^2 - 15x + 3$

$$= 12(3)^2 - 15 \times 3 + 3$$

$$= 12 \times 9 - 45 + 3 = 108 - 45 + 3 = 66$$

(ii) For $x=\frac{1}{2}$, $12x^2 - 15x + 3$

$$= 12\left(\frac{1}{2}\right)^2 - 15 \times \frac{1}{2} + 3$$

$$= 12 \times \frac{1}{4} - \frac{15}{2} + 3$$

$$= 6 - \frac{15}{2} = \frac{12-15}{2} = \frac{-3}{2}$$

(b) $a(a^2 + a + 1) + 5$

$$= a \times a^2 + a \times a + a \times 1 + 5$$

$$= a^3 + a^2 + a + 5$$

(i) For $a = 0$, $a^3 + a^2 + a + 5$

$$= (0)^3 + (0)^2 + (0) + 5$$

$$= 0 + 0 + 0 + 5 = 5$$

(ii) For $a = 1$, $a^3 + a^2 + a + 5$

$$= (1)^3 + (1)^2 + (1) + 5$$

$$= 1 + 1 + 1 + 5 = 8$$

(iii) For $a = -1$, $a^3 + a^2 + a + 5$

$$= (-1)^3 + (-1)^2 + (-1) + 5$$

$$= -1 + 1 - 1 + 5 = -2 + 6 = 4$$

5. (a) Add: $p(p - q)$, $q(q - r)$ and $r(r - p)$.

(b) Add: $2x(z - x - y)$ and $2y(z - y - zx)$.

(c) Subtract: $3l(l - 4m + 5n)$ from $4l(10n - 3m + 2l)$.

(d) Subtract: $3a(a + b + c) - 2b(a - b + c)$ from $4c(-a + b + c)$.

Ans. (a) $p(p - q) + q(q - r) + r(r - p)$

$$= p^2 - pq + q^2 - qr + r^2 - rp$$

$$= p^2 + q^2 + r^2 - pq - qr - rp$$

$$(b) 2x(z - x - y) + 2y(z - y - x)$$

$$= 2xz - 2x^2 - 2xy + 2yz - 2y^2 - 2xy$$

$$= 2xz - 2xy - 2xy + 2yz - 2x^2 - 2y^2$$

$$= -2x^2 - 2y^2 - 4xy + 2yz + 2zx$$

$$(c) 4l(10n - 3m + 2l) - 3l(l - 4m + 5n)$$

$$= 40ln - 12lm + 8l^2 - 3l^2 + 12lm - 15ln$$

$$= 8l^2 - 3l^2 - 12lm + 12lm + 40ln - 15ln$$

$$= 5l^2 + 25ln$$

$$(d) 4c(-a + b + c) - [3a(a + b + c) - 2b(a - b + c)]$$

$$= -4ac + 4bc + 4c^2 - [3a^2 + 3ab + 3ac - 2ab + 2b^2 - 2bc]$$

$$= -4ac + 4bc + 4c^2 - [3a^2 + 2b^2 + 3ab - 2bc + 3ac - 2ab]$$

$$= -4ac + 4bc + 4c^2 - [3a^2 + 2b^2 + ab + 3ac - 2bc]$$

$$= -4ac + 4bc + 4c^2 - 3a^2 - 2b^2 - ab - 3ac + 2bc$$

$$= -3a^2 - 2b^2 + 4c^2 - ab + 4bc + 2bc - 4ac - 3ac$$

$$= -3a^2 - 2b^2 + 4c^2 - ab + 6bc - 7ac$$