

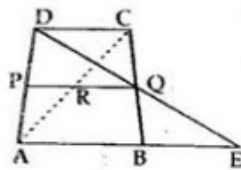


Exercise 9C

Question 3:

Given : ABCD is trapezium in which $AB \parallel DC$

P and Q are the mid – points of AD and BC. DQ is joined and produced and AB is also produced and so that they meet at E. AC cuts PQ at R.



To prove :

(i) $DQ = QE$

(ii) $PR \parallel AB$

(iii) $AR = RC$

Proof :

(i) Consider the triangles $\triangle QCD$ and $\triangle QBE$

$\angle DQC = \angle BQE$ [vertically opposite angles]

$CQ = BQ$ [\because Q is the midpoint of BC]

$\angle QDC = \angle QEB$ [$AE \parallel DC$, BC is a transversal, and thus alternate angles are equal]

Thus, by Angle-Side-Angle criterion of congruence, we have

$\triangle QCD \cong \triangle QEB$ [by ASA]

The corresponding parts of the congruent triangles are equal.

Thus, $DQ = QE$ [by c.p.c.t]

(ii) Midpoint Theorem: The line segment joining the midpoints of any two sides of a triangle is parallel to the third side and equal to half of it.

Thus by the midpoint Theorem, $PQ \parallel AE$.

AB is a part of AE and hence, we have $PQ \parallel AB$

Since the intercepts made by the lines AB, PQ and DC on AD

Since $PQ \parallel AB \parallel DC$

So, PR which is part of PQ is also parallel to AB

$\therefore PR \parallel AB \parallel DC$

(iii) Intercept Theorem: If there are three parallel lines and the intercepts made by them on one transversal are equal then the intercept on any other transversal are also equal.

The three lines PR, AB and DC are cut by AC and AD.

So, by intercept Theorem, $AR = RC$

***** END *****