Cyclic quadrilaterals

6 questions | 14 marks

Equivalent correct methods earn the corresponding marks.

1. $ABCD$ is cyclic in that order. Angle A is 112°. Find C. [2 marks]

$180 - 112 = 68$.

Answer: 68°.

2. Opposite angles of a cyclic quadrilateral are x and $3x$. Find both. [2 marks]

$4x = 180$, so $x = 45$.

Answer: 45° and 135°.

3. A side at vertex C is extended to form an exterior angle of 128° in cyclic $ABCD$. Find the opposite interior angle A. [2 marks]

An exterior angle of a cyclic quadrilateral equals the opposite interior angle.

Answer: 128°.

4. A convex quadrilateral has opposite angles 101° and 79°. Give a reason that its vertices lie on a circle. [2 marks]

$101 + 79 = 180$; apply the converse cyclic-quadrilateral theorem.

Answer: Opposite angles are supplementary.

5. A student claims every parallelogram is cyclic because opposite sides are parallel. Give a counterexample. [3 marks]

Its opposite angles sum to 120° or 240°, not 180°.

Answer: A parallelogram with angles $60^\circ, 120^\circ, 60^\circ, 120^\circ$.

6. $ABCD$ is cyclic with $A = 80^\circ$ and $B = 95^\circ$. Find C and D, then verify the angle sum. [3 marks]

$C = 180 - 80 = 100$ and $D = 180 - 95 = 85$.

$80 + 95 + 100 + 85 = 360$.

Answer: $C = 100^\circ$, $D = 85^\circ$; total 360°.