Chapter 9: Algebraic Expressions and Identities

Question 1

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

(i) $xyz^2 + 3xy$

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

(iii) $4p^2q^2 – 4p^2q^2r^2 + r^2$

(iv) $4 – xy + yz – xz$

(v) $(x/4) –(y/5) - y$

(vi) $1.3a – 2.6ab + 1.5b$

Question 2

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

$x^2 + y^2$

$1000-x$

$x + x^2 + x^3 + x^4 + x^5$

$8 - y + -5x$

$2y – 3y^2$

$2y – 3y + 4y^3$

$5x – 8y + 3xy$

$4 – 15z^2$

$ab + bc + cd + da + 2ab$

$pqr+2pq+5pqr$

$p^2q + pq^2$

$2p + 2q+1$

Question 3

Add the following.

(i) $ab – bc + ac$, $bc – ca + ab$, $ca – ab - 2bc$

(ii) $p – q + pq$, $q – r + qr$, $r – p + pr$, $p+q+r$

(iii) $2p^2q^2 – 3pq + 4$, $5 + 7pq – 3p^2q^2$,$4p^2q^2 + 10pq$

(iv) $a^2 + b^2$, $b^2 + c^2$, $c^2 + a^2$, $2ab + 2bc + 2ac$

Question 4.

(a) Subtract $8a – 7ab + 3b - 20$ from $20a – 9ab + 5b – 20$

(b) Subtract $3pq + 5qr – 7pr+1$ from $-4pq +2qr – 2pr + 5pqr+1$

(c) Subtract $4p^2q – 4pq - 5pq^2 – 8p + 7q – 18$

from $18 – 3p – 11q + 5pq – 2pq^2 + 5p^2q$

Question 5

What are the coefficient of each term in the below expression?

$4p^2q^2 + 4p^2q^2r^2 - r^2 + 5$

a) 4,4,-1,5

b) 4,4,1,5

c) $4,4r^2,-r^2, 5$

d) None of these

Question 6

The product of a monomial and trinomial will be a

a) monomial

b) trinomial

c) binomial

d) None of these

Question 7

The exponents of a variable term in the polynomial is a

a) integers

b) negative integers

c) positive integers

d) non -negative integers

Question 8

The expression pqr +rqp+qpr is a

a) Monomial

b) trinomial

c) binomial

d) none of these

Question 9

Find the product of the following expression

(a) 11, 7x

(b) – 4x, y

(c) – 4p, pq, pr

(d) $4p^3$, – 3p, p^2

(e) 3mn, 4n

f) 51p, p^2, p^8

g) *2p, 4q, 8r*

h) xy, $2x^2y$, $2xy^2$, xy

i) a, 2b, 3c

j) xy, yz, zx

k) 2, 4y, $8y^2$ $16y^3$

l) a, 2b, 3c, 6abc

m) p, – pq, pqr

Question 9

Volume of the cuboid with Length as 2x,breath as 2y and Height as 2 z is given by

a) xyz

b) 8xyz

c) 2x+2y+2z

d) None of these

Question 10

The sum of area of the squares of side 2a and 2b will be

a) 2a+ 2b

b) $4a^2 + 4b^2$

c) ab

d) None of these

Question 11

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

(i) $xyz^2 + 3xy$

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

(iii) $4p^2q^2 – 4p^2q^2r^2 + r^2$

(iv) $4 – xy + yz – xz$

(v) $(x/4) – (y/5) - y$

(vi) $1.3a – 2.6ab + 1.5b$

Question 12

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

$x^2 + y^2$

$1000-x$

$x + x^2 + x^3 + x^4 + x^5$

$8 - y + -5x$

$2y – 3y^2$

$2y – 3y + 4y^3$

$5x – 8y + 3xy$

$4 – 15z^2$

$ab + bc + cd + da + 2ab$

$pqr+2pq+5pqr$

$p^2q + pq^2$

$2p + 2q+1$

Question 13

Add the following.

