DAY 5

In last section, we have discussed about similarity of triangles. In this section we shall discuss about applications of similarity.

1. In the given figure, If PQ || RS. Prove that $\Delta POQ \sim \Delta SOR$. **[Example 4]**

Sol :- Given PQ || SR

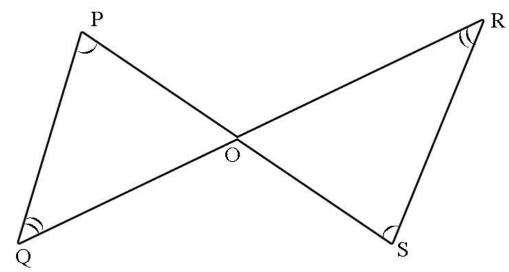
To prove $\Delta POQ \sim \Delta SOR$

Proof: Now In ΔPOQ and ΔSOR

$\angle P = \angle S$ {alternate angles}

and $\angle Q = \angle R$ {alternate angles}

$\therefore \Delta POQ \sim \Delta SOR$ (AA similarity)



2. ABCD is a trapezium in which AB || DC and its diagonals intersect each other at the point O. Show that $\frac{OA}{OC} = \frac{OB}{OD}$ **[Ex 6.3, Q4]**

Sol :- Given AB || DC

To Prove: $\frac{OA}{OC} = \frac{OB}{OD}$

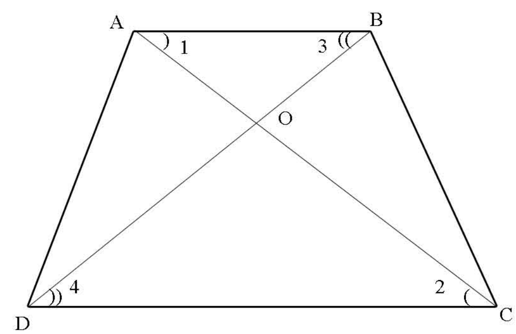
Proof: Now In ΔAOB and ΔCOD

$\angle 1 = \angle 2$ {alternate angles}

and $\angle 3 = \angle 4$ {alternate angles}

$\therefore \Delta AOB \sim \Delta COD$ (AA similarity)

$\Rightarrow \frac{OB}{OD} = \frac{OA}{OC}$ or $\frac{OA}{OC} = \frac{OB}{OD}$ Hence the result



3. S and T are points on the sides PR and QR of ΔPQR such that $\angle P = \angle RTS$. Show that $\Delta RPQ \sim \Delta RTS$

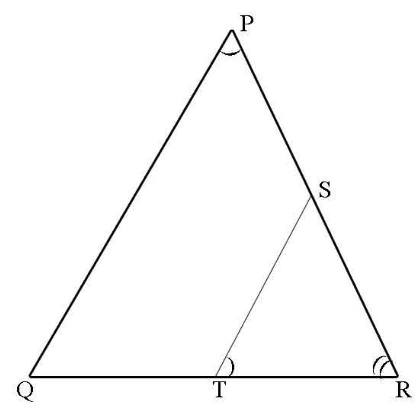
[Ex 6.3, Q5]

Sol :- In ΔRPQ and ΔRTS

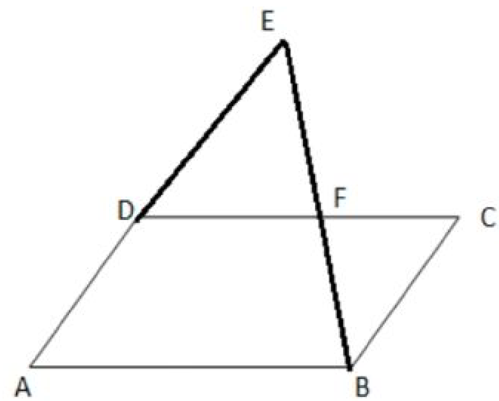
$\angle P = \angle RTS$ {given}

and $\angle R = \angle R$ {common}

$\therefore \Delta RPQ \sim \Delta RTS$ (AA similarity)



