Question:1

Identify the monomials, binomials, trinomials and quadrinomials from the following expressions:

i a^2

ii $a^2 - b^2$

iii $x^3 + y^3 + z^3$

iv $x^3 + y^3 + z^3 + 3xyz$

v $7 + 5$

vi $abc + 1$

vii $3x - 2 + 5$

viii $2x - 3x + 4$

ix $xy + yz + zx$

x $ax^3 + bc^2 + cx + d$

Solution:

The monomials, binomials, trinomials and quadrinomials are as follows.

i a^2 is a monomial expression as it contains one term only.

ii $a^2 - b^2$ is a binomial expression as it contains two terms.

iii $x^3 + y^3 + z^3$ is a trinomial expression as it contains three terms.

iv $x^3 + y^3 + z^3 + xyz$ is a quadrinomial expression as it contains four terms.

v $7 + 5 = 12$ is a monomial expression as it contains one term only.

vi $abc + 1$ is a binomial expression as it contains two terms.

vii $3x - 2 + 5 = 3x + 3$ is a binomial expression as it contains two terms.

viii $2x - 3y + 4$ is a trinomial expression as it contains three terms.

ix $xy + yz + zx$ is a trinomial expression as it contains three terms.

x $ax^3 + bx^2 + cx + d$ is a quadrinomial expression as it contains four terms.

Question:2

Write all the terms of each of the following algebraic expressions:

i $3x$

ii $2x - 3$

iii $2x^2 - 7$

iv $2x^2 + y^2 - 3xy + 4$

Solution:

The terms of each of the given algebraic expressions are as follows.

i 3x is the only term of the given algebraic expression.

ii 2x and -3 are the terms of the given algebraic expression.

iii $2x^2$ and -7 are the terms of the given algebraic expression.

iv $2x^2$, y^2, -3xy and 4 are the terms of the given algebraic expression.

Question:3

Identify the like terms and also mention the numerical coefficients of those terms:

i $4xy, -5x^2y, -3yx, 2xy^2$

ii $7a^2bc,\ -3ca^2b,\ -\frac{5}{2}abc^2,\ \frac{3}{2}abc^2,\ -\frac{4}{3}cba^2$

Solution:

	Like terms	**Numerical coefficients**
i	4xy, -3yx	4, -3
ii	$\{7a^2bc, -3ca^2b, -\frac{4}{3}cba^2\}$	$\{7, -3, -\frac{4}{3}\}$
	$\{-\frac{5}{2}abc^2, \frac{3}{2}abc^2\}$	$\{-\frac{5}{2}, \frac{3}{2}\}$

Question:4

Identify the like terms in the following algebraic expressions:

i $a^2 + b^2 - 2a^2 + c^2 + 4a$

ii $3x + 4xy - 2yz + \frac{5}{2}zy$

$iii\ abc + ab^2c + 2acb^2 + 3c^2ab + b^2ac - 2a^2bc + 3cab^2$

Solution:

The like terms in the given algebraic expressions are as follows.

i The like terms in the given algebraic expression are a^2 and $-2a^2$.

ii The like terms in the given algebraic expression are $-2\,\mathrm{yz}$ and $\frac{5}{2}\,\mathrm{zy}$.

iii The like terms in the given algebraic expression are ab^2c, $2acb^2$, b^2ac and $3cab^2$.

Question:5

Write the coefficient of x in the following:

i $-12x$

ii $-7xy$

iii xyz

iv $-7ax$

Solution:

The coefficients of x are as follows.

i The numerical coefficient of x is -12.

ii The numerical coefficient of x is -7y.

iii The numerical coefficient of x is yz.

iv The numerical coefficient of x is -7a.

Question:6

Write the coefficient of x^2 in the following:

i $-3x^2$

ii $5x^2yx$

iii $\frac{5}{7}x^2z$

iv $-\frac{3}{2}ax^2 + yx$

Solution:

The coefficients of x^2 are as follows.

i The numerical coefficient of x^2 is -3.

ii The numerical coefficient of x^2 is 5yz.

iii The numerical coefficient of x^2 is $\frac{5}{7}z$.

iv The numerical coefficient of x^2 is $-\frac{3}{2}a$.

Question:7

Write the coefficient of:

i y in $-3y$

ii a in $2ab$

iii z in $-7xyz$

iv p in $-3pqr$

v y^2 in $9xy^2z$

vi x^3 in $x^3 + 1$

vii x^2 in $-x^2$

Solution:

The coefficients are as follows.

i The coefficient of y is -3.

ii The coefficient of a is 2b.

iii The coefficient of z is -7xy.

iv The coefficient of p is -3qr.

v The coefficient of y^2 is 9xz.

vi The coefficient of x^3 is 1.

vii The coefficient of $-x^2$ is - 1.

Question:8

Write the numerical coefficient of each of the following:

i xy

ii $-6yz$

iii $7abc$

iv $-2x^3y^2z$

Solution:

The numerical coefficient of each of the given terms is as follows.

i The numerical coefficient in the term xy is 1.

ii The numerical coefficient in the term -6yz is - 6.

iii The numerical coefficient in the term 7abc is 7.

iv The numerical coefficient in the term $-2x^3y^2z$ is - 2.

Question:9

Write the numerical coefficient of each term in the following algebraic expressions:

i $4x^2y - \frac{3}{2}xy + \frac{5}{2}xy^2$

ii $-\frac{5}{3}x^2y + \frac{7}{4}xyz + 3$

Solution:

The numerical coefficient of each term in the given algebraic expressions is as follows.

	Term	**Coefficient**
i	$4x^2y$	4
	$-\frac{3}{2}xy$	$-\frac{3}{2}$
	$\frac{5}{2}xy^2$	$\frac{5}{2}$
ii	$-\frac{5}{3}x^2y$	$-\frac{5}{3}$
	$\frac{7}{4}xyz$	$\frac{7}{4}$
	3	3

Question:10

Write the constant term of each of the following algebraic expressions:

i $x^2y - xy^2 + 7xy - 3$

ii $a^3 - 3a^2 + 7a + 5$

Solution:

The constant term of each of the given algebraic expressions is as follows.

i The constant term in the given algebraic expression is -3.

ii The constant term in the given algebraic expression is 5.

