Chapter 8 Algebraic Expressions Ex 8.1

Question 1.
From the algebraic expressions using variables, constants, and arithmetic operations:
(i) 6 more than thrice a number x.
(ii) 5 times x is subtracted from 13.
(iii) The numbers x and y both squared and added.
(iv) Number 7 is added to 3 times the product of p and q.
(v) Three times of x is subtracted from the product of x with itself.
(vi) Sum of the numbers m and n is subtracted from their product.
Solution:

(i) 6 more than thrice a number x = $3x + 6$

(ii) 5 times x is subtracted from 13 = $13 - 5x$

(iii) The numbers x and y both squared and added = $x^2 + y^2$

(iv) Number 7 is added to 3 times the product of p and q = $3pq + 1$

(v) Three times of x is subtracted from the product of x with itself = $x^2 - 3x$

(vi) Sum of the numbers m and n is subtracted from their product = $mn - (m + n)$

Question 2.
A taxi charges ₹ 9 per km and a fixed charge of ₹ 50. If the taxi is hired for x km, write an algebraic expression for this situation.
Solution:

Charges of a taxi = ₹ 9 per km

Fixed charges = ₹ 50

and taxi is hired for x km = $(9x + 50)$ rupees

Question 3.
Write down the algebraic expression whose terms are:
(i) 5a, -3b, c
(ii) x^2, -5x, 6
(iii) x^2y, xy, $-xy^2$
Solution:

(i) $5a - 3b + c$

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

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

Question 4.
Write all the terms of each of the following algebraic expressions:
(i) $3 – 7x$
(ii) $2 – 5a + 12\ b$
(iii) $3x^5 + 4y^3 – 7xy^2 + 3$
Solution:

(i) $3 - 7x = 3, -7x$

(ii) $2 - 5a + \frac{3}{2}b = 2, -5a, \frac{3}{2}b$

(iii) $3x^5 + 4y^3 - 7xy^2 + 3 = 3x^5, 4y^3, -7xy^2, 3$

Question 5.
Identify the terms and their factors in the algebraic expressions given below:
(i) $-4x + 5y$
(ii) $xy + 2x^2y^2$
(iii) $1.2ab – 2.4b + 3.6a$
Solution:

(i) $-4x + 5y$

$-4x = -4, x$

$5y = 5, y$

(ii) $xy + 2x^2y^2$

$xy = x, y$

$2x^2y^2 = 2, x, x, y, y$

(iii) $1.2ab - 2.4b + 3.6a$

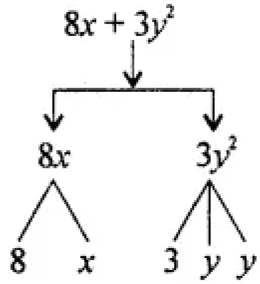
$1.2ab = 1.2, a, b$

$-2.4b = -2.4, b$

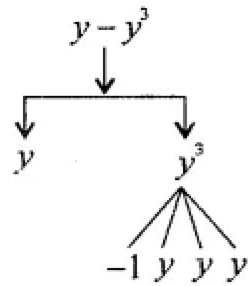
$3.6a = 3.6, a$

Question 6.
Show the terms and their factors by tree diagrams of the following algebraic expressions:
(i) $8x + 3y^2$
(ii) $y – y^3$
(iii) $5xy^2 + 7x^2y$
(iv) $-ab + 2b^2 – 3a^2$
Solution:

