



**SpeedLabs**

**MATHS**

**CBSE 8<sup>th</sup>**

**TEEVRA EDUTECH PVT. LTD.**

# Algebraic Expressions and Identities

## Exercise 9.1

**Q.1** Identify the terms, their coefficients for each of the following expressions.

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

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

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

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

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

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

**Sol:** (i)  $5xyz^2 - 3zy$  expression contains two terms  $5xyz^2$  and  $-3zy$ .

The coefficient in the term  $5xyz^2$  is 5 and the coefficient in the term  $-3zy$  is -3.

(ii)  $1 + x + x^2$  expression contains three terms 1, x and  $x^2$ , where 1 is a constant term, the coefficient of x is 1. And the coefficient of the term  $x^2$  is also 1.

(iii)  $4x^2 y^2 - 4x^2 y^2 z^2 + z^2$  expression contains three terms  $4x^2 y^2$ ,  $-4x^2 y^2 z^2$  and  $z^2$ . The coefficient of the term  $4x^2 y^2$  is 4, the coefficient of the term  $-4x^2 y^2 z^2$  is -4 and the coefficient of the term  $z^2$  is 1.

(iv)  $3 - pq + qr - rp$  expression contains four terms 3, -pq, qr and -rp. 3 is a constant term the coefficient of the term -pq is -1. The coefficient in the term qr is 1 and the coefficient in the term -rp is -1.

(v)  $\frac{x}{2} + \frac{y}{2} - xy$  expression contains three terms  $\frac{x}{2}$ ,  $\frac{y}{2}$  and  $-xy$ . The coefficient of the term  $\frac{x}{2}$  is  $\frac{1}{2}$ , the coefficient of the term  $\frac{y}{2}$  is  $\frac{1}{2}$  and the coefficient of the term  $-xy$  is -1.

(vi)  $0.3a - 0.6ab + 0.5b$  expression contains three terms  $0.3a$ ,  $-0.6ab$  and  $0.5b$ . The coefficient of the term

$0.3a$  is 0.3, the coefficient of the term  $-0.6ab$  is -0.6 and the coefficient of the term  $0.5b$  is 0.5.

**Q.2** Classify the following polynomials as monomials, binomials, trinomials. Which polynomials do not fit in any of these three categories?

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

**Sol:**

(i)  $x + y$  expression contains two terms  $x$  and  $y$ . So, it is binomial.

(ii)  $1000$  is a single term without variable, it is a monomial.

(iii)  $x + x^2 + x^3 + x^4$  expressions contains four terms  $x$ ,  $x^2$ ,  $x^3$  and  $x^4$ . It is a polynomial, so, it does not fit in above three categories.

(iv)  $7 + y + 5x$  expression contains three terms  $7$ ,  $y$  and  $5x$ . So, it is a trinomial.

(v)  $2y - 3y^2$  expression contains two terms  $2y$  and  $-3y^2$ . So, it is a binomials.

(vi)  $2y - 3y^2 + 4y^3$  expression contains three terms  $2y$ ,  $-3y^2$  and  $4y^3$ . So, it is a trinomial.

(vii)  $5x - 4y + 3xy$  expression contains three. terms  $5x$ ,  $-4y$  and  $3xy$ . So, it is a trinomial.

(viii)  $4z - 15z^2$  expression contains two terms  $4z$  and  $-15z^2$ . So, it is a binomial.

(ix)  $ab + bc + cd + da$  expression contains four terms  $ab$ ,  $bc$ ,  $cd$  and  $da$ . So, it is a polynomials and it does not fit in any three above categories.

(x)  $pqr$  expression contains only one term. So, it is a monomial.

(xi)  $p^2q + pq^2$  expression contains two terms  $p^2q$  and  $pq^2$ . So, it is a binomial.

(xii)  $2p + 2q$  expression contains two terms  $2p$  and  $2q$ . So, it a is binomial.

**Q.3** Add the following.

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

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

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

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

**Sol:** (i)  $ab - bc$ ,  $bc - ca$ ,  $ca - ab$

$$\begin{array}{r}
 ab - bc \\
 + \quad bc - ca \\
 + \quad -ab \quad +ca \\
 \hline
 0
 \end{array}$$

Hence, the sum of expressions is zero.

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

$$\begin{array}{r}
 a - b + ab \\
 + \quad b \quad -c + bc \\
 + \quad -a \quad \quad c \quad +ac \\
 \hline
 ab \quad +bc + ac
 \end{array}$$

Hence, the sum of expressions is  $ab + bc + ac$

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

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

Hence, the sum of expressions is  $-p^2q^2 + 4pq + 9$ .

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

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

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

#### Q.4

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

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

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

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

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

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

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

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

$$\begin{array}{r}
 18 - 3p - 11q + 5pq - 2pq^2 + 5p^2q \\
 -10 - 8p + 7q - 3pq + 5pq^2 + 4p^2q \\
 \hline
 +) \quad (+) \quad (-) \quad (+) \quad (-) \quad (-) \\
 28 + 5p - 18q + 8pq - 7pq^2 + p^2q
 \end{array}$$