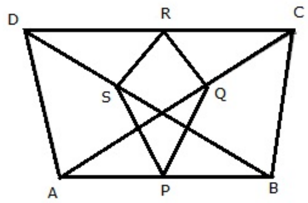
Exercise 4A

Question 13:



Given: ABCD is a quadrilateral in which AD = BC. P, Q , R, S are the midpoints of AB, AC, CD and BD.
To prove: PQRS is a rhombus
Proof: In ΔABC,
Since P and Q are mid points of AB and AC
Therefore, PQ || BC and $PQ = \frac{1}{2} BC = \frac{1}{2} DA$ (Mid-point theorem)
Similarly,
In ΔCDA,
Since R and Q are mid points of CD and AC
Therefore, RQ || DA and $RQ = \frac{1}{2} DA$
In ΔBDA,
Since S and P are mid points of BD and AB
Therefore, SP || DA and $SP = \frac{1}{2} DA$
In ΔCDB,
Since S and R are mid points of BD and CD
Therefore, SR | BC and $SR = \frac{1}{2} BC = \frac{1}{2} DA$
Therefore SP || RQ and PQ || SR and PQ = RQ = SP = SR
Hence, PQRS is a rhombus.

Question 14:
Given: ABC is a triangle in which AB = AC. D and E are points on AB and AC respectively such that AD = AE
To prove: The points B, C, E and D are concyclic.
Proof: AB = AC (given)

$\Rightarrow (AB - AD) = (AC - AE)$

$\Rightarrow DB = EC$

$\Rightarrow \dfrac{AD}{AE} = \dfrac{DB}{EC}$ (each equal to 1)

$\Rightarrow DE || BC$

(by the converse of Thale's theorem)

$\Rightarrow \angle DEC + \angle ECB = 180°$

$\Rightarrow \angle DEC + \angle CBD = 180° \left[\because AB = AC \Rightarrow \angle C = \angle B\right]$

Quad BCEA is cyclic
Hence, the point B, C, E, D are concyclic.

*********** END **********