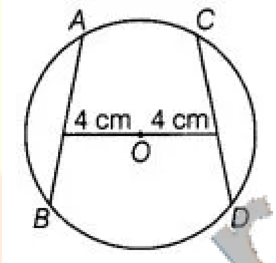
Exercise No. 10.2

Short Answer Questions with Reasoning:

Write True or False and justify your answer in each of the following:

1. Two chords AB and CD of a circle are each at distances 4 cm from the center. Then AB = CD.

Solution:
As we know that the chords equidistant from the centre of circle are equal in length.



Hence, the given statement is true.

2. Two chords AB and AC of a circle with center O are on the opposite side of OA. Then $\angle OAB = \angle OAC$.

Solution:
In this question, two chords AB and AC are not given equal.
Hence, the given statement is false because the angles will be equal if AB = AC.

3. Two congruent circles with center's O and O′ intersect at two points A and B. