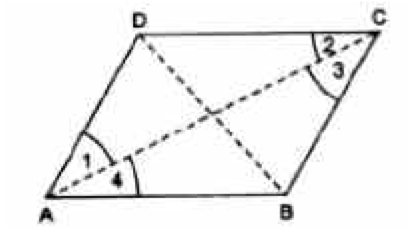
Class Notes	
Class: IX	**Topic: CH-8, QUADRILATERALS** **E.X-8.1**
Subject: MATHEMATICS	

Q.7 ABCD is a rhombus. Show that diagonal AC bisects ∠A as well as ∠C and diagonal BD bisects ∠B as well as ∠D.



Solution. ABCD is a rhombus.

∴ AB = BC = CD = AD

Also, AR || CD an AD || BC

Now, AD = CD

⇒∠1 = ∠2 ...(1) [Angles opposite to equal sides-are equal

Also, CD II AB [Opposite sides of the parallelogram]

∴ ∠1 = ∠3 .... (2) [alternate interior angles]

From (1) and (2), we have

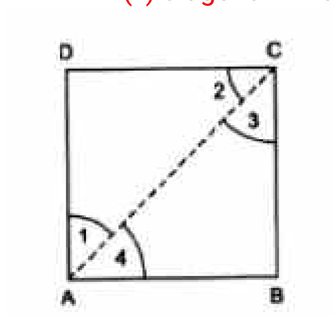
∠2 = ∠3 and ∠1 = ∠4

⇒AC bisects ∠C as well as ∠A.

Similarly, we prove that BD bisects ∠B as well as ∠D.

Q.8 ABCD is a rectangle in which diagonal AC bisects ∠A as well as ∠C. Show that:

(i) ABCD is a square (ii) diagonal BD bisects ∠B as well as ∠D.



Solution. We have a rectangle ABCD such that AC bisects ∠A as ∠C

i.e. ∠1 = ∠4 and ∠2 = ∠3 ....(1)

(i) Since, rectangle is a parallelogram.

∴ ABCD is a parallelogram.

⇒AB || CD and AC is a transversal.

∴∠2 = ∠4 [Alternate interior angles] ...(2)

From (1) and (2), we have

∠3 = ∠4

⇒AB = BC [∵ Sides opposite to equal angles in ΔABC are equal.]

∴AB = BC = CD = AD

⇒ABCD is a rectangle having all of its sides equal.

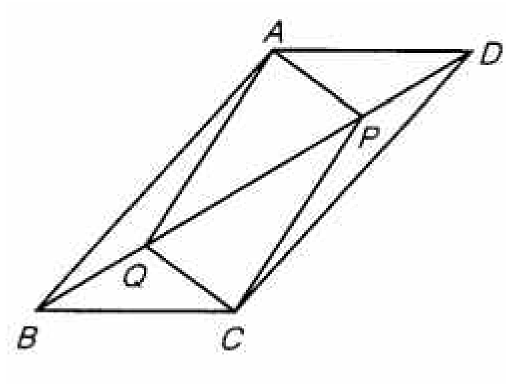
∴ABCD is a square.

(ii) Since, ABCD is a square, and diagonals of a square bisect the opposite angles.

∴ BD bisects ∠B as well as ∠D.

Q.9 In parallelogram ABCD, two points P and Q are taken on diagonal BD such that DP = BQ (see figure). Show that:

(i) ΔAPD ≅ ΔCQB
(ii) AP = CQ
(iii) ΔAQB ≅ ΔCPD
(iv) AQ = CP
(v) APCQ is a parallelogram.



Solution. We have parallelogram ABCD. BD is a diagonal and 'P' and 'Q' are such that
PD = QB

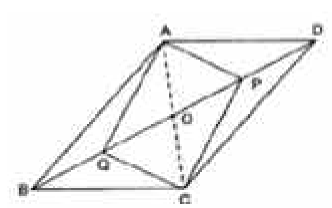
(i) To prove that ΔAPD ≅ ΔCQB
∵ AD || BC and BD is a transversal. [∵ABCD is a parallelogram.]
∴∠ADB = ∠CBD [Interior alternate angles]
⇒∠ADP = ∠CBQ
ΔAPD and ΔCQB, we have
(i) AD =CB [Opposite side of the parallelogram]
(ii) PD = QB [Given]
(iii) ∠CBQ = ∠ADP [Proved above]
ΔAPD ≅ ΔCQB (by SAS)

(ii) To prove that AP = CQ
Since ΔAPD ≅ ΔCQB [Proved above]
⇒AP = CQ (by C.P.C.T)

(iii) To prove that ΔAQB ≅ ΔCPD.
AB || CD and BD is a transversal. [∵ ABCD is a parallelogram.]
∴∠ABD = ∠CDB
⇒∠ABQ = ∠CDP
Now, in ΔAQB and ΔCPD, we have
(i) QB = PD [Given]
(ii) ∠ABQ = ∠CDP [Proved]
(iii) AB = CD [Opposite sides of parallelogram ABCD]
∴ΔAQB ≅ ΔCPD [SAS criteria]

(iv) To prove that AQ = CP.
Since ΔAQB ≅ ΔCPD [Proved]
∴Their corresponding parts are equal.
⇒ AQ = CP.

(v)To prove that APCQ is a parallelogram.
join AC.



Since, the diagonals of a || gm bisect each other
∴AO = CO and BO = DO
⇒(BO − BQ) = (DO − DP) [∵ BQ = DP (Given)]
⇒QO = PO…………………(2)
Now, in quadrilateral APCQ, we have
AO = CO and QO = PO
i.e. AC and QP bisect each other at O.
⇒APCQ is a parallelogram.

Q.10 ABCD is a parallelogram and AP and perpendiculars from vertices A and C on diagonal BD (see Show that

(i) ΔAPB ≅ ΔCQD

(ii) AP = CQ

Solution. (i) In ΔAPB and ΔCQD, we have

1.∠APB = ∠CQD [90° each]

2. AB = CD [Opposite sides of parallelogram ABCD]

3. ∠ABP = ∠CDQ

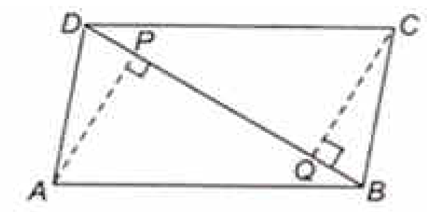
⇒Using AAS criteria, we have

∠APB ≅ ΔCQD

(ii) Since, ΔAPB ≅ ΔCQD

∴ Their corresponding parts are equal.

⇒AP = CQ



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NOTE: THE STUDENTS ARE ADVISED TO WRITE THIS CONTENT IN THEIR MATHS NOTEBOOK.

ASSIGNMENT: PRACTICE THESE SUMS AND RELATED TOPICS FROM R.D.SHARMA.

" CONTENT PREPARED ABSOLUTELY AT HOME "
