Rectangle Properties Quiz

Grade Level: Grade 9 | **Date:** 2025-11-16 16:42:38

Instructions: Answer all questions. Show your work where applicable.

Question 1: Which of the following is the defining characteristic that makes a parallelogram a rectangle?

A) All sides are equal.
B) Diagonals are perpendicular.
C) One angle is a right angle.
D) Opposite angles are equal.

Question 2: In a rectangle ABCD, if the length of diagonal AC is 15 cm, what is the length of diagonal BD?

A) 7.5 cm
B) 15 cm
C) 20 cm
D) It cannot be determined without side lengths.

Question 3: A quadrilateral ABCD is known to be a parallelogram. If its diagonals are found to be equal in length, what type of quadrilateral is ABCD? Justify your answer.

Answer: _____

Question 4: Explain why a cyclic parallelogram must always be a rectangle.

Answer: _____

Answer Key

Question 1: C

Explanation: A rectangle is defined as a parallelogram in which one of its angles is a right angle. This single right angle then implies all angles are right angles.

Question 2: B

Explanation: One of the key properties of a rectangle is that its diagonals are equal in length. Therefore, if AC is 15 cm, BD must also be 15 cm.

Question 3: Rectangle

Explanation: The quadrilateral ABCD is a rectangle. According to the properties of quadrilaterals, if the diagonals of a parallelogram are equal, then it is a rectangle.

Question 4: A cyclic parallelogram is a rectangle because in a cyclic quadrilateral, the sum of opposite angles is 180°. In a parallelogram, opposite angles are equal. Therefore, if $\angle A$ and $\angle C$ are opposite angles in a cyclic parallelogram, then $\angle A + \angle C = 180°$ and $\angle A = \angle C$. This implies $2\angle A = 180°$, so $\angle A = 90°$. Since a parallelogram with one right angle is a rectangle, a cyclic parallelogram must be a rectangle.

Explanation: This combines two key theorems: 1) Opposite angles of a cyclic quadrilateral sum to 180°. 2) Opposite angles of a parallelogram are equal. If a figure is both, then each angle must be 90°, making it a rectangle.