Question:11

Evaluate each of the following expressions for $x = -2$, $y = -1$, $z = 3$:

i $\frac{x}{y} + \frac{y}{z} + \frac{z}{x}$

ii $x^2 + y^2 + z^2 - xy - yz - zx$

Solution:

We have x = –2, y = –1 and z = 3.

Thus,

i

$$\frac{x}{y} + \frac{y}{z} + \frac{z}{x} = \left(\frac{-2}{-1}\right) + \left(\frac{-1}{3}\right) + \left(\frac{3}{-2}\right) = 2 - \frac{1}{3} - \frac{3}{2} = \frac{12-2-9}{6} = \frac{12-11}{6} = \frac{1}{6}$$

ii $x^2 + y^2 + z^2 - xy - yz - zx$

$= -2^2 + -1^2 + 3^2 - -2-1 - -13 - 3-2$

$= 4 + 1 + 9 - 2 + 3 + 6$

$= 4 + 1 + 9 + 3 + 6 - 2$

$= 23 - 2 = 21$

Question:12

Evaluate each of the following algebraic expressions for $x = 1$, $y = -1$, $z = 2$, $a = -2$, $b = 1$, $c = -2$:

i $ax + by + cz$

ii $ax^2 + by^2 - cz^2$

iii $axy + byz + cxy$

Solution:

We have x = 1, y = –1, z = 2, a = –2, b = 1 and c = –2.

Thus,

i $ax + by + cz$

$= -21 + 1-1 + -22$

$= - 2 + -1 + -4$

$= - 2 -1 - 4 = -7$

ii $ax^2 + by^2 - cz^2$

$= -21^2 + 1-1^2 - -22^2$

$= -2 \times 1 + 1 - -2x4$

$= -2 + 1 - -8$

$= -2 + 1 + 8$

$= -2 + 9$

$= 7$

iii $axy + byz + cxy$

$= -21-1 + 1-12 + -21-1$

$= 2 + -2 + 2$

$= 2 - 2 + 2$

$= 4 - 2$

$= 2$

Question:13

Add the following:

i $3x$ and $7x$

ii $-5xy$ and $9xy$

Solution:

We have

i $3x + 7x = 3 + 7x = 10x$

ii $-5xy + 9xy = -5 + 9xy = 4xy$

Question:14

Simplify each of the following:

i $7x^3y + 9yx^3$

ii $12a^2b + 3ba^2$

Solution:

Simplifying the given expressions, we have

i $7x^3y + 9yx^3 = 7 + 9x^3y = 16x^3y$

ii $12a^2b + 3ba^2 = 12 + 3a^2b = 15a^2b$

Question:15

Add the following:

i 7*abc*, –5*abc*, 9*abc*, –8*abc*

ii $2x^2y$, $-4x^2y$, $6x^2y$, $-5x^2y$

Solution:

Adding the given terms, we have

i 7abc + $-5abc + 9abc + -8abc$

= 7abc - 5abc + 9abc - 8abc

= $7 - 5 + 9 - 8$abc

= $16 - 13$abc

= 3abc

ii $2x^2y + (-4x^2y) + 6x^2y + (-5x^2y)$

= $2x^2y - 4x^2y + 6x^2y - 5x^2y$

= $2 - 4 + 6 - 5x^2y$

= $8 - 9x^2y$

= $-x^2y$

Question:16

Add the following expressions:

i $x^3 - 2x^2y + 3xy^2 - y^3,\ 2x^3 - 5xy^2 + 3x^2y - 4y^3$

ii $a^4 - 2a^3b + 3ab^3 + 4a^2b^2 + 3b^4, -2a^4 - 5ab^3 + 7a^3b - 6a^2b^2 + b^4$

Solution:

Adding the given expressions, we have

i $x^3 - 2x^2y + 3xy^2 - y^3 + 2x^3 - 5xy^2 + 3x^2y - 4y^3$

Collecting positive and negative like terms together, we get

$x^3 + 2x^3 - 2x^2y + 3x^2y + 3xy^2 - 5xy^2 - y^3 - 4y^3$

= $3x^3 + x^2y - 2xy^2 - 5y^3$

ii $(a^4 - 2a^3b + 3ab^3 + 4a^2b^2 + 3b^4) + (-2a^4 - 5ab^3 + 7a^3b - 6a^2b^2 + b^4)$

$a^4 - 2a^3b + 3ab^3 + 4a^2b^2 + 3b^4 - 2a^4 - 5ab^3 + 7a^3b - 6a^2b^2 + b^4$

Collecting positive and negative like terms together, we get

$a^4 - 2a^4 - 2a^3b + 7a^3b + 3ab^3 - 5ab^3 + 4a^2b^2 - 6a^2b^2 + 3b^4 + b^4$

= $-a^4 + 5a^3b - 2ab^3 - 2a^2b^2 + 4b^4$

Question:17

Add the following expressions:

i $8a - 6ab + 5b,\ -6a - ab - 8b \text{ and } -4a + 2ab + 3b$

ii $5x^3 + 7 + 6x - 5x^2,\ 2x^2 - 8 - 9x,\ 4x - 2x^2 + 3x^3,\ 3x^3 - 9x - x^2 \text{ and } x - x^2 - x^3 - 4$

Solution:

i Required expression = $8a - 6ab + 5b + -6a - ab - 8b + -4a + 2ab + 3b$

Collecting positive and negative like terms together, we get

8a - 6a - 4a - 6ab - ab + 2ab + 5b - 8b + 3b

= 8a - 10a - 7ab + 2ab + 8b - 8b

= - 2a - 5ab

ii Required expression = $(5x^3 + 7 + 6x - 5x^2) + (2x^2 - 8 - 9x) + (4x - 2x^2 + 3x^3) + (3x^3 - 9x - x^2) + (x - x^2 - x^3 - 4)$

