Triangle Congruence in Quadrilaterals Quiz

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

Question 1: In a rectangle ABCD, the diagonals AC and BD intersect at point O. Which of the following statements about the diagonals is proven using the congruence of triangles ΔAOB and ΔCOD?

A) The diagonals are perpendicular.
B) The diagonals bisect each other.
C) The diagonals are of unequal length.
D) The diagonals form only acute angles.

Question 2: The text explains that the diagonals of a square bisect each other at right angles. Which specific triangle congruence condition is used to prove that the angles formed by the intersecting diagonals are 90 degrees, and which two triangles are considered for this proof?

Answer: ____

Question 3: To prove that the opposite sides of a parallelogram are equal, the text suggests considering triangles ΔABD and ΔCDB. Which congruence condition is used for these triangles?

A) SSS (Side-Side-Side)
B) SAS (Side-Angle-Side)
C) ASA (Angle-Side-Angle)
D) AAS (Angle-Angle-Side)

Answer Key

Question 1: B) The diagonals bisect each other.

Explanation: The text explains that by the AAS condition for congruence, $\Delta AOB \cong \Delta COD$. This congruence proves that OA = OC and OB = OD, which means the diagonals bisect each other.

Question 2: SSS (Side-Side-Side) congruence condition, considering triangles ΔBOA and ΔBOC.

Explanation: The text states, 'By the SSS condition for congruence, $\Delta BOA \cong \Delta BOC$.' Since these congruent triangles share a common side and their corresponding angles are equal, and they form a straight angle (180°), each angle must be 90°.

Question 3: D) AAS (Angle-Angle-Side)

Explanation: The text explicitly states, 'In ΔABD and ΔCDB... by the AAS condition, the triangles are congruent, that is, $\Delta ABD \cong \Delta CDB$. Therefore, AD = CB, and AB = CD.'