

Grade 9 Geometry Quiz: Triangles and Circles

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

Question 1: What does it mean for two geometric figures to be congruent?

- A) They have the same shape.
- B) They have the same size.
- C) They have the same shape and size.
- D) They are mirror images of each other.

Question 2: Which congruence rule states that if two sides and the included angle of one triangle are equal to two sides and the included angle of another triangle, then the triangles are congruent?

- A) SSS
- B) ASA
- C) SAS
- D) AAS

Question 3: In an isosceles triangle ABC, if side AB is equal to side AC, what can you conclude about angles $\angle B$ and $\angle C$?

Answer: _____

Question 4: If two chords of a circle are equal in length, what can be said about the angles they subtend at the centre of the circle?

- A) The angles are complementary.
- B) The angles are supplementary.
- C) The angles are equal.
- D) The angles are different.

Question 5: A line segment is drawn from the centre of a circle perpendicular to a chord. What effect does this line segment have on the chord?

Answer: _____

Question 6: If two chords of a circle subtend equal angles at the centre, what can you conclude about the lengths of the chords?

- A) The chords are perpendicular.
- B) The chords are parallel.
- C) The chords are equal in length.
- D) The chords bisect each other.

Question 7: In triangles PQR and XYZ, if $\angle Q = \angle Y$, $\angle R = \angle Z$, and the side $QR = YZ$, which congruence rule proves that $\triangle PQR \cong \triangle XYZ$?

Answer: _____

Question 8: In a circle, if two chords are equidistant from the centre, what can you say about their lengths?

- A) They are perpendicular to each other.
- B) They are equal in length.
- C) One is twice the other.
- D) They are parallel.

Question 9: An arc of a circle subtends an angle of 80° at the centre. What angle will the same arc subtend at any point on the remaining part of the circle?

Answer: _____

Question 10: If two triangles, $\triangle ABC$ and $\triangle DEF$, are congruent, and side AB has a length of 7 cm, what is the length of the corresponding side DE?

Answer: _____

Question 11: If two angles and one non-included side of one triangle are equal to two angles and the corresponding non-included side of another triangle, which congruence rule applies?

- A) SAS
- B) ASA
- C) AAS
- D) SSS

Question 12: In two right-angled triangles, if the hypotenuse and one side of one triangle are equal to the hypotenuse and one side of the other triangle, which congruence rule proves them congruent?

Answer: _____

Question 13: What is the measure of the angle subtended by a semicircle at any point on the remaining part of the circle?

Answer: _____

Question 14: If a parallelogram is inscribed in a circle (meaning it is a cyclic parallelogram), what special type of parallelogram must it be?

Answer: _____

Question 15: If two intersecting chords of a circle make equal angles with the diameter passing through their point of intersection, what can be concluded about the lengths of the chords?

Answer: _____

Answer Key

Question 1: C

Explanation: Congruent figures are identical in all respects, meaning they have both the same shape and the same size.

Question 2: C

Explanation: SAS stands for Side-Angle-Side, where the angle must be included between the two sides for congruence.

Question 3: $\angle B = \angle C$

Explanation: In an isosceles triangle, the angles opposite to the equal sides are equal.

Question 4: C

Explanation: Equal chords of a circle subtend equal angles at the centre (Theorem 9.1).

Question 5: It bisects the chord.

Explanation: The perpendicular from the centre of a circle to a chord bisects the chord (Theorem 9.4).

Question 6: C

Explanation: If the angles subtended by the chords of a circle at the centre are equal, then the chords are equal in length (Theorem 9.2).

Question 7: ASA (Angle-Side-Angle)

Explanation: The ASA congruence rule states that if two angles and the included side of one triangle are equal to two angles and the included side of another triangle, then the triangles are congruent.

Question 8: B

Explanation: Chords equidistant from the centre of a circle are equal in length (Theorem 9.6).

Question 9: 40°

Explanation: The angle subtended by an arc at the centre is double the angle subtended by it at any point on the remaining part of the circle (Theorem 9.7). So, $80^\circ / 2 = 40^\circ$.

Question 10: 7 cm

Explanation: If two triangles are congruent, their corresponding parts are equal (CPCT - Corresponding Parts of Congruent Triangles). Therefore, $AB = DE$.

Question 11: C

Explanation: AAS (Angle-Angle-Side) congruence rule applies when two angles and a non-included side are equal to the corresponding parts of another triangle.

Question 12: RHS (Right angle-Hypotenuse-Side)

Explanation: RHS congruence rule is specifically for right-angled triangles where the hypotenuse and one leg (side) are equal.

Question 13: 90°

Explanation: A semicircle subtends an angle of 180° at the centre. By Theorem 9.7, the angle subtended at any point on the remaining part of the circle is half of the central angle, so $180^\circ / 2 = 90^\circ$.

Question 14: A rectangle.

Explanation: A cyclic parallelogram must be a rectangle. This is because opposite angles of a cyclic quadrilateral are supplementary, and opposite angles of a parallelogram are equal. This implies each angle must be 90° .

Question 15: The chords are equal in length.

Explanation: As shown in Example 1 from the text, by drawing perpendiculars from the centre to the chords and using triangle congruence (e.g., ASA or AAS), it can be proven that the perpendicular distances from the centre to the chords are equal. Since chords equidistant from the centre are equal, the chords must be equal.