Collecting positive and negative like terms together, we get

$5x^3 + 3x^3 + 3x^3 - x^3 - 5x^2 + 2x^2 - 2x^2 - x^2 - x^2 + 6x - 9x + 4x - 9x + x + 7 - 8 - 4$

= $11x^3 - x^3 - 7x^2 + 11x - 18x + 7 - 12$

= $10x^3 - 7x^2 - 7x - 5$

Question:18

Add the following:

i $x - 3y - 2z5x + 7y - 8z3x - 2y + 5z$

$ii\ 4ab - 5bc + 7ca - 3ab + 2bc - 3ca 5ab - 3bc + 4ca$

Solution:

i Required expression = $x - 3y - 2z + 5x + 7y - 8z + 3x - 2y + 5z$

Collecting positive and negative like terms together, we get

x + 5x + 3x - 3y + 7y - 2y - 2z - 8z + 5z

= 9x - 5y + 7y - 10z + 5z

= 9x + 2y - 5z

ii Required expression = $4ab - 5bc + 7ca + -3ab + 2bc - 3ca + 5ab - 3bc + 4ca$

Collecting positive and negative like terms together, we get

4ab - 3ab + 5ab - 5bc + 2bc - 3bc + 7ca - 3ca + 4ca

= 9ab - 3ab - 8bc + 2bc + 11 ca - 3ca

= 6ab - 6bc + 8ca

Question:19

Add $2x^2 - 3x + 1$ to the sum of $3x^2 - 2x$ and $3x + 7$.

Solution:

Sum of $3x^2$ - 2x and 3x + 7

= ($3x^2$ - 2x) + $3x + 7$

= $3x^2$ - 2x + 3x + 7

= ($3x^2$ + x + 7)

Now, required expression = ($2x^2$ - 3x + 1) + ($3x^2$ + x + 7)

= $2x^2$ + $3x^2$ - 3x + x + 1 + 7

= $5x^2$ - 2x + 8

Question:20

Add $x^2 + 2xy + y^2$ to the sum of $x^2 - 3y^2$ and $2x^2 - y^2 + 9$.

Solution:

Sum of x^2 - $3y^2$ and $2x^2$ - y^2 + 9

= (x^2 - $3y^2$) + ($2x^2$ - y^2 + 9)

= x^2 + $2x^2$ - $3y^2$ - y^2 + 9

= $3x^2$ - $4y^2$ + 9

Now, required expression = (x^2 + 2xy + y^2) + ($3x^2$ - $4y^2$ + 9)

= x^2 + $3x^2$ + 2xy + y^2 - $4y^2$ + 9

= $4x^2$ + 2xy - $3y^2$ + 9

Question:21

Add $a^3 + b^3 - 3$ to the sum of $2a^3 - 3b^3 - 3ab + 7$ and $-a^3 + b^3 + 3ab - 9$.

Solution:

First, we need to find the sum of $2a^3$ - $3b^3$ - 3ab + 7 and - a^3 + b^3 + 3ab - 9.

= ($2a^3$ - $3b^3$ - 3ab + 7) + (- a^3 + b^3 + 3ab - 9)

Collecting positive and negative like terms together, we get

= $2a^3$ - a^3 - $3b^3$ + b^3 - 3ab + 3ab + 7 - 9

= a^3 - $2b^3$ - 2

Now, the required expression = (a^3 + b^3 - 3) + (a^3 - $2b^3$ - 2).

= a^3 + a^3 + b^3 - $2b^3$ - 3 - 2

= $2a^3$ - b^3 - 5

Question:22

Subtract:

i $7a^2b$ from $3a^2b$

ii $4xy$ from $-3xy$

Solution:

i Required expression = $3a^2b - 7a^2b$

$= 3 - 7a^2b$

$= -4a^2b$

ii Required expression = $-3xy - 4xy$

$= -7xy$

Question:23

Subtract:

i $-4x$ from $3y$

ii $-2x$ from $-5y$

Solution:

i Required expression = $3y - -4x$

$= 3y + 4x$

ii Required expression = $-5y - -2x$

$= -5y + 2x$

Question:24

Subtract:

i $6x^3 - 7x^2 + 5x - 3$ from $4 - 5x + 6x^2 - 8x^3$

ii $-x^2 - 3z$ from $5x^2 - y + z + 7$

iii $x^3 + 2x^2y + 6xy^2 - y^3$ from $y^3 - 3xy^2 - 4x^2y$

Solution:

i Required expression = $(4 - 5x + 6x^2 - 8x^3) - (6x^3 - 7x^2 + 5x - 3)$

$= 4 - 5x + 6x^2 - 8x^3 - 6x^3 + 7x^2 - 5x + 3$

$= -8x^3 - 6x^3 + 7x^2 + 6x^2 - 5x - 5x + 3 + 4$

$= -14x^3 + 13x^2 - 10x + 7$

ii Required expression = $(5x^2 - y + z + 7) - (-x^2 - 3z)$

$= 5x^2 - y + z + 7 + x^2 + 3z$

$= 5x^2 + x^2 - y + z + 3z + 7$

$= 6x^2 - y + 4z + 7$

iii Required expression = $(y^3 - 3xy^2 - 4x^2y) - (x^3 + 2x^2y + 6xy^2 - y^3)$

$= y^3 - 3xy^2 - 4x^2y - x^3 - 2x^2y - 6xy^2 + y^3$

$= y^3 + y^3 - 3xy^2 - 6xy^2 - 4x^2y - 2x^2y - x^3$

$= 2y^3 - 9xy^2 - 6x^2y - x^3$

Question:25

From

i $p^3 - 4 + 3p^2$, take away $5p^2 - 3p^3 + p - 6$

ii $7 + x - x^2$, take away $9 + x + 3x^2 + 7x^3$

iii $1 - 5y^2$, take away $y^3 + 7y^2 + y + 1$

iv $x^3 - 5x^2 + 3x + 1$, take away $6x^2 - 4x^3 + 5 + 3x$

Solution:

