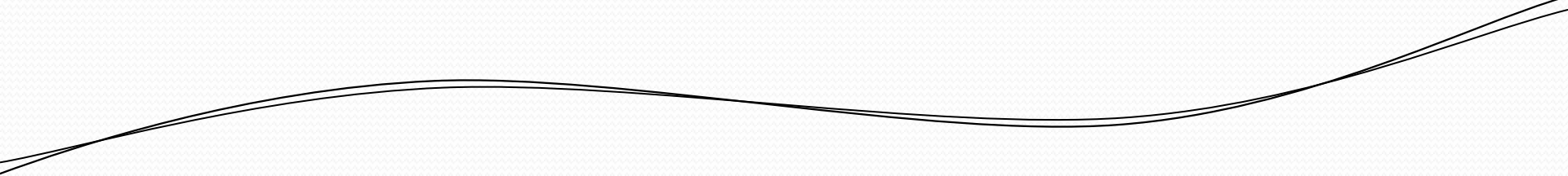


# ALGEBRAIC EXPRESSIONS

MODULE 2

## FINDING THE VALUE OF AN ALGEBRAIC EXPRESSION:

We know that the value of an algebraic expression depends on the values of the variables forming the expression. There are a number of situations in which we need to find the value of an expression, such as when we wish to check whether a particular value of a variable satisfies a given equation or not.



We find values of expressions, also, when we use formulas from geometry and from everyday mathematics. For example, the area of a square is  $l^2$ , where  $l$  is the length of a side of the square. If  $l = 5$  cm., the area is  $5^2$  cm<sup>2</sup> or 25 cm<sup>2</sup>; if the side is 10 cm, the area is  $10^2$  cm<sup>2</sup> or 100 cm<sup>2</sup> and so on.

FOR AN EXAMPLE:

Find the value of the following expressions for  $a = 3$ ,  $b = 2$ .

(i)  $a + b$ , we get

$$a + b = 3 + 2 = 5$$

(ii)  $7a - 4b$ , we get

$$7a - 4b = 7 \times 3 - 4 \times 2 = 21 - 8 = 13.$$

# USING ALGEBRAIC EXPRESSIONS – FORMULAE AND RULES:

## ✧ Perimeter formulae

✧ The perimeter of an equilateral triangle =  $3 \times$  the length of its side. If we denote the length of the side of the equilateral triangle by  $l$ , then **the perimeter of the equilateral triangle =  $3l$**

✧ Similarly, **the perimeter of a 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 and so on.

# Area formulae

If we denote the length of a square by  $l$ , then the 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 =  $l \times b = lb$ .

Similarly, if  $b$  stands for the base and  $h$  for the height of a triangle, then the area of the

triangle =  $b \times h/2$

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

For example, 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, i.e.,  $4l$ . The perimeter of the given square  $= (4 \times 3) \text{ cm} = 12 \text{ cm}$ .

Similarly, the area of the square is obtained by putting in the value of  $l$  ( $= 3 \text{ cm}$ ) in the expression for the area of a square, that is,  $l^2$ ; Area of the given square  $= (3)^2 \text{ cm}^2 = 9 \text{ cm}^2$ .

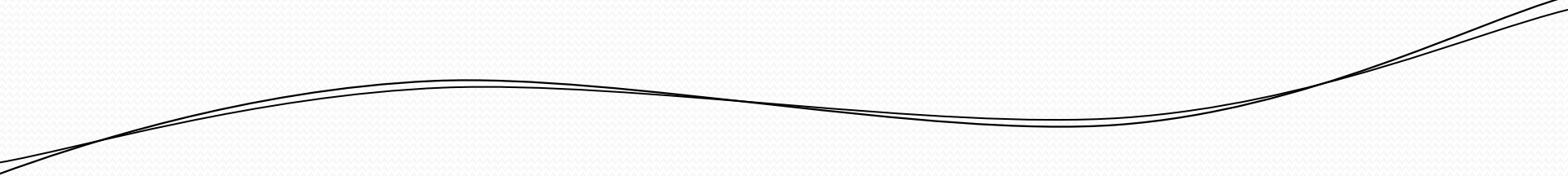
# Rules for number patterns

- ✧ If a natural number is denoted by  $n$ , its successor is  $(n + 1)$ . We can check this for any natural number. For example, if  $n = 10$ , its successor is  $n + 1 = 11$ , which is known.
- ✧ If a natural number is denoted by  $n$ ,  $2n$  is an even number and  $(2n + 1)$  an odd number. Let us check it for any number, say, 15;  $2n = 2 \times n = 2 \times 15 = 30$  is indeed an even number and  $2n + 1 = 2 \times 15 + 1 = 30 + 1 = 31$  is indeed an odd number.



# Pattern in geometry

- ✧ What is the number of diagonals we can draw from one vertex of a quadrilateral? Check it, it is one.
- ✧ From one vertex of a pentagon? Check it, it is 2.
- ✧ From one vertex of a hexagon? It is 3.
- ✧ From one vertex of a heptagon? Check it, it is 4.
- ✧ From one vertex of a octagon? It is 5.
- ✧ From one vertex of a nonagon? Check it, it is 6.
- ✧ From one vertex of a decagon? It is 7.



The number of diagonals we can draw from one vertex of a polygon of  $n$  sides is  $(n - 3)$ . Check it for a heptagon (7 sides) and octagon (8 sides) by drawing figures. What is the number for a triangle (3 sides)? Observe that the diagonals drawn from any one vertex divide the polygon in as many non-overlapping triangles as the number of diagonals that can be drawn from the vertex plus one.



Thank you