

## EXERCISE 12.1

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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.**

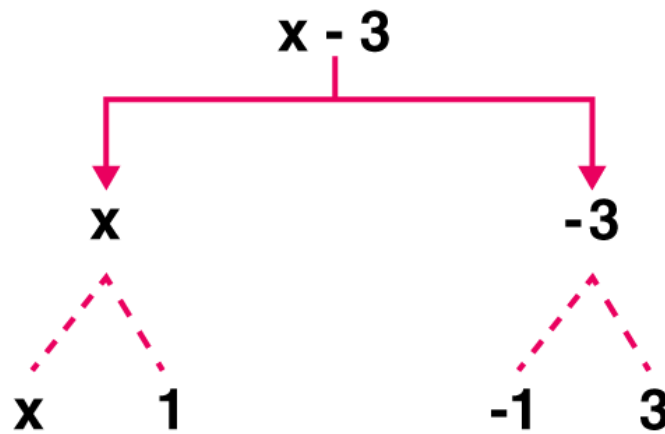
**(a)  $x - 3$**

**Solution:-**

Expression:  $x - 3$

Terms:  $x, -3$

Factors:  $x; -3$



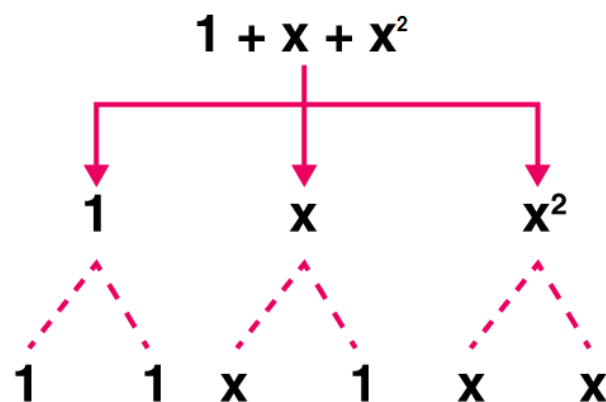
**(b)  $1 + x + x^2$**

**Solution:-**

Expression:  $1 + x + x^2$

Terms:  $1, x, x^2$

Factors:  $1; x; x, x$



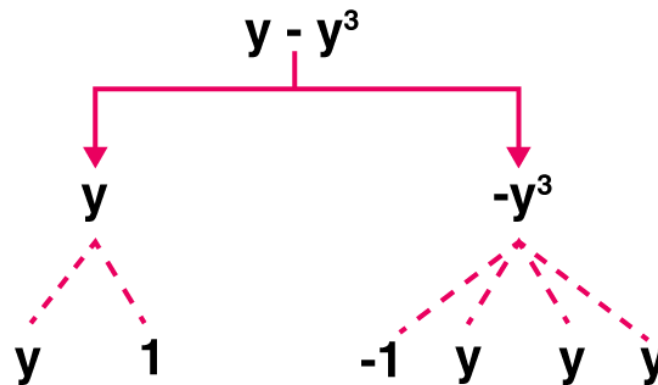
(c)  $y - y^3$

**Solution:-**

Expression:  $y - y^3$

Terms:  $y, -y^3$

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



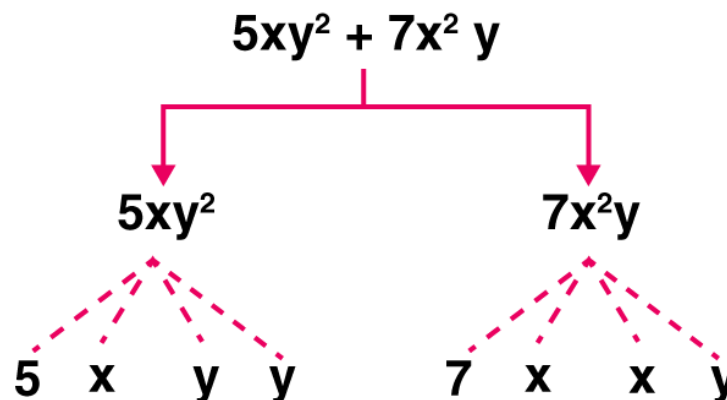
(d)  $5xy^2 + 7x^2y$

**Solution:-**

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

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

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



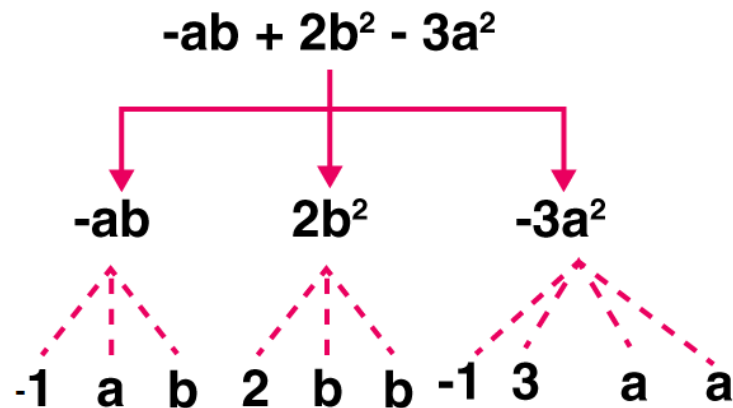
(e)  $-ab + 2b^2 - 3a^2$

**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 is 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.

Factors is 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)	$0.1p^2 + 0.2q^2$	$0.1p^2$ $0.2q^2$	$0.1, p, p$ $0.2, q, q$

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 is 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.

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 $x$
(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 term have the same algebraic factors, they are like terms.

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

**Solution:-**

Like term.

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

They are,

$$10pq, -7qp, 78qp$$

$$7p, 2405p$$

$$8q, -100q$$

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

$$-23, 41$$

$$-5p^2, 701p^2$$

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