i Required expression = $(p^3 - 4 + 3p^2) - (5p^2 - 3p^3 + p - 6)$

$= p^3 - 4 + 3p^2 - 5p^2 + 3p^3 - p + 6$

$= p^3 + 3p^3 + 3p^2 - 5p^2 - p - 4 + 6$

$= 4p^3 - 2p^2 - p + 2$

ii Required expression $= (7 + x - x^2) - (9 + x + 3x^2 + 7x^3)$

$= 7 + x - x^2 - 9 - x - 3x^2 - 7x^3$

$= - 7x^3 - x^2 - 3x^2 + 7 - 9$

$= - 7x^3 - 4x^2 - 2$

iii Required expression $= (1 - 5y^2) - (y^3 + 7y^2 + y + 1)$

$= 1 - 5y^2 - y^3 - 7y^2 - y - 1$

$= - y^3 - 5y^2 - 7y^2 - y$

$= - y^3 - 12y^2 - y$

iv Required expression $= (x^3 - 5x^2 + 3x + 1) - (6x^2 - 4x^3 + 5 + 3x)$

$= x^3 - 5x^2 + 3x + 1 - 6x^2 + 4x^3 - 5 - 3x$

$= x^3 + 4x^3 - 5x^2 - 6x^2 + 1 - 5$

$= 5x^3 - 11x^2 - 4$

Question:26

From the sum of $3x^2 - 5x + 2$ and $-5x^2 - 8x + 9$ subtract $4x^2 - 7x + 9$.

Solution:

Required expression $= \{(3x^2 - 5x + 2) + (- 5x^2 - 8x + 9)\} - (4x^2 - 7x + 9)$

$= \{3x^2 - 5x + 2 - 5x^2 - 8x + 9\} - (4x^2 - 7x + 9)$

$= \{3x^2 - 5x^2 - 5x - 8x + 2 + 9\} - (4x^2 - 7x + 9)$

$= \{- 2x^2 - 13x + 11\} - (4x^2 - 7x + 9)$

$= - 2x^2 - 13x + 11 - 4x^2 + 7x - 9$

$= - 2x^2 - 4x^2 - 13x + 7x + 11 - 9$

$= - 6x^2 - 6x + 2$

Question:27

Subtract the sum of $13x - 4y + 7z$ and $-6z + 6x + 3y$ from the sum of $6x - 4y - 4z$ and $2x + 4y - 7$.

Solution:

Sum of $13x - 4y + 7z$ and $-6z + 6x + 3y$

$= \{13x - 4y + 7z + -6z + 6x + 3y$

$= \{13x - 4y + 7z - 6z + 6x + 3y\}$

$= \{13x + 6x - 4y + 3y + 7z - 6z\}$

$= 19x - y + z$

Sum of $6x - 4y - 4z$ and $2x + 4y - 7$

$= 6x - 4y - 4z + 2x + 4y - 7$

$= 6x - 4y - 4z + 2x + 4y - 7$

$= 8x - 4z - 7$

Now, required expression $= \{8x - 4z - 7 - 19x - y + z\}$

$= 8x - 4z - 7 - 19x + y - z$

$= 8x - 19x + y - 4z - z - 7$

$= - 11x + y - 5z - 7$

Question:28

From the sum of $x^2 + 3y^2 - 6xy$, $2x^2 - y^2 + 8xy$, $y^2 + 8$ and $x^2 - 3xy$ subtract $-3x^2 + 4y^2 - xy + x - y + 3$.

Solution:

Sum of $(x^2 + 3y^2 - 6xy)$, $(2x^2 - y^2 + 8xy)$, $(y^2 + 8)$ and $(x^2 - 3xy)$

$= \{(x^2 + 3y^2 - 6xy) + (2x^2 - y^2 + 8xy) + (y^2 + 8) + (x^2 - 3xy)\}$

$= \{x^2 + 3y^2 - 6xy + 2x^2 - y^2 + 8xy + y^2 + 8 + x^2 - 3xy\}$

= {x^2+ 2x^2+ x^2 + 3y^2- y^2 + y^2- 6xy + 8xy - 3xy + 8}

= 4x^2 + 3y^2 - xy + 8

Now, required expression = (4x^2 + 3y^2 - xy + 8) - (- 3x^2 + 4y^2 - xy + x - y + 3)

= 4x^2 + 3y^2 - xy + 8 + 3x^2 - 4y^2 + xy - x + y - 3

= 4x^2 + 3x^2+ 3y^2- 4y^2- x + y - 3 + 8

= 7x^2 - y^2- x + y + 5

Question:29

What should be added to $xy - 3yz + 4zx$ to get $4xy - 3zx + 4yz + 7$?

Solution:

The required expression can be got by subtracting xy - 3yz + 4zx from 4xy - 3zx + 4yz + 7.

Therefore, required expression = $4xy - 3zx + 4yz + 7$ - $xy - 3yz + 4zx$

= 4xy - 3zx + 4yz + 7 - xy + 3yz - 4zx

= 4xy - xy - 3zx - 4zx + 4yz + 3yz + 7

= 3xy - 7zx + 7yz + 7

Question:30

What should be subtracted from $x^2 - xy + y^2 - x + y + 3$ to obtain $-x^2 + 3y^2 - 4xy + 1$?

Solution:

Let 'M' be the required expression. Then, we have

x^2 - xy + y^2 - x + y + 3 - M = - x^2 + 3y^2 - 4xy + 1

Therefore,

M = (x^2 - xy + y^2 - x + y + 3) - (- x^2 + 3y^2 - 4xy + 1)

= x^2 - xy + y^2 - x + y + 3 + x^2 - 3y^2 + 4xy - 1

Collecting positive and negative like terms together, we get

x^2 + x^2- xy + 4xy + y^2- 3y^2 - x + y + 3 - 1

= 2x^2 + 3xy- 2y^2- x + y + 2

Question:31

How much is $x - 2y + 3z$ greater than $3x + 5y - 7$?

