

Activity 5

OBJECTIVE

To verify the algebraic identity :

$$a^2 - b^2 = (a + b)(a - b)$$

MATERIAL REQUIRED

Drawing sheets, cardboard, coloured papers, scissors, sketch pen, ruler, transparent sheet and adhesive.

METHOD OF CONSTRUCTION

1. Take a cardboard of a convenient size and paste a coloured paper on it.
2. Cut out one square ABCD of side a units from a drawing sheet [see Fig. 1].
3. Cut out one square AEGF of side b units ($b < a$) from another drawing sheet [see Fig. 2].

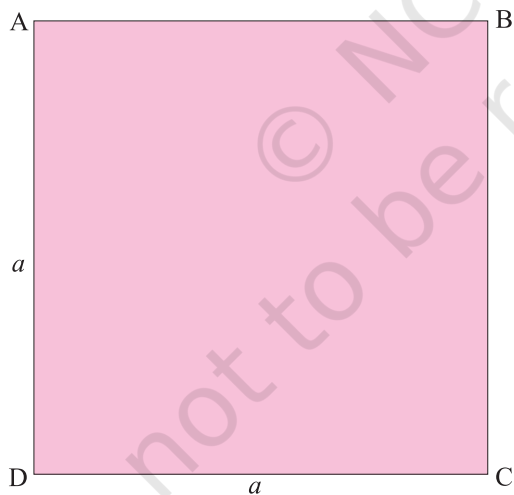


Fig. 1

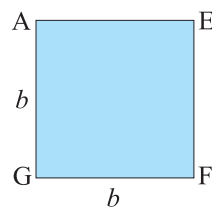


Fig. 2

4. Arrange these squares as shown in Fig. 3.
5. Join F to C using sketch pen. Cut out trapeziums congruent to EBCF and GFCD using a transparent sheet and name them as EBCF and GFCD, respectively [see Fig. 4 and Fig. 5].

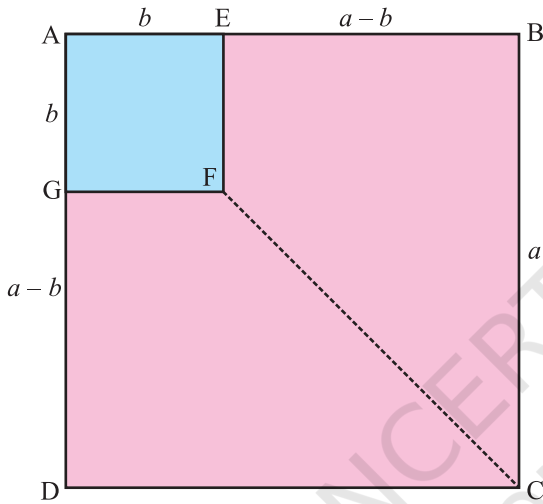


Fig. 3

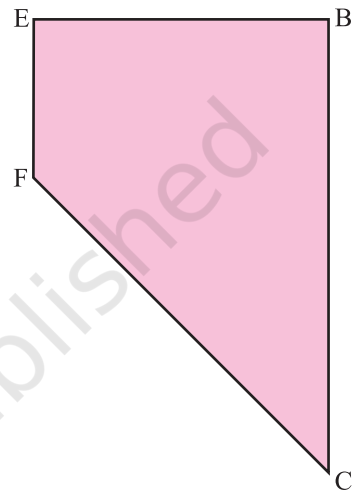


Fig. 4

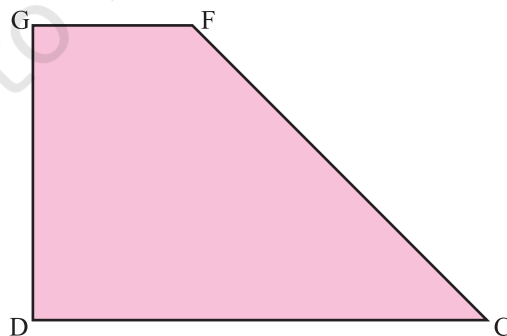


Fig. 5

6. Arrange these trapeziums as shown in Fig. 6.

DEMONSTRATION

Area of square ABCD = a^2

Area of square ACFG = b^2

In Fig. 3,

Area of square ABCD – Area of square ACFG

= Area of trapezium EBCF + Area of trapezium GFCG

= Area of rectangle EBGD [Fig. 6].

= ED × DG

Thus, $a^2 - b^2 = (a+b) (a-b)$

Here, area is in square units.

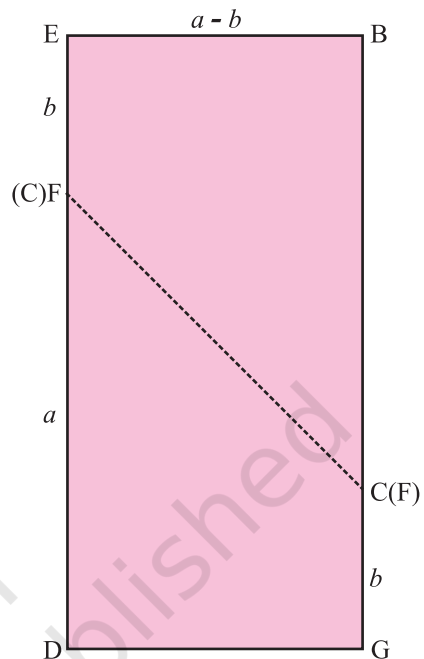


Fig. 6

OBSERVATION

On actual measurement:

$a = \dots\dots\dots$, $b = \dots\dots\dots$, $(a+b) = \dots\dots\dots$,

So, $a^2 = \dots\dots\dots$, $b^2 = \dots\dots\dots$, $(a-b) = \dots\dots\dots$,

$a^2 - b^2 = \dots\dots\dots$, $(a+b) (a-b) = \dots\dots\dots$,

Therefore, $a^2 - b^2 = (a+b) (a-b)$

APPLICATION

The identity may be used for

1. difference of two squares
2. some products involving two numbers
3. simplification and factorisation of algebraic expressions.