

Basic Proportionality Theorem for a Triangle

Objective

To verify the Basic Proportionality Theorem using parallel line board and triangle cut-outs.

Basic Proportionality Theorem

If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio.

Pre-requisite Knowledge

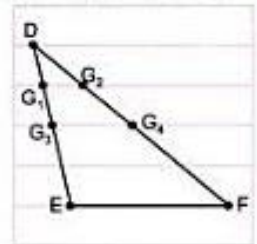
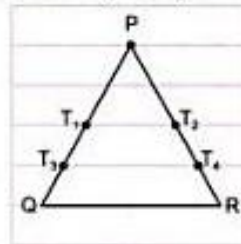
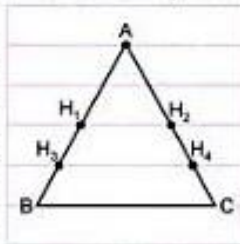
Drawing parallel lines on a rectangular sheet of paper.

Material Required

Coloured paper, pair of scissors, parallel line board, ruler, sketch pens.

Procedure

- Cut three different triangles from a coloured paper without measuring any side or any angle. Name the triangles as $\triangle ABC$, $\triangle PQR$ and $\triangle DEF$.
- Take a parallel line board (a board on which parallel lines are drawn).
- Place $\triangle ABC$ on the parallel line board such that any one side of the triangle is placed on one of the lines of the board.
- Make the points H_1, H_2 and H_3, H_4 on $\triangle ABC$. Join H_1H_2 and H_3H_4 , $H_1H_2 \parallel BC$, $H_3H_4 \parallel BC$.
- Similarly make the points G_1G_2 and G_3G_4 on $\triangle DEF$ and points T_1T_2 and T_3T_4 on $\triangle PQR$. Join G_1G_2, G_3G_4, T_1T_2 and T_3T_4 .
- Note the following by measuring the lengths of respective segments using a ruler.



$\triangle ABC$	$AH_1 =$ $AH_2 =$ $AH_3 =$ $AH_4 =$	$BH_1 =$ $CH_2 =$ $BH_3 =$ $CH_4 =$	$AH_1/BH_1 =$ $AH_2/CH_2 =$ $AH_3/BH_3 =$ $AH_4/CH_4 =$
$\triangle DEF$	$DG_1 =$ $DG_2 =$ $DG_3 =$ $DG_4 =$	$EG_1 =$ $FG_2 =$ $EG_3 =$ $FG_4 =$	$DG_1/EG_1 =$ $DG_2/FG_2 =$ $DG_3/EG_3 =$ $DG_4/FG_4 =$
$\triangle PQR$	$PT_1 =$ $PT_2 =$ $PT_3 =$ $PT_4 =$	$QT_1 =$ $RT_2 =$ $QT_3 =$ $RT_4 =$	$PT_1/QT_1 =$ $PT_2/RT_2 =$ $PT_3/QT_3 =$ $PT_4/RT_4 =$

Observation

- In $\triangle ABC$,

$$\frac{AH_1}{BH_1} = \frac{AH_2}{CH_2}, \quad \frac{AH_3}{BH_3} = \frac{AH_4}{CH_4}$$
- Similar equalities for $\triangle DEF$ and $\triangle PQR$ are observed.
- We observe that in all the three triangles, the Basic Proportionality Theorem is verified.