Solution:

Required expression = $x - 2y + 3z$ - $3x + 5y - 7$

= x - 2y + 3z - 3x - 5y + 7

Collecting positive and negative like terms together, we get

x - 3x - 2y - 5y + 3z + 7

= - 2x - 7y + 3z + 7

Question:32

How much is $x^2 - 2xy + 3y^2$ less than $2x^2 - 3y^2 + xy$?

Solution:

Required expression = (2x^2 - 3y^2 + xy) - (x^2 - 2xy + 3y^2)

= 2x^2 - 3y^2 + xy - x^2 + 2xy - 3y^2

Collecting positive and negative like terms together, we get

2x^2 - x^2 - 3y^2 - 3y^2 + xy + 2xy

= x^2 - 6y^2 + 3xy

Question:33

How much does $a^2 - 3ab + 2b^2$ exceed $2a^2 - 7ab + 9b^2$?

Solution:

Required expression = (a^2 - 3ab + 2b^2) - (2a^2 - 7ab + 9b^2)

$= a^2 - 3ab + 2b^2 - 2a^2 + 7ab - 9b^2$

Collecting positive and negative like terms together, we get

$= a^2 - 2a^2 - 3ab + 7ab + 2b^2 - 9b^2$

$= - a^2 + 4ab - 7b^2$

Question:34

What must be added to $12x^3 - 4x^2 + 3x - 7$ to make the sum $x^3 + 2x^2 - 3x + 2$?

Solution:

Let 'M' be the required expression. Thus, we have

$12x^3 - 4x^2 + 3x - 7 + M = x^3 + 2x^2 - 3x + 2$

Therefore,

$M = (x^3 + 2x^2 - 3x + 2) - (12x^3 - 4x^2 + 3x - 7)$

$= x^3 + 2x^2 - 3x + 2 - 12x^3 + 4x^2 - 3x + 7$

Collecting positive and negative like terms together, we get

$x^3 - 12x^3 + 2x^2 + 4x^2 - 3x - 3x + 2 + 7$

$= - 11x^3 + 6x^2 - 6x + 9$

Question:35

If $P = 7x^2 + 5xy - 9y^2$, $Q = 4y^2 - 3x^2 - 6xy$ and $R = -4x^2 + xy + 5y^2$, show that $P + Q + R = 0$.

Solution:

We have

$P + Q + R = (7x^2 + 5xy - 9y^2) + (4y^2 - 3x^2 - 6xy) + (- 4x^2 + xy + 5y^2)$

$= 7x^2 + 5xy - 9y^2 + 4y^2 - 3x^2 - 6xy - 4x^2 + xy + 5y^2$

Collecting positive and negative like terms together, we get

$7x^2 - 3x^2 - 4x^2 + 5xy - 6xy + xy - 9y^2 + 4y^2 + 5y^2$

$= 7x^2 - 7x^2 + 6xy - 6xy - 9y^2 + 9y^2$

$= 0$

Question:36

If $P = a^2 - b^2 + 2ab$, $Q = a^2 + 4b^2 - 6ab$, $R = b^2 + b$, $S = a^2 - 4ab$ and $T = -2a^2 + b^2 - ab + a$. Find $P + Q + R + S - T$.

Solution:

We have

$P + Q + R + S - T = \{(a^2 - b^2 + 2ab) + (a^2 + 4b^2 - 6ab) + (b^2 + b) + (a^2 - 4ab)\} - (-2a^2 + b^2 - ab + a)$

$= \{a^2 - b^2 + 2ab + a^2 + 4b^2 - 6ab + b^2 + b + a^2 - 4ab\} - (- 2a^2 + b^2 - ab + a)$

$= \{3a^2 + 4b^2 - 8ab + b\} - (-2a^2 + b^2 - ab + a)$

$= 3a^2 + 4b^2 - 8ab + b + 2a^2 - b^2 + ab - a$

Collecting positive and negative like terms together, we get

$3a^2 + 2a^2 + 4b^2 - b^2 - 8ab + ab - a + b$

$= 5a^2 + 3b^2 - 7ab - a + b$

Question:37

Place the last two terms of the following expressions in parentheses preceded by a minus sign:

i $x + y - 3z + y$

ii $3x - 2y - 5z - 4$

iii $3a - 2b + 4c - 5$

iv $7a + 3b + 2c + 4$

v $2a^2 - b^2 - 3ab + 6$

vi $a^2 + b^2 - c^2 + ab - 3ac$

Solution:

We have

i $x + y - 3z + y = x + y - 3z - y$

ii $3x - 2y - 5z - 4 = 3x - 2y - 5z + 4$

iii 3a – 2b + 4c – 5 = 3a - 2b - $-4c+5$

iv 7a + 3b + 2c + 4 = 7a + 3b - $-2c-4$

v $2a^2 - b^2 - 3ab + 6 = 2a^2 - b^2 - 3ab - 6$

vi $a^2 + b^2 - c^2 + ab - 3ac = a^2 + b^2 - c^2 - -ab + 3ac$

Question:38

Write each of the following statements by using appropriate grouping symbols:

i The sum of *a* – *b* and 3*a* – 2*b* + 5 is subtracted from 4*a* + 2*b* – 7.

ii Three times the sum of 2*x* + *y* – {5 – (*x* – 3*y*)} and 7*x* – 4*y* + 3 is subtracted from 3*x* – 4*y* + 7.

iii The subtraction of $x^2 - y^2 + 4xy$ from $2x^2 + y^2 - 3xy$ is added to $9x^2 - 3y^2 - xy$.