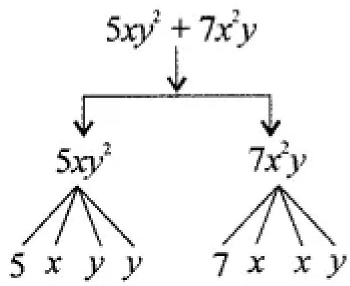
(i) $8x + 3y^2$



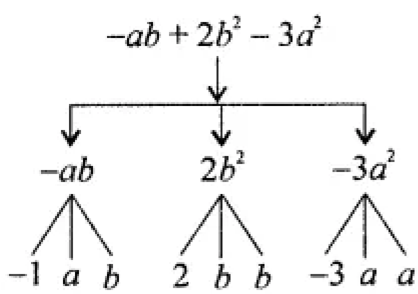
(ii) $y - y^3$



(iii) $5xy^2 + 7x^2y$



(iv) $-ab + 2b^2 - 3a^2$



Question 7.
Write down the numerical coefficient of each of the following:
(i) $-7x$

(ii) $-2x^3y^2$
(iii) $6abcd^2$
(iv) $\frac{2}{3}pq^2$
Solution:

Numerical co-efficient

(i) $-7x$ – numerical co-efficient is -7

(ii) $-2x^3y^2$ – numerical co-efficient is -2

(iii) $6abcd^2$ – numerical co-efficient is 6

(iv) $\frac{2}{3}pq^2$ – numerical co-efficient is $\frac{2}{3}$

Question 8.
Write down the coefficient of x in the following:
(i) $-4bx$
(ii) $5xyz$
(iii) $-x$
(iv) $-3x^2y$
Solution:

coefficient of x

(i) $-4bx$ – $-4b$

(ii) $5xyz$ – $5yz$

(iii) $-x$ – -1

(iv) $-3x^2y$ – $-3xy$

Question 9.
In $-7xy^2z^3$, write down the coefficient of:
(i) $7x$
(ii) $-xy^2$
(iii) xyz
(iv) $7yz^2$
Solution:

In $-7xy^2z^3$

(i) Co-efficient of $7x = -y^2z^3$

(ii) Co-efficient of $-xy^2 = 7z^3$

(iii) Co-efficient of $xyz = -7yz^2$

(iv) Co-efficient of $7yz^2 = -xyz$

Question 10.
Identify the terms (other than constants) and write their numerical coefficients in each of the following algebraic expressions:

(i) $3 – 7x$
(ii) $1 + 2x – 3x^2$
(iii) $1.2a + 0.8b$
Solution:

Expression	Non-constant terms	Numerical co-efficient
(i) $3 - 7x$	$-7x$	-7
(ii) $1 + 2x - 3x^2$	$2x$	2
	$-3x^2$	-3
(iii) $1.2a + 0.8b$	$1.2a$	1.2
	$0.8b$	0.8

Question 11.
Identify the terms which contain x and write the coefficient of x in each of the following expressions:
(i) $13y^2 – 8xy$
(ii) $7x – xy^2$
(iii) $5 – 7xyz + 4x^2y$
Solution:

Expression	Term(s) Containing x	Co-efficient of x
(i) $13y^2 - 8xy$	$-8xy$	$-8y$
(ii) $7x - xy^2$	$7x$	7
	$-xy^2$	$-y^2$
(iii) $5 - 7xyz + 4x^2y$	$-7xyz$	$-7yz$
	$4x^2y$	$4xy$

Question 12.
Identify the term which contain y2 and write the coefficient of y2 in each of the following expressions:
(i) $8 – xy^2$
(ii) $5y^2 + 7x – 3xy^2$
(iii) $2x^2y – 15xy^2 + 7y^2$

Solution:

Expression	Term(s) Containing y^2	Co-efficient of y^2
(i) $8 - xy^2$	$-xy^2$	$-x$
(ii) $5y^2 + 7x - 3xy^2$	$5y^2$	5
	$-3xy^2$	$-3x$
(iii) $2x^2y - 15xy^2 + 7y^2$	$-15xy^2$	$-15x$
	$7y^2$	7

Question 13.
Classify into monomials, binomials and trinomials:
(i) $4y - 7z$
(ii) $-5xy^2$
(iii) $x + y - xy$
(iv) $ab^2 - 5b - 3a$
(v) $4p^2q - 5pq^2$
(vi) 2017
(vii) $1 + x + x^2$
(viii) $5x^2 - 7 + 3x + 4$
Solution:

