WORKSHEET 1

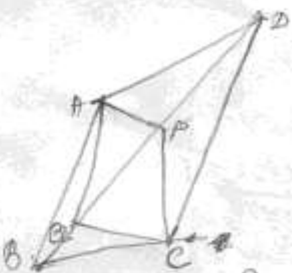
STD: IX

Topic- Quadrilaterals

SUBJECT: Mathematics

Exercise 8.1

9th In Parallelogram ABCD, two points P and Q are taken on diagonal BD such that DP = BQ (See fig 8.20) Show that



(fig 8.20)

(I) $\Delta APD \cong \Delta CQB$
(II) $AP = CQ$
(III) $\Delta AQB \cong \Delta CPD$
(IV) $AQ = CP$
(V) APCQ is a Parallelogram

(I) $\Delta APD \cong \Delta CQB$

AP ∥ BC $AD = BC$

$DP = BQ$ given

$\angle ADP = \angle CBQ$

$\angle ADB = \angle CBQ$ (alternate interior angles are equal)

$\therefore \Delta APD \cong \Delta CQB$ by SAS criteria

$AP = CQ$ CPCT

(II) $\Delta AQB \cong \Delta CPD$

AB ∥ DC ~~AB = D~~

$\therefore AB = DC$

$\angle ABD = \angle BDC$

$DP = BQ$ (given)

$\Delta AQB \cong \Delta CPD$ by SAS criteria

$AQ = CP$ - Proved

(iii) To prove APCQ is a ||gm

Join AC to meet BD at O

BO = OD ABCD is a ||gm

∴ AO = OC

BO − BQ = OD − DP

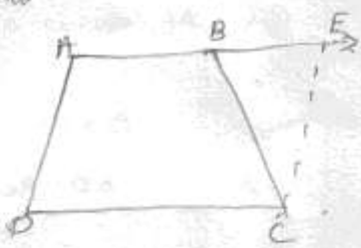
∴ OQ = OP

Now in Quadrilateral APCQ is a ||gm

Home work

[Exercise 8.1. − 10th sum, 11th, 12th sum to be done as per the above examples]

12th Sum ABCD is a trapezium in which AB || CD and AD = BC (See fig 8.23) Show that



(i) ∠A = ∠B

(ii) ∠C = ∠D

(iii) △ABC ≅ △BAD

(iv) Diagonal AC = diagonal BD

Construction Extend AB and draw a line through C Parallel to DA intersecting AB Produced at E

Draw CE || AD

(i) To prove ∠A = ∠B

AB || DC (given)

AE || DC

∵ AD || CE ∴ AECD is a Parallelogram

since opposite sides are Parallel + equal

AD = CE −(1)

AD = BC given −(2)

∴ BC = CE from (1) (2)

$\angle CBE = \angle CEB$ —(1)

∴ Angles opposite to equal sides are equal.

Also $\angle ABC + \angle CBE = 180°$ linear Pair —(3)

Also $\angle A + \angle CEB = 180°$ Adjacent angles of a llgm is supplementary —(4)

from (3) + (4)

$\angle ABC + \angle CBE = \angle A + \angle CEB$

But $\angle CBE = \angle CEB$

$\angle ABC = \angle A$

$\Rightarrow \angle B = \angle A$

(ii) To prove $\angle C = \angle D$

$AB \parallel CD$ and AD is a transversal

$\angle A + \angle D = 180°$ Sum of interior opposite angles

similarly $\angle B + \angle C = 180°$

∴ $\angle A + \angle D = \angle B + \angle C$

But $\angle A = \angle B$

$\angle B + \angle D = \angle B + \angle C$

∴ $\angle D = \angle C$

(iii) To prove $\Delta ABC \cong \Delta BAD$

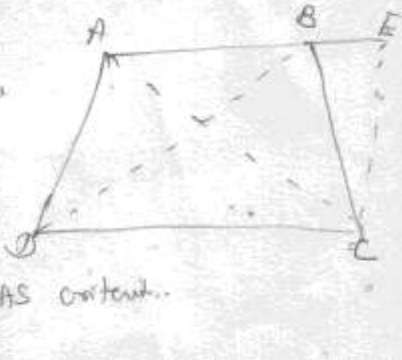
In ΔABC and ΔBAD we have

$BA = AB$ Common

$AD = BC$ given

$\angle ABC = \angle BAD$ Proved

$\Delta ABC \cong \Delta BAD$ by SAS criteria.



(V) Diagonal AC = diagonal BD

$\Delta ABC \cong \Delta BAD$

Thus corresponding parts are equal

$\Rightarrow$ Diagonal AC = diagonal BD