

Activity 19

OBJECTIVE

To draw a quadrilateral similar to a given quadrilateral as per given scale factor (less than 1).

MATERIAL REQUIRED

Chart paper (coloured and white), geometry box, cutter, eraser, drawing pins, glue, pins, sketch pens, tape.

METHOD OF CONSTRUCTION

1. Take a cut-out of the given quadrilateral ABCD from a coloured chart paper and paste it on another chart paper [see Fig. 1].
2. Divide the base (here AB) of the quadrilateral ABCD internally in the ratio (given by scale factor) at P [see Fig. 2].
3. With the help of ruler (scale), join the diagonal AC of the quadrilateral ABCD.
4. From P, draw a line-segment $PQ \parallel BC$, with the help of compasses (set squares or paper folding) meeting AC at R [see Fig. 3].

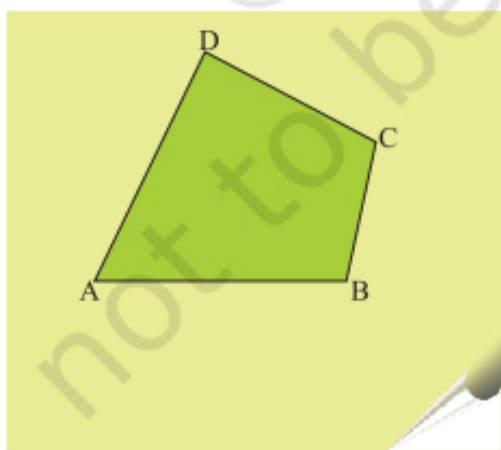


Fig. 1

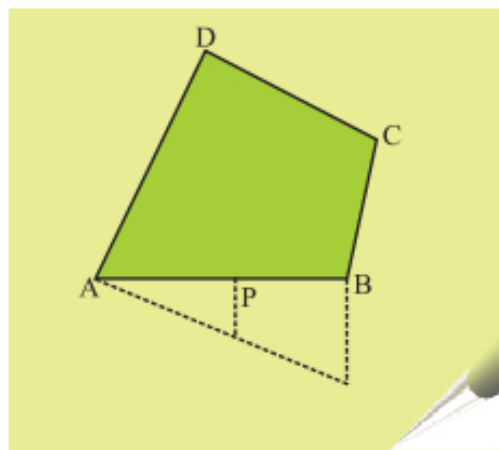


Fig. 2

DEMONSTRATION

1. In $\triangle ABC$, $PR \parallel BC$. Therefore, $\triangle APR \sim \triangle ABC$
2. In $\triangle ACD$, $RS \parallel CD$. Therefore, $\triangle ARS \sim \triangle ACD$
3. From Steps (1) and (2), quadrilateral APRS $\sim$ quadrilateral ABCD

OBSERVATION

By actual measurement:

$AB = \underline{\hspace{2cm}}, \quad AP = \underline{\hspace{2cm}}, \quad BC = \underline{\hspace{2cm}},$
 $PR = \underline{\hspace{2cm}}, \quad CD = \underline{\hspace{2cm}}, \quad RS = \underline{\hspace{2cm}},$
 $AD = \underline{\hspace{2cm}}, \quad AS = \underline{\hspace{2cm}}$
 $\angle A = \underline{\hspace{2cm}}, \quad \angle B = \underline{\hspace{2cm}}, \quad \angle C = \underline{\hspace{2cm}},$
 $\angle D = \underline{\hspace{2cm}}, \quad \angle P = \underline{\hspace{2cm}}, \quad \angle R = \underline{\hspace{2cm}},$
 $\angle S = \underline{\hspace{2cm}}.$

$\frac{AP}{AB} = \underline{\hspace{2cm}}, \quad \frac{PR}{BC} = \underline{\hspace{2cm}}, \quad \frac{RS}{CD} = \underline{\hspace{2cm}}, \quad \frac{AS}{AD} = \underline{\hspace{2cm}},$

$\angle A = \text{Angle } \underline{\hspace{2cm}}, \quad \angle P = \text{Angle } \underline{\hspace{2cm}}, \quad \angle R = \text{Angle } \underline{\hspace{2cm}}, \quad \angle S = \text{Angle } \underline{\hspace{2cm}},$

Hence, quadrilateral APRS and ABCD are $\underline{\hspace{2cm}}$.

APPLICATION

This activity can be used in day to day life in making pictures (photographs) of same object in different sizes.

5. From R, draw a line-segment RS parallel to CD using pair of compasses (set-squares/paper folding) meeting AD in S [see Fig. 4].
6. Colour the quadrilateral APRS using sketch pen.

APRS is the required quadrilateral, similar to the given quadrilateral ABCD for given scale factor [see Fig. 5].

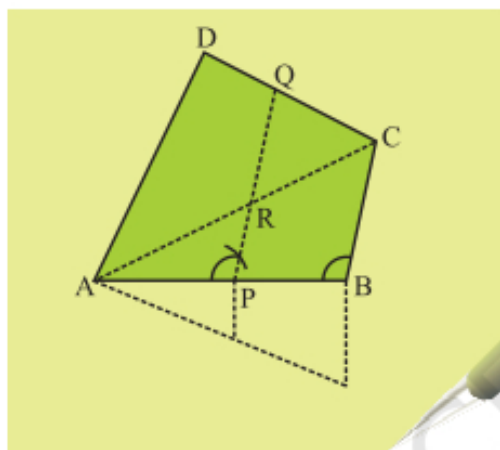


Fig. 3

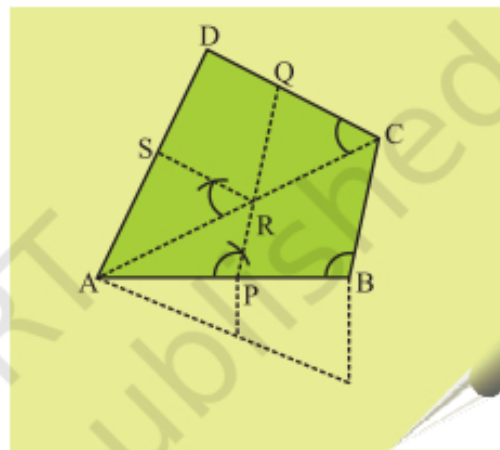


Fig. 4

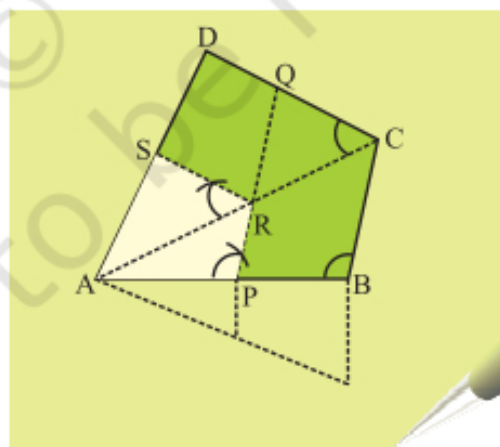


Fig. 5