(i) $ab – bc + ac$, $bc – ca + ab$, $ca – ab - 2bc$

(ii) $p – q + pq$, $q – r + qr$, $r – p + pr$, $p+q+r$

(iii) $2p^2q^2 – 3pq + 4$, $5 + 7pq – 3p^2q^2$, $4p^2q^2 + 10pq$

(iv) $a^2 + b^2$, $b^2 + c^2$, $c^2 + a^2$, $2ab + 2bc + 2ac$

Question 14

(a) Subtract $8a – 7ab + 3b - 20$ from $20a – 9ab + 5b – 20$

(b) Subtract $3pq + 5qr – 7pr+1$ from $-4pq +2qr – 2pr + 5pqr+1$

(c) Subtract $4p^2q – 4pq - 5pq^2 – 8p + 7q – 18$

from $18 – 3p – 11q + 5pq – 2pq^2 + 5p^2q$

Question 15

What are the coefficient of each term in the below expression?

$4p^2q^2 + 4p^2q^2r^2 - r^2 + 5$

a) 4,4,-1,5

b) 4,4,1,5

c) $4,4r^2, -r^2, 5$

d) None of these

Question 16

The product of a monomial and trinomial will be a

a) monomial

b) trinomial

c) binomial

d) None of these

Question 17

The exponents of a variable term in the polynomial is a

a) integers

b) negative integers

c) positive integers

d) non -negative integers

Question 18

The expression pqr +rqp+qpr is a

a) Monomial

b) trinomial

c) binomial

d) none of these

Question 19

Use a suitable identity to get each of the following products.

a) $(p - 11)(p + 11)$

b) $(2y + 5)(2y - 5)$

c) $(12a – 9)(12a +)$

d) $(2a-1/2)(2a-1/2)$

e) $(1.1m – 0.4)(1.1m + 0.4)$

f) $(a^2+ b^2)(– a^2+ b^2)$

g) $(6x – 7)(6x + 7)$

h) $(– a/2 + c/2)(– a/2 + c/2)$

i) $[(p/8)+(3q/4)][(p/8)+(3q/4)]$

j) $(3a + 9b)(3a – 9b)$

k) $2(a – 9)^2$

l) $5(xy - 3z)^2$

m) $(6x+ 5y)^2$

n) $36[(3p/2\}) + (2q/3)]^2$

o) $(x – 0.5y)^2$

p) $(2xy - 5y)^2$

Question 20

Use the identity $(x + a)(x + b) = x^2 + (a + b)x + ab$ to find the following products.

(i) $(p + 10)(p + 11)$

(ii) $(4x + 9)(4x + 12)$

(iii) $(x – 5)(x – 1)$

(iv) $(9x - 5)(9x – 1)$

(v) $(2x + 5y)(2x + 3y)$

(vi) $(2a^2+ 9)(2a^2+ 5)$

Question 21

Simplify the following

(i) $(x^2– y^2)^2 + 4x^2y^2$

(ii) $(p + q)^2 – (p – q)^2 + p^2q^2$

(iii) $(2m – 8n)^2+ (2m + 8n)^2$

(iv) $(4m + 5n)^2 + (5m + 4n)^2 + (4m + 5n)(4m -5n)$

(v) $(.5p – 1.5q)^2 – (.5p – 1.5q)^2 +p^2q^2$

(vi) $(ab - bc)^2+2ab^2c$

(vii) $(m^2 – n^2m)^2 + 2m^3n^2$

Question 22

Using identities, evaluate.

a) 91^2

b) 89^2

c) 202^2

d) 999^2

e) 1.2^2

f) 397 x 403

g) 48 x 52

h) 5.1^2

(i) $61^2 - 59^2$

j) $11.1^2 - 9.9^2$

(k) 503 x 504

(l) 2.1 x 2.2

(m) 103 x 98

(n) 9.7 x 9.8

(o) $729^2 - 271^2$

Question 23

Find the value of x if $8x=35^2 - 27^2$

Question 24

a) If $a - 1/a = 4$, find the value of $a^2 + 1/a^2$

b) If $p + q = 13$ and $pq = 22$, then $p^2 + q^2$