Expression	Number of terms	Kind
(i) $4y - 7z$	Two terms	Bionomial
(ii) $-5xy^2$	One term	Monomial
(iii) $x + y - xy$	Three terms	Trinomial
(iv) $ab^2 - 5b - 3a$	Three terms	Trinomial
(v) $4p^2q - 5pq^2$	Two terms	Bionomial
(vi) 2017	One term	Monomial
(vii) $1 + x + x^2$	Three terms	Trinomial
(viii) $5x^2 - 7 + 3x + 4$ $= 5x^2 + 3x - 3$	Three terms	Trinomial

Question 14.
State whether the given pair of terms is of like or unlike terms:
(i) $-7x$, $\frac{5}{2}x$
(ii) $-29x$, $-29y$
(iii) $2xy$, $2xyz$

(iv) $4m^2p$, $4mp^2$
(v) $12xz$, $12x^2z^2$
(vi) $-5pq$, $7qp$
Solution:

(i) $-7x$, $\frac{5}{2}x$ – Like

(ii) $-29x$, $-29y$ – Unlike

(iii) $2xy$, $2xyz$ – Unlike

(iv) $4m^2p$, $4mp^2$ – Unlike

(v) $12xz$, $12x^2z^2$ – Unlike

(vi) $-5pq$, $7qp$ – Like

Question 15.
Identify like terms in the following:
(i) x^2y, $3xy^2$, $-2x^2y$, $4x^2y^2$
(ii) $3a^2b$, $2abc$, $-6a^2b$, $4abc$
(iii) $10pq$, $7p$, $8q - p^2q^2$, $-7qp$, $-100q$, -23, $12q^2p^2$, $-5p^2$, 41, $2405p$, $78qp$, $13p^2q$, qp^2, $701p^2$
Solution:

(i) x^2y and $-2x^2y$ are like terms.

(ii) $3a^2b$, $-6a^2b$ and $2abc$, $4abc$ are pairs of like terms.

(iii) $10pq$, $-7qp$, $78qp$ and $7p$, $2405p$ and $8q$, $-100q$,
and $-p^2q^2$, $12q^2p^2$ and -23, 41 and $-5p^2$, $701p^2$
and $13p^2q$, qp^2 are groups of like terms.

Question 16.
Write down the degree of following polynomials in x:
(i) $x^2 - 6x^7 + x^8$
(ii) $3 - 2x$
(iii) -2
(iv) $1 - x^2$
Solution:

(i) $x^2 - 6x^7 + x^8$; degree is 8

(ii) $3 - 2x$; degree is 1

(iii) -2 ; degree is 0

(iv) $1 - x^2$; degree is 2

Question 17.
Write the degree of the following polynomials:
(i) $3x^2 - 5xy^2 + 7$

(ii) $xy^2 - y^3 + 3y^4 - 2$
(iii) $7 - 2x^3 - 5xy^3 + 9y^5$
Solution:

(i) $3x^2 - 5xy^2 + 1$; degree is 1 + 2 = 3
(ii) $xy^2 - y^3 + 3y^4 - 2$; degree is 4
(iii) $7 - 2x^3 - 5xy^3 + 9y^5$; degree is 5

Question 18.
State true or false:
(i) If 5 is constant andy is variable, then 5y and 5 + y are variables
(ii) 7x has two terms, 7 and x
(iii) 5 + xy is a trinomial
(iv) 7a × bc is a binomial
(v) $7x^3 + 2x^2 + 3x - 5$ is a polynomial
(vi) $2x^2 - 3x$ is a polynomial
(vii) Coefficient of x in -3xy is -3
Solution:

(i) True.
(ii) False. Correct: 7x has one term.
(iii) False. Correct: It is bionomial.
(iv) False. Correct: It is 7abc monomial.
(v) True.
(vi) False. Correct: It is bionomial.
(vii) False. Correct: It is -3y.