

EXERCISE 12.1**PAGE: 234**

1. Get the algebraic expressions in the following cases using variables, constants and arithmetic operations.

(i) Subtraction of z from y .

Solution:-

$$= Y - z$$

(ii) One-half of the sum of numbers x and y .

Solution:-

$$= \frac{1}{2} (x + y)$$

$$= (x + y)/2$$

(iii) The number z multiplied by itself.

Solution:-

$$= z \times z$$

$$= z^2$$

(iv) One-fourth of the product of numbers p and q .

Solution:-

$$= \frac{1}{4} (p \times q)$$

$$= pq/4$$

(v) Numbers x and y , both squared and added.

Solution:-

$$= x^2 + y^2$$

(vi) Number 5 added to three times the product of numbers m and n .

Solution:-

$$= 3mn + 5$$

(vii) Product of numbers y and z subtracted from 10.

Solution:-

$$= 10 - (y \times z)$$

$$= 10 - yz$$

(viii) Sum of numbers a and b subtracted from their product.

Solution:-

$$= (a \times b) - (a + b)$$

$$= ab - (a + b)$$

2. (i) Identify the terms and their factors in the following expressions.

Show the terms and factors by tree diagrams.

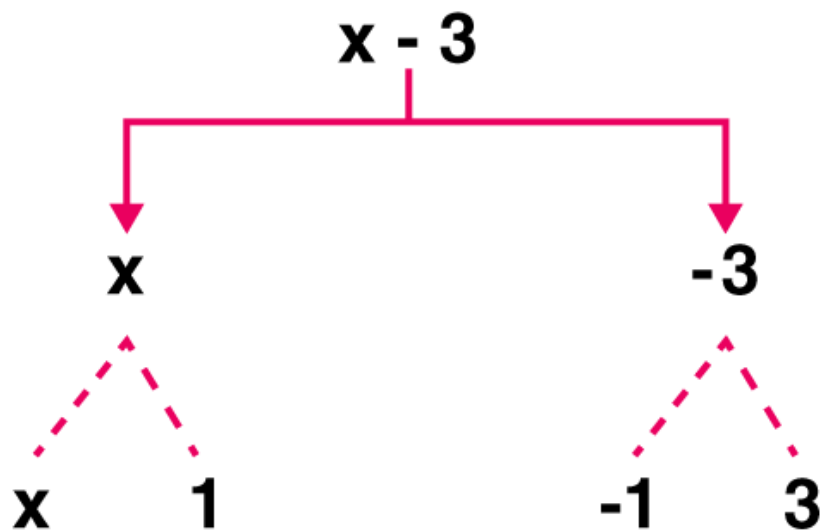
(a) $x - 3$

Solution:-

Expression: $x - 3$

Terms: x , -3

Factors: x ; -3



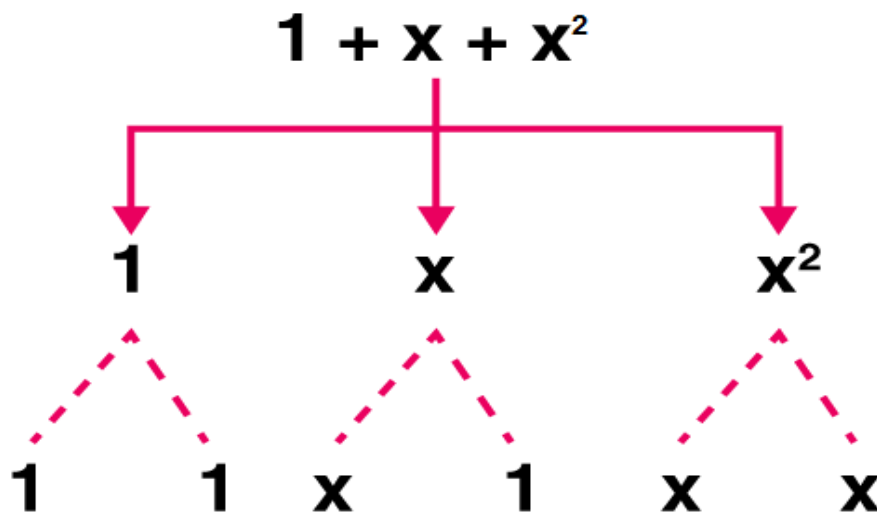
(b) $1 + x + x^2$

Solution:-

Expression: $1 + x + x^2$

Terms: 1, x, x^2

Factors: 1; x; x,x



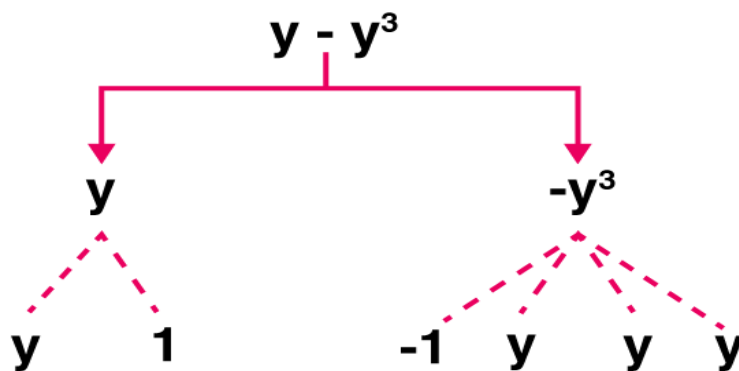
(c) $y - y^3$

Solution:-

Expression: $y - y^3$

Terms: y, $-y^3$

Factors: y; -y, -y, -y



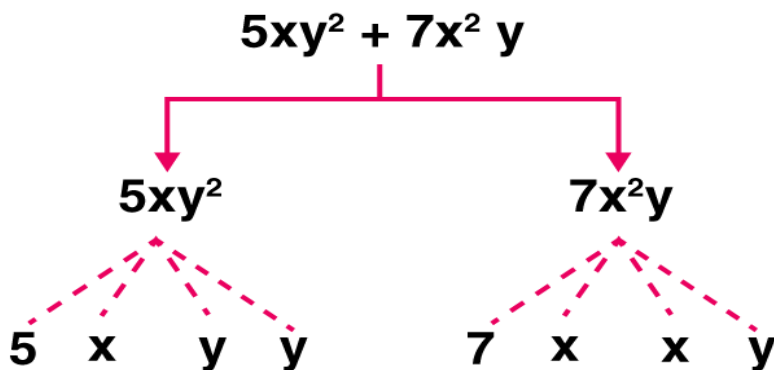
(d) $5xy^2 + 7x^2y$

Solution:-

Expression: $5xy^2 + 7x^2y$

Terms: $5xy^2, 7x^2y$

Factors: 5, x, y, y; 7, x, x, y



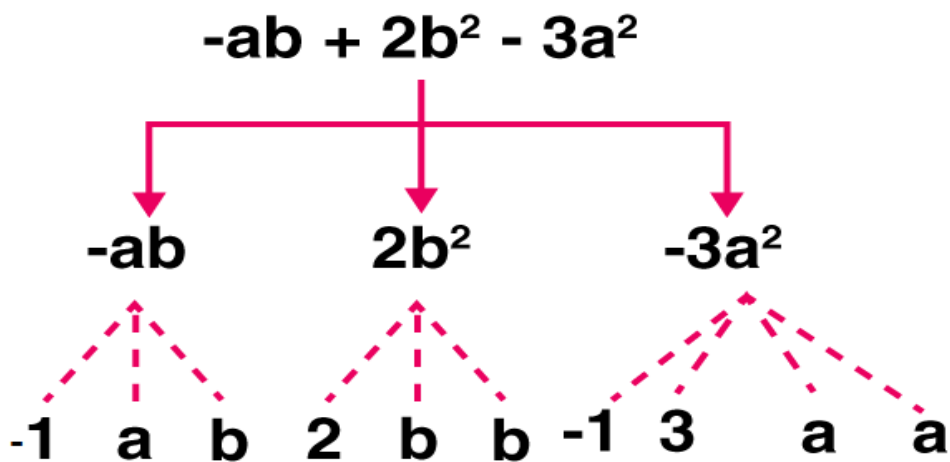
(e) $-ab + 2b^2 - 3a^2$

Solution:-

Expression: $-ab + 2b^2 - 3a^2$

Terms: $-ab, 2b^2, -3a^2$

Factors: -a, b; 2, b, b; -3, a, a



(ii) Identify terms and factors in the expressions given below.