4. E is a point on the side AD produced of a parallelogram ABCD and BE intersects CD at F. Show that $\Delta ABE \sim \Delta CFB$ **[Ex 6.3, Q8]**



Sol :- In ΔABE and ΔCFB

$\angle A = \angle C$ {Opposite angles of parallelogram}

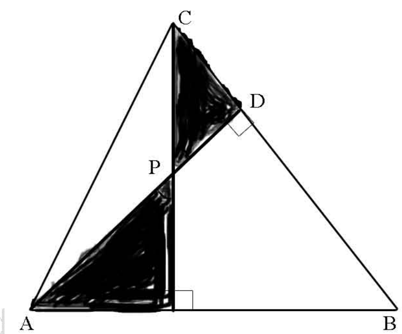
and $\angle E = \angle FBC$ {Alternate angles}

$\therefore \Delta ABE \sim \Delta CFB$ (AA similarity)

5. In figure altitudes AD and CE of ΔABC intersect each other at the point P. Show that

i) $\Delta AEP \sim \Delta CDP$ ii) $\Delta AEP \sim \Delta CDP$

[Ex 6.3, Q7]



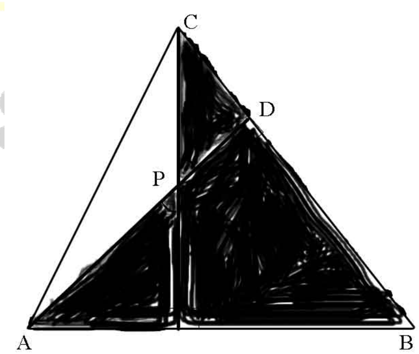
Sol :-

i) In ΔAEP and ΔCDP

$\angle 1 = \angle 2$ {Vertically opposite angles}

and $\angle 3 = \angle 4 = 90^0$

$\therefore \Delta AEP \sim \Delta CDP$ (AA similarity)



ii) In ΔABD and ΔCBE

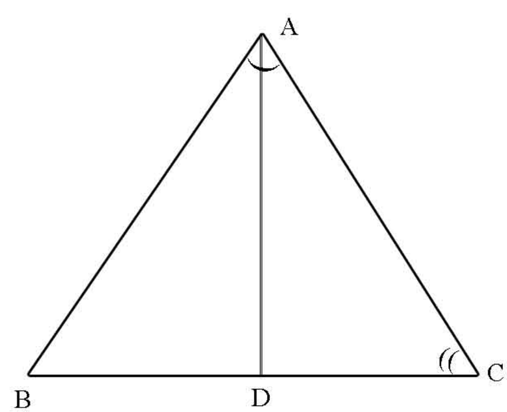
$\angle B = \angle B$ {Common}

and $\angle 1 = \angle 2 = 90^0$

$\therefore \Delta ABD \sim \Delta CBE$ (AA similarity)

6. D is a point on the side BC of ΔABC, such that $\angle ADC = \angle BAC$. Show that $CA^2 = CB \times CD$

[Ex 6.3, Q13]



Sol :- Given: $\angle ADC = \angle BAC$

To prove: $CA^2 = CB \times CD$

Proof : - In ΔDAC and ΔABC, we've

$\angle ADC = \angle BAC$ (Given)

$\angle C = \angle C$ (Common)

$\therefore \Delta DAC \sim \Delta ABC$ (AA Similarity)

$\therefore$ Their corresponding sides are in proportional

$$\Rightarrow \frac{AC}{BC} = \frac{AD}{AB} = \frac{CD}{AC}$$

From 1st and last $\frac{AC}{BC} = \frac{CD}{AC}$

$\Rightarrow \quad AC^2 = CD \times BC$ or $\mathbf{CA^2 = CB \times CD}$

EXERCISE

1. Example 6
2. Ex 6.3, Q 2,7,11,15