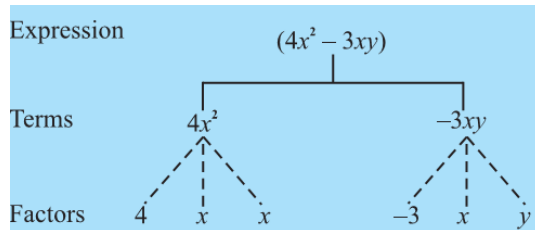


Framing Algebraic Expressions - Including Evaluation



In words	Expression
A number x is increased by 7	$x + 7$
A number y is decreased by 7	$y - 7$
A number a is multiplied by 7	$a \times 7$
A number k is divided by 7	$k \div 7$

Classification of expressions based on number of terms	
Special name	Number of terms
Monomial	1
Binomial	2 unlike
Trinomial	3 unlike
Quadranomial	4 unlike

- Algebraic expression : Combination of variables and constants
- Term: Terms are parts of an algebraic expression separated by + and - signs . Each term in an algebraic expression is a product of one or more number(s) and (or) literals .These numbers and /or literal(s) are called as factors of the term. The term $-3xy$ is a product of the factors -3 , x and y .
- 1 is not taken as a separate factor ; 1 is a factor of every term
- Expressions are formed by adding terms.
- Constant: symbol having a fixed numerical value
- Variable : a symbol that has no fixed or constant value and takes on various numerical values
- constant factor: numerical factor or numerical coefficient
- variable factor: literal factor
- Polynomial: an expression with one or more terms with having whole numbers as exponents
- Like terms ; terms with same variables and powers of variables also same ; same literal factors ; $3a$, $-8a$
- Unlike terms ; terms having different variables or even if they have same variables, they are raised to different powers ; different literal factors; $2a$, $2b$, $3a^2$
- Like terms can be added / subtracted ; Coefficients of like term need not be same
- Constant term: term having no literal factor
- Coefficient : in the term of an expression, any of the factors with the sign of the term is called coefficient of the product of other factors
- While simplifying an algebraic expression, first gather all like terms together and then simplify them and then move on to unlike terms

Steps to identify like terms

- Ignore the numerical coefficients.
- Check the variables in the terms. They must be the same.
- Next, check the powers of each variable in the terms. They must be the same.

in deciding like terms, two things do not matter

- the numerical coefficients of the terms and
- order in which the variables are multiplied in the term

Addition and subtraction of Algebraic expressions

- Sum of two or more like terms is a like term with a numerical coefficient equal to the sum of the numerical coefficients of all the like terms
- Difference between two like terms is a like term with a numerical coefficient equal to the difference between the numerical coefficients of the two like terms.
- subtracting a term is the same as adding its inverse.
- unlike terms cannot be added or subtracted the way like terms are added or subtracted: when 5 is added to x , we write the result as $(x+ 5)$. both the terms 5 and x are retained

value of an algebraic expression

- Depends on the values of the variables forming the expression.
- To find the value of an expression, substitute the values of the variables in the expression and then simplify

Perimeter Formulas:

- The perimeter of an equilateral triangle = $3l$ where l denotes the length of the side of the equilateral triangle
- Perimeter of square = $4l$ where l = the length of the side of the square.
- Perimeter of a regular pentagon = $5l$, where l = the length of the side of the pentagon

Area formulas

- If l denotes the length of a square, then area of the square = l^2
- If we denote the length of a rectangle by l and its breadth by b , then the area of the rectangle = $l \times b = lb$.
- If b stands for the base and h for the height of a triangle, then the area of the triangle =

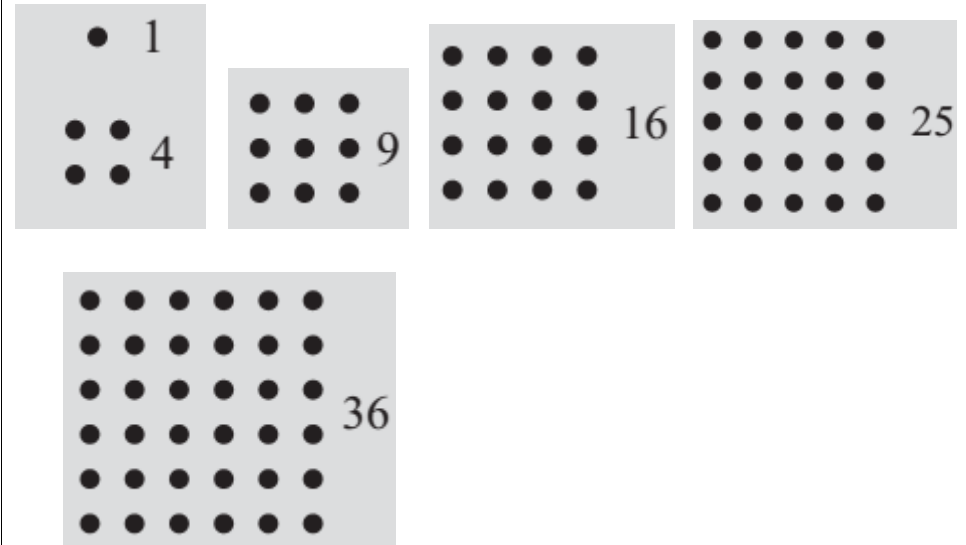
Once a formula is known, that is, the algebraic expression for a given quantity is known, value of the quantity can be computed as required.

- For a square of length 3 cm, the perimeter is obtained by putting the value $l = 3$ cm in the expression of the perimeter of a square; The perimeter of the given square = (4×3) cm = 12 cm.
- area of the square is obtained by putting the value of $l (= 3 \text{ cm})$ in the expression for the area of a square, that is, $l^2 = 9 \text{ cm}^2$

Rules for number patterns

- If a natural number is denoted by n , its successor is $(n + 1)$
- If a natural number is denoted by n , $2n$ is an even number and $(2n + 1)$ an odd number.
- 1, 4, 9, 16, 25, ... square numbers.
- The general (n th) term of a number pattern (or a sequence) is an expression in n .

Dotted patterns with square numbers :



Pattern in geometry

- The number of diagonals we can draw from one vertex of a polygon of n sides is $(n-3)$
- The number diagonals that can be drawn from one vertex divide the n sided polygon into $n-2$ non overlapping triangles

