NCERT Solutions for Class 8 Maths Chapter 9 Algebraic Expressions and Identities

NCERT Solutions for Class 8 Maths Chapter 9 Algebraic Expressions and Identities Exercise 9.1

Ex 9.1 Class 8 Maths Question 1.

Identify the terms, their coefficients for each of the following expressions.

(i) $5xyz^2 - 3zy$

(ii) $1 + x + x^2$

(iii) $4x^2y^2 - 4x^2y^2z^2 + z^2$

(iv) $3 - pq + qr - rp$

(v) $\frac{x}{2} + \frac{y}{2} - xy$

(vi) $0.3a - 0.6ab + 0.5b$

Solution:

Expression	Terms	Coefficients
(i) $5xyz^2 - 3zy$	$5xyz^2$	5
	$-3zy$	-3
(ii) $1 + x + x^2$	1	1
	x	1
	x^2	1
(iii) $4x^2y^2 - 4x^2y^2z^2 + z^2$	$4x^2y^2$	4
	$-4x^2y^2z^2$	-4
	z^2	1
(iv) $3 - pq + qr - rp$	3	3
	$-pq$	-1
	qr	1
	$-rp$	-1
(v) $\frac{x}{2} + \frac{y}{2} - xy$	$\frac{x}{2}$	$\frac{1}{2}$
	$\frac{y}{2}$	$\frac{1}{2}$
	$-xy$	-1
(vi) $0.3a - 0.6ab + 0.5b$	$0.3a$	0.3
	$-0.6ab$	-0.6
	$0.5b$	0.5

Ex 9.1 Class 8 Maths Question 2.

Classify the following polynomials as monomials, binomials, trinomials. Which polynomials do not fit in any of these three categories?

$x + y$, 1000, $x + x^2 + x^3 + x^4$, $7 + y + 5x$, $2y - 3y^2$, $2y - 3y^2 + 4y^3$, $5x - 4y + 3xy$, $4z - 15z^2$, $ab + bc + cd + da$, pqr, $p^2q + pq^2$, $2p + 2q$

Solution:

Expression	Category
(i) $x + y$	binomial
(ii) 1000	monomial
(iii) $x + x^2 + x^3 + x^4$	polynomial → does not fit in the given categories
(iv) $7 + y + 5x$	trinomial
(v) $2y - 3y^2$	binomial
(vi) $2y - 3y^2 + 4y^3$	trinomial
(vii) $5x - 4y + 3xy$	trinomial
(viii) $4z - 15z^2$	binomial
(ix) $ab + bc + cd + da$	polynomial → does not fit in the given categories
(x) pqr	monomial
(xi) $p^2q + pq^2$	binomial
(xii) $2p + 2q$	binomial

Ex 9.1 Class 8 Maths Question 3.

Add the following:

(i) $ab - bc$, $bc - ca$, $ca - ab$

(ii) $a - b + ab$, $b - c + bc$, $c - a + ac$

(iii) $2p^2q^2 - 3pq + 4$, $5 + 7pq - 3p^2q^2$

(iv) $l^2 + m^2$, $m^2 + n^2$, $n^2 + l^2$, $2lm + 2mn + 2nl$

Solution:

(i) Given: $ab - bc$, $bc - ca$, $ca - ab$

We have

$(ab - bc) + (bc - ca) + (ca - ab)$ (Adding all the terms)

$= ab - bc + bc - ca + ca - ab$

$= (ab - ab) + (bc - bc) + (ca - ca)$ (Collecting the like terms together)

$= 0 + 0 + 0$

$= 0$

(ii) Given:

$a - b + ab, b - c + bc, c - a + ac$

We have $(a - b + ab) + (b - c + bc) + (c - a + ac)$ (Adding all the terms)

$= a - b + ab + b - c + bc + c - a + ac$

$= (a - a) + (b - b) + (c - c) + ab + bc + ac$ (Collecting all the like terms together)

$= 0 + 0 + 0 + ab + bc + ac$

$= ab + bc + ac$

(iii) Given:

$2p^2q^2 - 3pq + 4, 5 + 7pq - 3p^2q^2$

By arranging the like terms in the same column, we have

$$\begin{array}{r} 2p^2q^2 - 3pq + 4 \\ -3p^2q^2 + 7pq + 5 \\ + \\ \hline - p^2q^2 + 4pq + 9 \\ \hline \end{array}$$

(Adding columnwise)

(iv) Given: $l^2 + m^2, m^2 + n^2, n^2 + l^2, 2lm + 2mn + nl$

By arranging the like terms in the same column, we have

$$\begin{array}{rrr} l^2 + m^2 & & \\ + m^2 & + n^2 & \\ l^2 & + n^2 & \\ + & & 2lm + 2mn + 2nl \\ \hline 2l^2 + 2m^2 + 2n^2 + & & 2lm + 2mn + 2nl \\ \hline \end{array}$$

(Adding columnwise)

Thus, the sum of the given expressions is $2(l^2 + m^2 + n^2 + lm + mn + nl)$

Ex 9.1 Class 8 Maths Question 4.

(a) Subtract $4a - 7ab + 3b + 12$ from $12a - 9ab + 5b - 3$

(6) Subtract $3xy + 5yz - 7zx$ from $5xy - 2yz - 2zx + 10xyz$

(c) Subtract $4p^2q - 3pq + 5pq^2 - 8p + 7q - 10$ from $18 - 3p - 11q + 5pq - 2pq^2 + 5p^2q$

Solution:

(a) Arranging the like terms column-wise, we have

$$\begin{array}{r} 12a - 9ab + 5b - 3 \\ 4a - 7ab + 3b + 12 \\ \hline (-)\ (+)\ \ (-)\ \ (-) \\ \hline 8a - 2ab + 2b - 15 \end{array}$$

[Change the signs of all the terms of lower expressions and then add]

(b) Arranging the like terms column-wise, we have

$$\begin{array}{r} 5xy - 2yz - 2zx + 10xyz \\ 3xy + 5yz - 7zx + \ \ 0 \\ \hline (-)\ \ (-)\ \ (+)\ \ \ (-) \\ \hline 2xy - 7yz + 5zx + 10xyz \end{array}$$

[Change the signs of all the terms of lower expressions and then add]

(c) Arranging the like terms column-wise, we have

$$\begin{array}{r} 18 - 3p - 11q + 5pq - 2pq^2 + 5p^2q \\ -10 - 8p + 7q - 3pq + 5p^2q + 4p^2q \\ \hline (+)\ \ (+)\ \ (-)\ \ \ (+)\ \ \ (-)\ \ \ \ (-) \\ \hline 20 + 5p - 18q + 8pq - 7pq^2 + p^2q \end{array}$$

[Change the signs of all the terms of lower expressions and then add]

The terms are $p^2q - 7pq^2 + 8pq - 18q + 5p + 20$