

Circles: Chords, Arcs, and Cyclic Quadrilaterals Quiz

Grade Level: Grade 9 | **Date:** 2025-11-16 18:59:23

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

Question 1: What is the angle formed by joining the endpoints of a chord to the center of the circle called?

- A) Inscribed angle
- B) Central angle
- C) Tangent angle
- D) Segment angle

Question 2: If two chords of a circle are equal in length, what can be said about the angles they subtend at the center of the circle?

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

Question 3: A perpendicular line is drawn from the center of a circle to a chord. What effect does this line have on the chord?

- A) It divides the chord into three equal parts
- B) It bisects the chord
- C) It is parallel to the chord
- D) It is longer than the chord

Question 4: If a line segment from the center of a circle bisects a chord, what is the relationship between this line segment and the chord?

Answer: _____

Question 5: In a circle, if two chords are equidistant from the center, what can be concluded about their lengths?

- A) One chord is twice as long as the other

- B) The chords are equal in length
- C) The chords are perpendicular to each other
- D) The chords are parallel to each other

Question 6: An arc of a circle subtends an angle of 70° at the center. What angle will the same arc subtend at any point on the remaining part of the circle?

Answer: _____

Question 7: What is the measure of the angle inscribed in a semicircle?

- A) 45°
- B) 60°
- C) 90°
- D) 180°

Question 8: What is a quadrilateral called if all four of its vertices lie on a circle?

- A) Regular quadrilateral
- B) Tangential quadrilateral
- C) Cyclic quadrilateral
- D) Inscribed quadrilateral

Question 9: In a cyclic quadrilateral, if one angle is 110° , what is the measure of its opposite angle?

Answer: _____

Question 10: A chord of a circle is 16 cm long. If the radius of the circle is 10 cm, what is the distance of the chord from the center of the circle?

Answer: _____

Question 11: A chord PQ of a circle with center O subtends an angle of 120° at the center. What is the angle subtended by the chord at a point R on the major arc PQ?

Answer: _____

Question 12: In a cyclic quadrilateral ABCD, if $\angle A = 85^\circ$ and $\angle B = 70^\circ$, find the measures of $\angle C$ and $\angle D$.

Answer: _____

Question 13: If the angles subtended by two chords of a circle at the center are equal, what can be concluded about the chords?

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

Question 14: A line segment AB subtends equal angles at two points C and D on the same side of the line containing AB. What can be said about the points A, B, C, and D?

- A) They form a parallelogram
- B) They are collinear
- C) They are concyclic
- D) They form a rhombus

Question 15: Prove that a cyclic parallelogram is a rectangle.

Answer: _____

Answer Key

Question 1: B) Central angle

Explanation: The angle subtended by a chord at the center of the circle is known as the central angle.

Question 2: C) The angles are equal

Explanation: Theorem 9.1 states that equal chords of a circle subtend equal angles at the center.

Question 3: B) It bisects the chord

Explanation: Theorem 9.3 states that the perpendicular from the center of a circle to a chord bisects the chord.

Question 4: The line segment is perpendicular to the chord.

Explanation: This is the converse of Theorem 9.3. If a line from the center bisects a chord, it must be perpendicular to the chord.

Question 5: B) The chords are equal in length

Explanation: Theorem 9.6 states that chords equidistant from the center of a circle are equal in length.

Question 6: 35°

Explanation: Theorem 9.7 states that the angle subtended by an arc at the center is double the angle subtended by it at any point on the remaining part of the circle. So, $70^\circ / 2 = 35^\circ$.

Question 7: C) 90°

Explanation: Theorem 9.8 states that the angle in a semicircle is a right angle (90°).

Question 8: C) Cyclic quadrilateral

Explanation: A quadrilateral is called cyclic if all four vertices lie on a circle.

Question 9: 70°

Explanation: Theorem 9.10 states that the sum of either pair of opposite angles of a cyclic quadrilateral is 180° . So, $180^\circ - 110^\circ = 70^\circ$.

Question 10: 6 cm

Explanation: The perpendicular from the center bisects the chord, so half the chord is 8 cm. Using the Pythagorean theorem ($\text{radius}^2 = \text{distance}^2 + (\text{half chord})^2$), we have $10^2 = \text{distance}^2 + 8^2$, which means $100 = \text{distance}^2 + 64$. So, $\text{distance}^2 = 36$, and $\text{distance} = 6$ cm.

Question 11: 60°

Explanation: The angle subtended by an arc at the center is double the angle subtended by it at any point on the remaining part of the circle (Theorem 9.7). So, $\angle PRQ = \angle POQ / 2 = 120^\circ / 2 = 60^\circ$.

Question 12: $\angle C = 95^\circ$, $\angle D = 110^\circ$

Explanation: In a cyclic quadrilateral, opposite angles are supplementary (sum to 180°). So, $\angle C = 180^\circ - \angle A = 180^\circ - 85^\circ = 95^\circ$. And $\angle D = 180^\circ - \angle B = 180^\circ - 70^\circ = 110^\circ$.

Question 13: C) The chords are equal in length

Explanation: This is the converse of Theorem 9.1. If the angles subtended by two chords at the center are equal, then the chords are equal.

Question 14: C) They are concyclic

Explanation: Theorem 9.9 states that if a line segment joining two points subtends equal angles at two other points lying on the same side of the line segment, the four points lie on a circle (i.e., they are concyclic).

Question 15: A parallelogram has opposite angles equal. A cyclic quadrilateral has opposite angles supplementary. If a parallelogram is cyclic, then its opposite angles must be both equal and supplementary. The only angles that are both equal and supplementary are 90° . Therefore, all angles of the parallelogram are 90° , making it a rectangle.

Explanation: Let ABCD be a cyclic parallelogram. Since it's a parallelogram, $\angle A = \angle C$ and $\angle B = \angle D$. Since it's cyclic, $\angle A + \angle C = 180^\circ$ and $\angle B + \angle D = 180^\circ$. Substituting $\angle A$ for $\angle C$, we get $\angle A + \angle A = 180^\circ$, so $2\angle A = 180^\circ$, which means $\angle A = 90^\circ$. Similarly, $\angle B = 90^\circ$. Since all angles are 90° , the parallelogram is a rectangle.