Euclidean Geometry Riders: Proving It, With Reasons (Grade 10)

MEMORANDUM

Name: ..... Class: .....

Date: .....

MARK ____ / 30

Answer all questions. Show all your working — marks are awarded for method as well as the final answer. **Teacher copy: accept any correct equivalent method.**

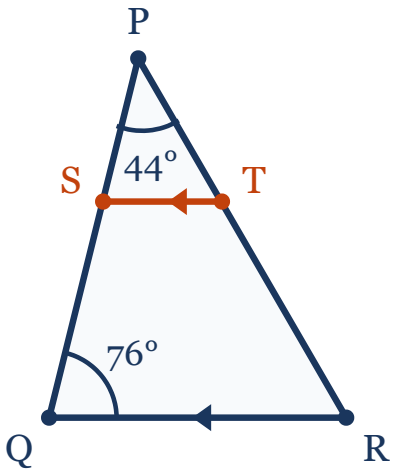
1 Write down the reason you would quote for the statement "$x = 65°$" if the two angles are on opposite sides of a transversal, between two parallel lines AB and CD. (2)

> alt ∠s; AB ∥ CD ✓✓ (2)

2 Why is a correct angle written with no reason usually worth only half the marks? (2)

> The marking guideline awards a mark for the statement and a separate mark for the reason; without the reason the second mark cannot be given. ✓✓ (2)

3 In △PQR, ST ∥ QR with S on PQ and T on PR. $\hat{P} = 44°$ and $\hat{Q} = 76°$. Determine, with reasons, the size of $P\hat{S}T$. (3)



> $P\hat{S}T = 76°$ ✓ (corresp ∠s; ST ∥ QR) ✓✓ (3)

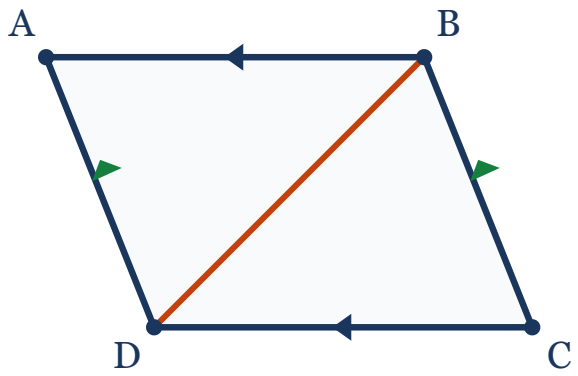
4 Using the same triangle, determine, with a reason, the size of $\hat{R}$. (3)

> $\hat{R} = 180° - 44° - 76°$ ✓ $= 60°$ ✓ (∠s of a △) ✓ (3)

5 List the FOUR conditions for congruency and state which one applies only to right-angled triangles. (4)

> SSS, SAS, AAS and RHS ✓✓✓; RHS applies only to right-angled triangles ✓ (4)

6 ABCD is a parallelogram with diagonal BD drawn. Prove that △ABD ≡ △CDB. (4)

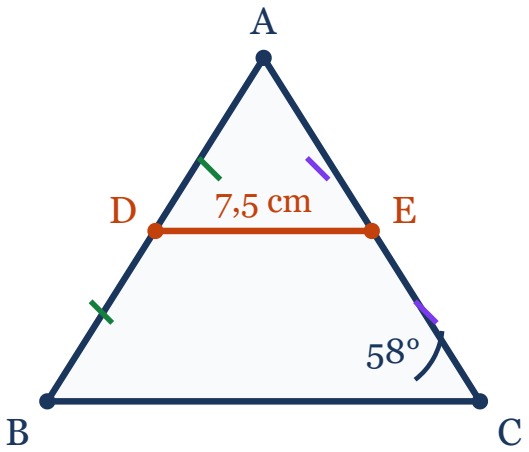


> AB = CD ✓ (opp sides of a parm); AD = CB ✓ (opp sides of a parm); BD = DB ✓ (common); ∴ △ABD ≡ △CDB ✓ (SSS) (4)

7 State THREE different ways of proving that a quadrilateral is a parallelogram. (3)

> Any three of: both pairs of opp sides parallel ✓; both pairs of opp sides equal ✓; both pairs of opp ∠s equal ✓; one pair of opp sides equal and parallel; diagonals bisect each other (3)

8 In △ABC, D and E are the midpoints of AB and AC. If DE = 7,5 cm and $A\hat{C}B = 58°$, determine BC and $A\hat{E}D$, with reasons. (4)



> BC = 2 × 7,5 = 15 cm ✓✓ (midpt theorem); $A\hat{E}D = 58°$ ✓ (corresp ∠s; DE ∥ BC) ✓ (4)

9 Explain why you may NOT use the reason "opp sides of a parm" inside a proof whose conclusion is that the shape is a parallelogram. (2)

> It assumes the very thing you are asked to prove ✓. Properties of a parallelogram may only be used once the shape has been established as one ✓. (2)

10 PQRS is a quadrilateral with PQ ∥ SR and PQ = SR. Prove that PQRS is a parallelogram. (3)

> PQ ∥ SR ✓ (given); PQ = SR ✓ (given); ∴ PQRS is a parallelogram ✓ (one pair of opp sides equal and parallel) (3)

TOTAL: 30 marks

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