Properties of Quadrilaterals & Their Proofs (Grade 10)

MEMORANDUM

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

Date: .....

MARK ____ / 18

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.**

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1 Two co-interior angles of a parallelogram are $(3x + 10)°$ and $(x + 30)°$. Determine the value of x, and hence the size of each angle. **(4)**

> Co-interior angles of a parallelogram add up to $180°$ *(1)*
> $4x + 40 = 180$ *(1)*
> $x = 35$ *(1)*
> The angles are **115°** and **65°** *(1)* ✓✓✓✓ (4)

2 Define a parallelogram. **(2)**

> A quadrilateral with **both pairs of opposite sides parallel**. ✓✓ (2)

3 Which quadrilateral has diagonals that are equal AND bisect each other? **(1)**

> A **rectangle** (and therefore also a square). ✓ (1)

4 Which quadrilateral has perpendicular diagonals that bisect the angles? **(1)**

> A **rhombus** (and therefore also a square). ✓ (1)

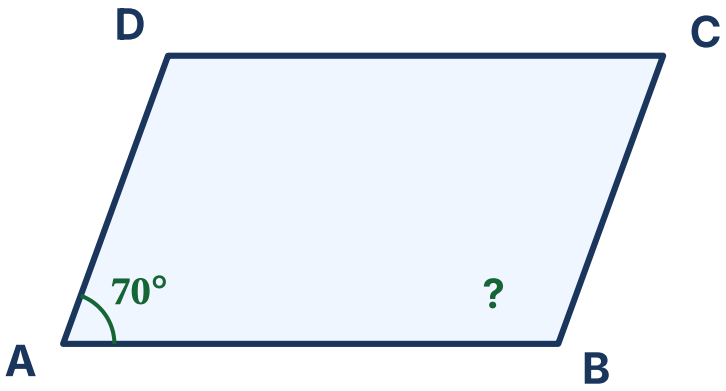
5 How many pairs of parallel sides does a trapezium have? **(1)**

> **One** ✓ (1)

6 Do a kite's diagonals bisect each other? **(1)**

> **No** — only one diagonal bisects the other, and it does so perpendicularly. ✓ (1)

7 In parallelogram ABCD, $\hat{A} = 70°$. Find $\hat{C}$ and $\hat{B}$. (2)



> $\hat{C} = 70°$ (opposite angles equal); $\hat{B} = 110°$ (co-interior) ✓✓ (2)

8 State five ways to prove a quadrilateral is a parallelogram. (4)

> Opposite sides parallel; opposite sides equal; opposite angles equal; diagonals bisect each other; one pair opposite sides equal *and* parallel. ✓✓✓✓ (4)

9 Is every rectangle a parallelogram? Is every parallelogram a rectangle? (2)

> **Yes** to the first; **no** to the second. ✓✓ (2)

TOTAL: 18 marks

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