Mathematics

(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) $\quad 5xyz^2 - 3zy$

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

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

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

(v) $\quad \dfrac{x}{2} + \dfrac{y}{2} - xy$
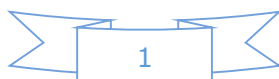
(vi) $\quad 0.3a - 0.6ab + 0.5b$

Answer 1:

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

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

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

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

(iii) Terms: $\quad 4x^2y^2, -4x^2y^2z^2$ 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: $\quad 3, -pq, qr$ and $-rp$

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

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

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

(vi) Terms: $\quad 0.3a, -0.6ab$ 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:

$x + y$, $\quad 1000$, $\quad x + x^2 + x^3 + x^4$, $\quad 7 + y + 5x$, $\quad 2y - 3y^2$, $\quad 2y - 3y^2 + 4y^3$, $\quad 5x - 4y + 3xy$,

$4z - 15z^2$, $\quad ab + bc + cd + da$, $\quad pqr$, $\quad p^2q + pq^2$, $\quad 2p + 2q$

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.

(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) $ab - bc, bc - ca, ca - ab$
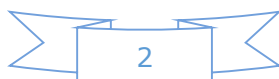
$$\begin{aligned} ab - bc \\ + bc - ca \\ -ab \quad\;\; + ca \\ \hline \boxed{0 + 0 + \; 0} \end{aligned}$$

Hence the sum is 0.

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

$$\begin{aligned} a - b - ab \\ + b \quad\;\; - c + bc \\ -a \quad\quad\;\; + c \quad\;\; + ac \\ \hline \boxed{0 + 0 + ab + 0 + bc + ac} \end{aligned}$$

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

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

$$2p^2q^2 - 3pq + 4$$
$$-3p^2q^2 + 7pq + 5$$
$$\boxed{-p^2q^2 + 4pq + 9}$$

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

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

$$l^2 + m^2$$
$$+\quad m^2 + n^2$$
$$+l^2 \qquad + n^2$$
$$+\qquad\qquad 2lm + 2mn + 2nl$$
$$\boxed{2l^2 + 2m^2 + 2n^2 + 2lm + 2mn + 2nl}$$

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)

$$12a - 9ab + 5b - 3$$
$$4a - 7ab + 3b + 12$$
$$(-)\quad (+)\quad (-)(-)$$
$$\boxed{8a - 2ab + 2b - 15}$$

(b)

$$5xy - 2yz - 2zx + 10xyz$$
$$3xy + 5yz - 7zx$$
$$(-)\quad (-)\quad (+)$$
$$\boxed{2xy - 7yz + 5zx + 10xyz}$$

(c)

$$5p^2q - 2pq^2 + 5pq - 11q - 3p + 18$$
$$4p^2q + 5pq^2 - 3pq + 7q\ -8p - 10$$
$$(-)\quad (-)\quad (+)\quad (-)\quad (+)\quad (+)$$
$$\boxed{p^2q - 7pq^2 + 8pq - 18q + 5p + 28}$$