Solution:

i The sum of a – b and 3a – 2b + 5 = $\{a - b + 3a - 2b + 5\}$.

This is subtracted from 4a + 2b - 7.

Thus, the required expression is {4a + 2b - 7) - $\{a - b + 3a - 2b + 5\}$.

ii Three times the sum of 2x + y – {5 – $x - 3y$} and 7x – 4y + 3 = 3

$$(2x + y) - 5 - (x - 3y) + (7x - 4y + 3)$$

.

This is subtracted from 3x - 4y +7.

Thus, the required expression is $3x - 4y + 7$ - 3

$$(2x + y) - 5 - (x - 3y) + (7x - 4y + 3)$$

.

iii The product of subtraction of $x^2 - y^2 + 4xy$ from $2x^2 + y^2 - 3xy$ is given by $\{(2x^2 + y^2 - 3xy) - (x^2 - y^2 + 4xy)\}$.

When the above equation is added to $9x^2 - 3y^2 - xy$, we get

$\{(2x^2 + y^2 - 3xy) - (x^2 - y^2 + 4xy)\} + (9x^2 - 3y^2 - xy)$

Question:39

Simplify each of the following algebraic expressions by removing grouping symbols.

2*x* + (5*x* – 3*y*)

Solution:

We have

2x + $5x - 3y$

Since the '+' sign precedes the parentheses, we have to retain the sign of each term in the parentheses when we remove them.

= 2x + 5x - 3y

= 7x - 3y

Question:40

Simplify each of the following algebraic expressions by removing grouping symbols.

3*x* – (*y* – 2*x*)

Solution:

We have

3x – $y - 2x$

Since the '-' sign precedes the parentheses, we have to change the sign of each term in the parentheses when we remove them. Therefore, we have

3x – y + 2x

= 5x - y

Question:41

Simplify each of the following algebraic expressions by removing grouping symbols.

5*a* – (3*b* – 2*a* + 4*c*)

Solution:

We have

5a – $3b - 2a + 4c$

Since the '-' sign precedes the parentheses, we have to change the sign of each term in the parentheses when we remove them.

= 5a - 3b + 2a - 4c

= 7a - 3b - 4c

Question:42

Simplify each of the following algebraic expressions by removing grouping symbols.

$-2\ (x^2 - y^2 + xy) - 3(x^2 + y^2 - xy)$

Solution:

We have

$- 2(x^2 - y^2 + xy) - 3(x^2 + y^2 - xy)$

Since the '-' sign precedes the parentheses, we have to change the sign of each term in the parentheses when we remove them.

$= - 2x^2 + 2y^2 - 2xy - 3x^2 - 3y^2 + 3xy$

$= - 2x^2 - 3x^2 + 2y^2 - 3y^2 - 2xy + 3xy$

$= - 5x^2 - y^2 + xy$

Question:43

Simplify each of the following algebraic expressions by removing grouping symbols.

$3x + 2y - \{x - (2y - 3)\}$

Solution:

We have

3x + 2y – {x – $2y - 3$}

First, we have to remove the small brackets $or parentheses$. Then, we have to remove the curly brackets $or braces$: { }.

Therefore,

= 3x + 2y – {x – 2y + 3}

= 3x + 2y – x + 2y - 3

= 2x + 4y - 3

Question:44

Simplify each of the following algebraic expressions by removing grouping symbols.

$5a - \{3a - (2 - a) + 4\}$

Solution:

We have

5a – {3a – 2 – a + 4}

First, we have to remove the small brackets $or parentheses$. Then, we have to remove the curly brackets $or braces$: { }.

Therefore,

= 5a – {3a – 2 + a + 4}

= 5a – 3a + 2 - a - 4

= 5a - 4a - 2

= a - 2

Question:45

Simplify each of the following algebraic expressions by removing grouping symbols.

$a - [b - \{a - (b - 1) + 3a\}]$

Solution:

First we have to remove the parentheses, or small brackets, , then the curly brackets, { }, and then the square brackets

.

Therefore, we have

a -

$$b - a - (b - 1) + 3a$$

= a -

$$b - a - b + 1 + 3a$$

= a -

$$b - 4a - b + 1$$

= a -

$$b - 4a + b - 1$$

= a -

$$2b - 4a - 1$$

= a - 2b + 4a + 1
= 5a - 2b + 1

Question:46

Simplify each of the following algebraic expressions by removing grouping symbols.

$a - [2b - \{3a - (2b - 3c)\}]$

Solution:

First we have to remove the small brackets, or parentheses, , then the curly brackets, { }, and then the square brackets,

.

Therefore, we have

a -

$$2b - 3a - (2b - 3c)$$

= a -

$$2b - 3a - 2b + 3c$$

= a -

$$2b - 3a + 2b - 3c$$

= a -

$$4b - 3a - 3c$$

= a - 4b + 3a + 3c
= 4a - 4b + 3c

Question:47

Simplify each of the following algebraic expressions by removing grouping symbols.

$-x + [5y - \{2x - (3y - 5x)\}]$

Solution:

First we have to remove the small brackets, or parentheses, , then the curly brackets, { }, and then the square brackets,

.

