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G.D.GOENKA PUBLIC SCHOOL

Subject: Mathematics (8^{th})

Date: 16-09-2021

Chapter 13 (Understanding Quadrilaterals)

Exercise 13.2

(7) If the adjacent angles of a parallelogram are in the ratio 4 : 5, find all the angles of the parallelogram.

Let the angles be $4x$ and $5x$.

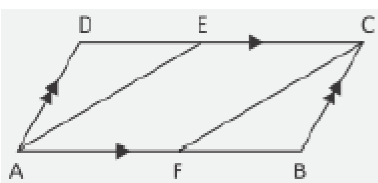
In a parallelogram, adjacent angles are supplementary.

Hence, $4x + 5x = 180°$

$\therefore 9x = 180°$

$x = 20° \Rightarrow 4x = 80°, 5x = 100°$

(8) ABCD is a parallelogram. AE bisects $\angle A$ and CF bisects $\angle C$.



If $\angle DAB = 60°$, find

(i) $\angle ABC$

$\angle DAB$ and $\angle ABC$ are adjacent angles. In a parallelogram adjacent angles are supplementary.

Hence, if $\angle DAB = 60°$, $\angle ABC = 180° - 60° = 120°$.

(ii) $\angle ECF$

In a parallelogram opposite angles are equal.

$\therefore \angle DAB = \angle DCB = 60°$

It is given that CF bisects $\angle C$. Hence $\angle ECF = 30°$.

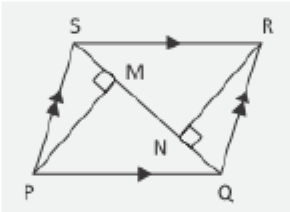
(iii) Prove that AE||CF.

Since AE bisects $\angle DAB$, $\angle EAF = 30°$.

In the ΔFBC, $\angle B = 110°$; $\angle FCB = 30°$; hence $\angle CFB = 180° - (120° + 30°) = 30°$.

Thus, AF and CF make equal angles with the base AB. Hence, AE||CF.

(9) In a parallelogram PQRS, PM ⊥ SQ and RN ⊥ SQ. Prove that



(i) ∠SRN = ∠QPM

Diagonal of a parallelogram divides it into two congruent triangles.

Hence ΔSPQ ≅ ΔQRS [By SSS criterion]

PM and RN are altitudes of congruent triangles. Hence PM = RN.

PQ = RS [Opposite sides]

∠M = ∠N [Both 90°]

Hence, right–angled triangles ΔQPM and ΔSRN are congruent by RHS criterion.

∴ ∠SRN = ∠QPM [Corresponding angles of congruent triangles]

(ii) PM = RN

Consider ΔSPQ and ΔQRS.

PQ = RS [Opposite sides of a parallelogram]

SQ = SQ [Common]

SP = QR [Opposite sides of a parallelogram]

Hence, ΔSPQ ≅ ΔQRS [By SSS criterion]

SQ is the base of both triangles; PM and RN are altitudes of congruent triangles. Hence PM = RN.

Write Q7 to Q9 in your mathematics notebook.