

ACTIVITY

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Title

Area of a Trapezium.



Objective

To derive the formula for finding the area of trapezium by paper cutting and pasting method.



Prerequisite knowledge

1. Concept of area of parallelogram.
2. Concept of drawing of perpendicular.
3. Concept of meaning of congruency.
4. Concept of parallel lines.



Materials required

Green and yellow coloured papers, a pair of scissors, glue stick, geometry box and drawing sheets.



Procedure

1. With the help of scissors cut a trapezium ABCD taking $AB \parallel CD$ and taking $AB = a$ and $CD = b$ from green coloured sheet and paste on drawing sheet as shown in the Fig. (i).

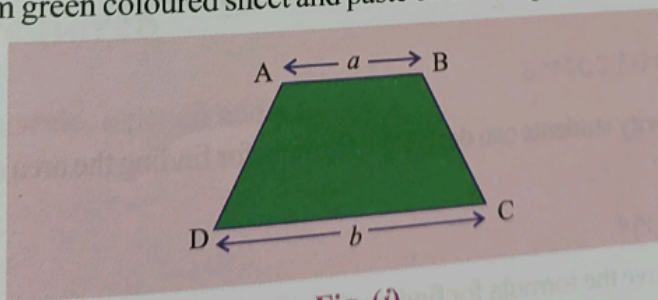


Fig. (i)

2. Draw perpendicular AP from vertex A on side CD (let height of perpendicular be h) as shown in the Fig. (ii).

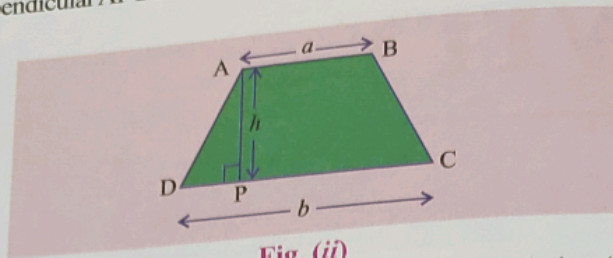


Fig. (ii)

3. Cut another trapezium CEFB congruent to trapezium such that (take $CE = a$ and $BF = b$) from yellow coloured paper and paste on the drawing sheet along side BC shown in Fig. (iii).

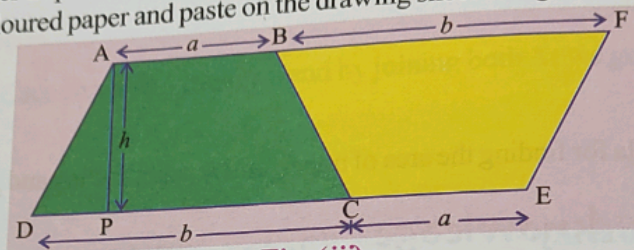


Fig. (iii)

4. Now ADEF will be a parallelogram with base as DE ($b + a$) and height as h .



Observation

After seeing the Fig. (iii), we observe that

$$AF \parallel DE$$

and

$$AF = DE$$

$$[\text{as } AF = DE = (a + b)]$$

$\therefore$ ADEF is a parallelogram with height $AP = h$ and base $DE = (a + b)$



Result

$$\text{Area of trapezium } ABCD = \frac{1}{2} \times \text{area of parallelogram ADEF}$$

$$= \frac{1}{2} \times \text{base} \times \text{height} = \frac{1}{2} \times (a + b) \times h$$

$$= \frac{1}{2} (\text{sum of parallel sides}) \times \text{height}$$

$$\left[\begin{array}{l} \text{ar ||gm ADEF} = \text{ar trap.} \\ \text{ABCD} + \text{ar trap. BCEF} \end{array} \right]$$



Learning outcome

After doing this activity students can derive the formula for finding the area of rhombus.



Activity time

By paper cutting derive the formula for finding the area of square.