Therefore, we have

- x +

$$5y - 2x - (3y - 5x)$$

= - x +

$$5y - 2x - 3y + 5x$$

= - x +

$$5y - 7x - 3y$$

= - x +

$$5y - 7x + 3y$$

= - x +

$$8y - 7x$$

= - x + 8y - 7x
= - 8x + 8y

Question:48

Simplify each of the following algebraic expressions by removing grouping symbols.
$2a - [4b - \{4a - 3(2a - b)\}]$

Solution:

First we have to remove the small brackets, or parentheses, , then the curly brackets, { }, and then the square brackets,

.
Therefore, we have
2a -

$$4b - 4a - 3(2a - b)$$

= 2a -

$$4b - 4a - 6a + 3b$$

= 2a -

$$4b - -2a + 3b$$

= 2a -

$$4b + 2a - 3b$$

= 2a -

$$b + 2a$$

= 2a - b - 2a
= - b

Question:49

Simplify each of the following algebraic expressions by removing grouping symbols.
$-a - [a + \{a + b - 2a - (a - 2b)\} - b]$

Solution:

First we have to remove the small brackets, or parentheses, , then the curly brackets,{ }, and then the square brackets,

.
Therefore, we have
- a -

$$a+a+b-2a-(a-2b)-b$$

= - a -

$$a+a+b-2a-a+2b-b$$

= - a -

$$a+-2a+3b-b$$

= - a -

$$a-2a+3b-b$$

= - a -

$$-a+2b$$

= - a + a - 2b
= - 2b

Question:50
Simplify each of the following algebraic expressions by removing grouping symbols.
$2x-3y-[3x-2y-\{x-z-(x-2y)\}]$
Solution:
First we have to remove the small brackets, or parentheses, , then the curly brackets, { }, and then the square brackets,

.
Therefore, we have
2x - 3y -

$$3x-2y-x-z-(x-2y)$$

= 2x - 3y -

$$3x-2y-x-z-x+2y$$

= 2x - 3y -

$$3x-2y--z+2y$$

= 2x - 3y -

$$3x-2y+z-2y$$

= 2x - 3y -

$$3x-4y+z$$

= 2x - 3y - 3x + 4y - z
= - x + y - z

Question:51

Simplify each of the following algebraic expressions by removing grouping symbols.

$5 + [x - \{2y - (6x + y - 4) + 2x\} - \{x - (y - 2)\}]$

Solution:

First we have to remove the small brackets, or parentheses, , then the curly brackets, { }, and then the square brackets,

.

Therefore, we have

5 +

$$x - 2y - (6x + y - 4) + 2x - x - (y - 2)$$

= 5 +

$$x - 2y - 6x - y + 4 + 2x - x - y + 2$$

= 5 +

$$x - y - 4x + 4 - x - y + 2$$

= 5 +

$$x - y + 4x - 4 - x + y - 2$$

= 5 +

$$4x - 6$$

= 5 + 4x - 6

= 4x - 1

Question:52

Simplify each of the following algebraic expressions by removing grouping symbols.

$x^2 - [3x + \{2x - (x^2 - 1) + 2\}]$

Solution:

First we have to remove the small brackets, or parentheses, , then the curly brackets, { }, and then the square brackets,

.

Therefore, we have

x^2 - [3x + {2x - (x^2 - 1)} + 2]

= x^2 - [3x + {2x - x^2 + 1} + 2]

= x^2 - [3x + 2x - x^2 + 1+ 2]

= x^2 - [5x - x^2 + 3]

= x^2 - 5x + x^2 - 3

= 2x^2 - 5x - 3

Question:53

Simplify each of the following algebraic expressions by removing grouping symbols.

$20 - [5xy + 3\{x^2 - (xy - y) - (x - y)\}]$

Solution:

First we have to remove the small brackets, or parentheses, , then the curly brackets, { }, and then the square brackets,

.

Therefore, we have

20 - [5xy + 3{x^2 - $xy - y$ - $x - y$}]

= 20 - [5xy + 3{x^2 - xy + y - x + y}]

= 20 - [5xy + 3{x^2 - xy + 2y - x}]

= 20 - [5xy + 3x^2 - 3xy + 6y - 3x]

= 20 - [2xy + 3x^2 + 6y - 3x]

= 20 - 2xy - 3x^2 - 6y + 3x

= - 3x^2 - 2xy - 6y + 3x + 20

Question:54

Simplify each of the following algebraic expressions by removing grouping symbols.

85 – [12*x* – 7(8*x* – 3) – 2 {10*x* – 5(2 – 4*x*)}]

Solution:

First we have to remove the small brackets, or parentheses, , then the curly brackets, { }, and then the square brackets,

.

Therefore, we have

85 -

$$12x - 7(8x - 3) - 210x - 5(2 - 4x)$$

= 85 -

$$12x - 56x + 21 - 210x - 10 + 20x$$

= 85 -

$$12x - 56x + 21 - 230x - 10$$

= 85 -

$$12x - 56x + 21 - 60x + 20$$

= 85 -

$$12x - 116x + 41$$

= 85 -

$$-104x + 41$$

= 85 + 104x - 41

= 44 + 104x

Question:55

Simplify each of the following algebraic expressions by removing grouping symbols.

xy [*yz* – *zx* – {*yx* – (3*y* – *xz*) – (*xy* – *zy*)}]

Solution:

First we have to remove the small brackets, or parentheses, , then the curly brackets, { }, and then the square brackets,

.

Therefore, we have

xy -

$$yz - zx - yx - (3y - xz) - (xy - zy)$$

= xy -

$$yz - zx - yx - 3y + xz - xy + zy$$

= xy -

$$yz - zx - -3y + xz + zy$$

= xy -

$$yz - zx + 3y - xz - zy$$

= xy -

$$-zx + 3y - xz$$

= xy -

$$-2zx + 3y$$

= xy + 2xz - 3y

Question:56

Mark the correct alternative in the following question:

Which of the following pairs is/are like terms?

1 x 2 x^2 3 $3x^3$ 4 $4x^3$

a 1, 2 b 2, 3 c 3, 4 d None of these

Solution:

Since, $3x^3$ and $4x^3$ is the pair of like terms.

Hence, the correct option is c.

Question:57

Mark the correct alternative in the following question:

Which of the following is not a monomial?

a $2x^2 + 1$ b $3x^4$ c ab d x^2y

Solution:

Since, $2x^2 + 1$ has two terms $2x^2$ and 1.

So, $2x^2 + 1$ is a binomial.

Hence, the correct alternative is option a.

Question:58

Mark the correct alternative in the following question:

The sum of the coefficients in the monomials $3a^2b$ and $-2ab^2$ is

a 5 b -1 c 1 d 6

Solution:

Since, the coefficient in the monomial $3a^2b$ is 3 and the coefficient in the monomial $-2ab^2$ is -2.