(a) $-4x + 5$ (b) $-4x + 5y$ (c) $5y + 3y^2$ (d) $xy + 2x^2y^2$

(e) $pq + q$ (f) $1.2ab - 2.4b + 3.6a$ (g) $\frac{3}{4}x + \frac{1}{4}$

(h) $0.1p^2 + 0.2q^2$

Solution:-

Expressions are defined as numbers, symbols and operators (such as +, -, × and ÷) grouped together that show the value of something.

In algebra, a term is either a single number or variable or numbers and variables multiplied together. Terms are separated by + or - signs or sometimes by division.

Factors are defined as numbers we can multiply together to get another number.

Sl.No.	Expression	Terms	Factors
(a)	$-4x + 5$	$-4x$ 5	$-4, x$ 5
(b)	$-4x + 5y$	$-4x$ $5y$	$-4, x$ $5, y$
(c)	$5y + 3y^2$	$5y$ $3y^2$	$5, y$ $3, y, y$
(d)	$xy + 2x^2y^2$	xy $2x^2y^2$	x, y $2, x, x, y, y$
(e)	$pq + q$	pq q	P, q Q
(f)	$1.2ab - 2.4b + 3.6a$	$1.2ab$ $-2.4b$ $3.6a$	$1.2, a, b$ $-2.4, b$ $3.6, a$
(g)	$\frac{3}{4}x + \frac{1}{4}$	$\frac{3}{4}x$ $\frac{1}{4}$	$\frac{3}{4}, x$ $\frac{1}{4}$
(h)	$0.1p^2 + 0.2q^2$	$0.1p^2$	$0.1, p, p$

		$0.2q^2$	$0.2, q, q$
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3. Identify the numerical coefficients of terms (other than constants) in the following expressions.

(i) $5 - 3t^2$ (ii) $1 + t + t^2 + t^3$ (iii) $x + 2xy + 3y$ (iv) $100m + 1000n$ (v) $-p^2q^2 + 7pq$ (vi) $1.2a + 0.8b$ (vii) $3.14r^2$ (viii) $2(l + b)$

(ix) $0.1y + 0.01y^2$

Solution:-

Expressions are defined as numbers, symbols and operators (such as $+$, $-$, \times and \div) grouped together that show the value of something.

In algebra, a term is either a single number or variable or numbers and variables multiplied together. Terms are separated by $+$ or $-$ signs or sometimes by division.

A coefficient is a number used to multiply a variable ($2x$ means 2 times x , so 2 is a coefficient). Variables on their own (without a number next to them) actually have a coefficient of 1 (x is really $1x$).

Sl.No.	Expression	Terms	Coefficients
(i)	$5 - 3t^2$	$-3t^2$	-3
(ii)	$1 + t + t^2 + t^3$	t t^2 t^3	1 1 1
(iii)	$x + 2xy + 3y$	x $2xy$ $3y$	1 2 3
(iv)	$100m + 1000n$	$100m$ $1000n$	100 1000
(v)	$-p^2q^2 + 7pq$	$-p^2q^2$ $7pq$	-1 7
(vi)	$1.2a + 0.8b$	$1.2a$ $0.8b$	1.2 0.8
(vii)	$3.14r^2$	$3.14r^2$	3.14

(viii)	$2(l + b)$	$2l$ $2b$	2 2
(ix)	$0.1y + 0.01y^2$	$0.1y$ $0.01y^2$	0.1 0.01

4. (a) Identify terms which contain x and give the coefficient of x .

