

Activity 12

OBJECTIVE

To verify the formula for the area of a triangle by graphical method.

MATERIAL REQUIRED

Cardboard, chart paper, graph paper, glue, pen/pencil and ruler.

METHOD OF CONSTRUCTION

1. Take a cardboard of convenient size and paste a chart paper on it [see Fig. 1].
2. Paste a graph paper on the chart paper.
3. Draw the axes $X'OX$ and $Y'OY$ on the graph paper [see Fig. 1].

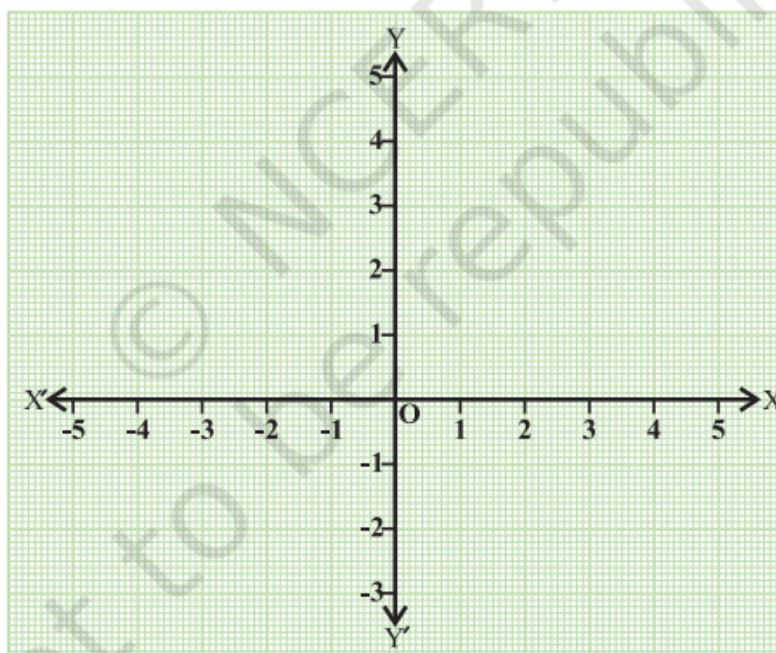


Fig. 1

4. Take three points $A(x_1, y_1)$, $B(x_2, y_2)$ and $C(x_3, y_3)$ on the graph paper.
5. Join the points to get a triangle ABC [see Fig. 2].

OBSERVATION

1. Coordinates of A are _____.
Coordinates of B are _____.
Coordinates of C are _____.
2. Area of $\triangle ABC$ by using formula = _____.
3. (i) Number of complete squares = _____.
(ii) Number of more than half squares = _____.
(iii) Number of half squares = _____.
(iv) Total area by counting the squares = _____.
4. Area calculated by using formula and by counting the number of squares are _____.

APPLICATION

The formula for the area of the triangle is useful in various results in geometry such as checking collinearity of three points, calculating area of a triangle/quadrilateral/polygon.

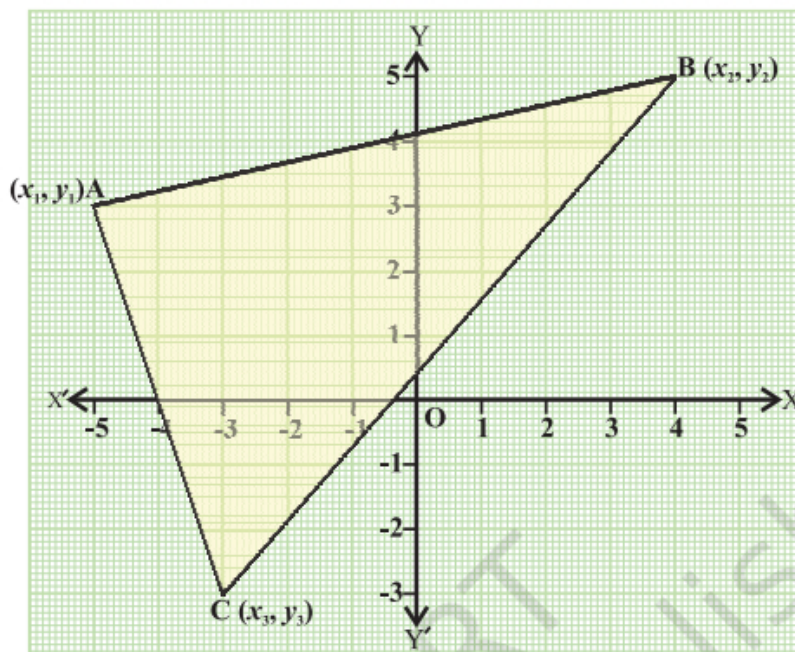


Fig. 2

DEMONSTRATION

1. Calculate the area of the triangle ABC using the formula:

$$\text{Area} = \frac{1}{2} [x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)].$$

2. Find the area of the triangle ABC by counting the number of squares enclosed in it in the following way:
 - (i) take a complete square as 1
 - (ii) take more than half a square as 1
 - (iii) take half a square as $\frac{1}{2}$
 - (iv) ignore the squares which are less than half a square.
3. Area calculated from formula and by actually counting the squares is nearly the same [see steps 1 and 2].