So, the sum of the coefficients in the monomials $3a^2b$ and $-2ab^2 = 3 + (-2) = 3 - 2 = 1$

Hence, the correct alternative is option c.

Question:59

Mark the correct alternative in the following question:

$\text{The coefficient of } x^2 \text{ in } -\frac{5}{3}x^2y \text{ is equal to (a) } -\frac{5}{3} \quad \text{(b) } -\frac{5}{3}y \quad \text{(c) } \frac{5}{3} \quad \text{(d) } \frac{5}{3}y$

Solution:

$\text{Since, the coefficient of } x^2 \text{ in } -\frac{5}{3}x^2y \text{ is equal to } -\frac{5}{3}y.$

Hence, the correct alternative is option b.

Question:60

Mark the correct alternative in the following question:

If a, b and c are respectively the coefficients of x^2 in $-x^2$, $2x^2 + x$ and $2x - x^2$, respectively, then $a + b + c =$

$a\ 0 \qquad b\ -2 \qquad c\ 2 \qquad d\ -1$

Solution:

As, the coefficient x^2 in $-x^2 = -1$, the coefficient x^2 in $2x^2 + x = 2$ and the coefficient x^2 in $2x - x^2 = -1$.

Now, $a + b + c = (1) + 2 + (1) = 2 + 2 = 0$

Hence, the correct alternative is option a.

Question:61

Mark the correct alternative in the following question:

The sum of the coefficients in the terms of $2x^2y\ 3xy^2 + 4xy$ is

a 3 b 3 c 9 d 5

Solution:

As, the coefficient in the term $2x^2y = 2$, the coefficient in the term $3xy^2 = 3$ and the coefficient in the term $4xy = 4$.

So, the sum of the coefficients in the terms of $2x^2y\ \ 3xy^2 + 4xy = 2 + (3) + 4 = 3 + 6 = 3$

Hence, the correct alternative is option b.

Question:62

Mark the correct alternative in the following question:

Solution:

Hence, the correct alternative is option c.

Question:63

Mark the correct alternative in the following question:

If a and b are respectively the sum and product of coefficients of terms in the expression $x^2 + y^2 + z^2\ xy\ yz\ zx$, then $a + 2b =$

a 0 b 2 c 2 d 1

Solution:

We have,

The expression $x^2 + y^2 + z^2\ \ xy\ \ yz\ \ zx$,

Terms	Coefficients
x^2	1
y^2	1
z^2	1
xy	1
yz	1
zx	1
Sum, a	0
Product, b	1

So, $a + 2b = 0 + 2(1) = 2$

Hence, the correct alternative is option c.

Question:64

Mark the correct alternative in the following question:

Solution:

Hence, the correct alternative is option d.

Question:65

Mark the correct alternative in the following question:

The sum of the values of the expression $2x^2 + 2x + 2$ when $x = 1$ and $x = 1$ is

a 6 b 8 c 4 d 2

Solution:

Since, when $x = 1$, the value of the expression $2x^2 + 2x + 2 = 2(1)^2 + 2(1) + 2 = 2\ \ 2 + 2 = 2$

And, when $x = 1$, the value of the expression $2x^2 + 2x + 2 = 2\,1^2 + 2\,1 + 2 = 2 + 2 + 2 = 6$

So, the sum of the values of the expression $2x^2 + 2x + 2$ when $x = 1$ and $x = 1 = 2 + 6 = 8$

Hence, the correct alternative is option b.

Question:66

Mark the correct alternative in the following question:

What should be added to $3x^2 + 4$ to get $9x^2\ \ 7$?

a $6x^2\ \ 11$ b $6x^2 + 11$ c $12x^2\ \ 11$ d $12x^2 + 11$

Solution:

Since, $(9x^2\ \ 7)\ \ (3x^2 + 4) = 9x^2\ \ 7\ \ 3x^2\ \ 4 = 6x^2\ \ 11$

So, $6x^2 - 11$ should added to $3x^2 + 4$ to get $9x^2 - 7$.

Hence, the correct alternative is option a.

Question:67

Mark the correct alternative in the following question:

How much is $a^2 - 3a$ greater than $2a^2 + 4a$?

a $a^2 - 7a$ b $a^2 + 7a$ c $a^2 - 7a$ d $a^2 + 7a$

Solution:

Since, $(a^2 - 3a) - (2a^2 + 4a) = a^2 - 3a - 2a^2 - 4a = -a^2 - 7a$

So, $a^2 - 3a$ is greater than $2a^2 + 4a$ by $-a^2 - 7a$.

Hence, the correct alternative is option c.

Question:68

Mark the correct alternative in the following question:

How much is $2x^2 + x + 1$ less than $x^2 + 2x - 3$?

a $x^2 + 3x - 2$ b $3x^2 + x - 4$ c $3x^2 - x + 4$ d $3x^2 + 3x - 4$

Solution:

Since, $(x^2 + 2x - 3) - (2x^2 + x + 1) = x^2 + 2x - 3 + 2x^2 - x - 1 = 3x^2 + x - 4$

So, $2x^2 + x + 1$ is less than $x^2 + 2x - 3$ by $3x^2 + x - 4$.

Hence, the correct alternative is option b.

Question:69

Mark the correct alternative in the following question:

What should be added to $xy + yz + zx$ to get $xy - yz - zx$?

a $-2xy - 2yz - 2zx$ b $3xy - yz - zx$ c $3xy - 3yz - 3zx$ d $2xy + 2yz + 2zx$

Solution:

Since, $(xy - yz - zx) - (xy + yz + zx) = xy - yz - zx - xy - yz - zx = -2xy - 2yz - 2zx$

So, $-2xy - 2yz - 2zx$ should be added to $xy + yz + zx$ to get $xy - yz - zx$.

Hence, the correct alternative is option a.