SpeedLabs

MATHS

CBSE 8th

TEEVRA EDUTECH PVT. LTD.

Algebraic Expressions and Identities
Exercise 9.3

Q.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) $pq + qr + rp, 0$

Sol:

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

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

$= 4pq + 4pr$

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

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

$= a^2b - ab^2$

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

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

$= 7a^3b^2 + 7a^2b^3$

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

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

$= 4a^3 - 36a$

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

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

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

$= 0 + 0 + 0 = 0.$

Q.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	-

Sol: The table can be completed as follows:

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

Q. 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) $x \times x^2 \times x^3 \times x^4$

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

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

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

$= 8 \times a^{50}$. (In multiplication, powers are added)

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

$= \frac{2}{3} \times -\frac{9}{10} \times x \times y \times x^2 \times y^2$

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

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

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

$= -\frac{10}{3} \times \frac{6}{5} \times p \times q^3 \times p^3 \times q$

$= -4 \times p^4 \times q^4 = -4p^4q^4$.

(iv) $x^1 \times x^2 \times x^3 \times x^4$

$= (x^3 \times x^3) \times x^4$ (Taking two terms at a line)

$= x^6 \times x^4 = x^{10}$.

Q.4: (a) Simplify: $3x(4x - 5) + 3$ and find its 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) $a = -1$.

Sol: (a) $3x(4x - 5) + 3$

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

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

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

$= 12 \times 9 - 45 + 3$

$= 108 - 45 + 3$

$= 66$.

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

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

$= \frac{6}{1} - \frac{15}{2} = \frac{12-15}{2} = -\frac{3}{2}$.

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

$= -1+1-1+5$

$= -2 + 6 = 4$

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

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

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

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

Sol: (a) First expression $p(p - q) = p^2 - pq$

Second expression $q(q - r) = q^2 - qr$

Third expression $r(r - p) = r^2 - rp$

On adding the three expressions,

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

$= p^2 + q^2 + r^2 - pq - qr - pr.$

(b) First expression $2x(z - x - y) = 2x \times z - 2x \times x - 2x \times y = 2xz - 2x^2 - 2xy$

Second expression $2y(z - y - x) = 2y \times z - 2y \times y - 2y \times x$

$= 2yz - 2y^2 - 2xy$

On adding both expressions,

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

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

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

(c) First expression $3l(l - 4m + 5n)$

$= 3l \times l - 3l \times 4m + 3l \times 5n$

$= 31^2 - 12lm + 15ln$

Second expression 4l (10n - 3m + 2l)

$=4l \times 10n - 4l \times 3m + 4l \times 2l$

$= 40ln - 12lm + 81^2$

$= 81^2 - 12lm + 40ln$

On subtracting first expressions from second expression

$$\begin{array}{l} 40ln - 12lm + 8l^2 \\ 15ln - 12lm + 3l^2 \\ \hline (-) \quad (+) \quad (-) \\ \hline +25ln \qquad +5l^2 \end{array}$$

(d) First expression 3a (a + b + c) - 2b (a - b + c)

$=3a \times a + 3a \times b + 3a \times c - 2b \times a + 2b \times b - 2b \times c$

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

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

Second expression 4c (- a + b + c)

$=4c \times -a + 4c \times b + 4c \times c$

$= - 4ac + 4bc + 4c^2$

On subtracting first expression from second expression

$$\begin{array}{l} -4ac + 4bc + 4c^2 \\ 3ac - 2bc \qquad +3a^2 + 2b^2 + ab \\ \hline (-) \quad (+) \qquad (-) \quad (-) \quad (-) \\ \hline -7ac + 6bc + 4c^2 - 3a^2 - 2b^2 - ab \end{array}$$

Hence, required answer is $-3a^2 - 2b^2 + 4c^2 - ab + 6bc - 7ac$.