

# Mathematics

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(Chapter - 9) (Algebraic Expressions and Identities)

(Class - VIII)

## Exercise 9.1

### 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)  $0.3a - 0.6ab + 0.5b$

### Answer 1:

(i) Terms:  $5xyz^2$  and  $-3zy$

Coefficient in  $5xyz^2$  is 5 and in  $-3zy$  is  $-3$ .

(ii) Terms:  $1, x$  and  $x^2$ .

Coefficient of  $x$  and coefficient of  $x^2$  is 1.

(iii) Terms:  $4x^2y^2, -4x^2y^2z^2$  and  $z^2$ .

Coefficient in  $4x^2y^2$  is 4, coefficient of  $-4x^2y^2z^2$  is  $-4$  and coefficient of  $z^2$  is 1.

(iv) Terms:  $3, -pq, qr$  and  $-rp$

Coefficient of  $-pq$  is  $-1$ , coefficient of  $qr$  is 1 and coefficient of  $-rp$  is  $-1$ .

(v) Terms:  $\frac{x}{2}, \frac{y}{2}$  and  $-xy$

Coefficient of  $\frac{x}{2}$  is  $\frac{1}{2}$ , coefficient of  $\frac{y}{2}$  is  $\frac{1}{2}$  and coefficient of  $-xy$  is  $-1$ .

(vi) Terms:  $0.3a, -0.6ab$  and  $0.5b$

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

### Question 2:

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

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

### Answer 2:

(i) Since  $x + y$  contains two terms. Therefore it is binomial.

(ii) Since 1000 contains one terms. Therefore it is monomial.

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

(iv) Since  $7 + y + 5x$  contains three terms. Therefore it is trinomial.

(v) Since  $2y - 3y^2$  contains two terms. Therefore it is binomial.

(vi) Since  $2y - 3y^2 + 4y^3$  contains three terms. Therefore it is trinomial.

(vii) Since  $5x - 4y + 3xy$  contains three terms. Therefore it is trinomial.

(viii) Since  $4x - 15z^2$  contains two terms. Therefore it is binomial.

(ix) Since  $ab + bc + cd + da$  contains four terms. Therefore it is a polynomial and it does not fit in above three categories.

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- (x) Since  $pqr$  contains one terms. Therefore it is monomial.  
(xi) Since  $p^2q + pq^2$  contains two terms. Therefore it is binomial.  
(xii) Since  $2p + 2q$  contains two terms. Therefore it is binomial.

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

### Answer 3:

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

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

Hence the sum is 0.

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

$$\begin{array}{r} a - b - ab \\ + b - c + bc \\ - a + c + ac \\ \hline 0 + 0 + ab + 0 + bc + ac \end{array}$$

Hence the sum is  $ab + bc + ac$ .

(iii)  $2p^2q^2 - 3pq + 4, 5 + 7pq - 3p^2q^2$  (iv)  $l^2 + m^2, m^2 + n^2, n^2 + l^2 + 2lm + 2mn + 2nl$

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

$$\boxed{-p^2q^2 + 4pq + 9}$$

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

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

Hence the sum is  $2(l^2 + m^2 + n^2 + lm + mn + nl)$

### Question 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  $18 - 3p - 11q + 5pq - 2pq^2 + 5p^2q$ .

### Answer 4:

(a)

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

(b)

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

(c)

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