(i) $y^2x + y$ (ii) $13y^2 - 8yx$ (iii) $x + y + 2$

(iv) $5 + z + zx$ (v) $1 + x + xy$ (vi) $12xy^2 + 25$

(vii) $7x + xy^2$

Solution:-

Sl.No.	Expression	Terms	Coefficient of x
(i)	$y^2x + y$	y^2x	y^2
(ii)	$13y^2 - 8yx$	$-8yx$	$-8y$
(iii)	$x + y + 2$	x	1
(iv)	$5 + z + zx$	x zx	1 z
(v)	$1 + x + xy$	xy	y
(vi)	$12xy^2 + 25$	$12xy^2$	$12y^2$
(vii)	$7x + xy^2$	$7x$ xy^2	7 y^2

(b) Identify terms which contain y^2 and give the coefficient of y^2 .

(i) $8 - xy^2$ (ii) $5y^2 + 7x$ (iii) $2x^2y - 15xy^2 + 7y^2$

Solution:-

Sl.No.	Expression	Terms	Coefficient of y^2
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(i)	$8 - xy^2$	$- xy^2$	$- x$
(ii)	$5y^2 + 7x$	$5y^2$	5
(iii)	$2x^2y - 15xy^2 + 7y^2$	$- 15xy^2$ $7y^2$	$- 15x$ 7

5. Classify into monomials, binomials and trinomials.

(i) $4y - 7z$

Solution:-

Binomial.

An expression which contains two unlike terms is called a binomial.

(ii) y^2

Solution:-

Monomial.

An expression with only one term is called a monomial.

(iii) $x + y - xy$

Solution:-

Trinomial.

An expression which contains three terms is called a trinomial.

(iv) 100

Solution:-

Monomial.

An expression with only one term is called a monomial.

(v) $ab - a - b$

Solution:-

Trinomial.

An expression which contains three terms is called a trinomial.

(vi) $5 - 3t$

Solution:-

Binomial.

An expression which contains two unlike terms is called a binomial.

(vii) $4p^2q - 4pq^2$

Solution:-

Binomial.

An expression which contains two unlike terms is called a binomial.

(viii) $7mn$

Solution:-

Monomial.

An expression with only one term is called a monomial.

(ix) $z^2 - 3z + 8$

Solution:-

Trinomial.

An expression which contains three terms is called a trinomial.

(x) $a^2 + b^2$

Solution:-

Binomial.

An expression which contains two unlike terms is called a binomial.

(xi) $z^2 + z$

Solution:-

Binomial.

An expression which contains two unlike terms is called a binomial.

(xii) $1 + x + x^2$

Solution:-

Trinomial.

An expression which contains three terms is called a trinomial.

6. State whether a given pair of terms is of like or unlike terms.

(i) 1, 100

Solution:-

Like term.

When terms have the same algebraic factors, they are like terms.

(ii) $-7x$, $(5/2)x$

Solution:-

Like term.

When terms have the same algebraic factors, they are like terms.

(iii) $-29x$, $-29y$

Solution:-

Unlike terms.

The terms have different algebraic factors, they are unlike terms.

(iv) $14xy$, $42yx$

Solution:-

Like term.

When terms have the same algebraic factors, they are like terms.

(v) $4m^2p$, $4mp^2$

Solution:-

Unlike terms.

The terms have different algebraic factors, they are unlike terms.

(vi) $12xz, 12x^2z^2$

Solution:-

Unlike terms.

The terms have different algebraic factors, they are unlike terms.

7. Identify like terms in the following.

(a) $-xy^2, -4yx^2, 8x^2, 2xy^2, 7y, -11x^2, -100x, -11yx, 20x^2y, -6x^2, y, 2xy, 3x$

Solution:-

When terms have the same algebraic factors, they are like terms.

They are,

$-xy^2, 2xy^2$

$-4yx^2, 20x^2y$

$8x^2, -11x^2, -6x^2$

$7y, y$

$-100x, 3x$

$-11yx, 2xy$

(b) $10pq, 7p, 8q, -p^2q^2, -7qp, -100q, -23, 12q^2p^2, -5p^2, 41, 2405p, 78qp,$

$13p^2q, qp^2, 701p^2$

Solution:-

When terms have the same algebraic factors, they are like terms.

They are,

$10pq, -7qp, 78qp$

$7p, 2405p$

$8q, -100q$

$-p^2q^2, 12q^2p^2$

– 23, 41

– $5p^2$, $701p^2$

$13p^2q$, qp^2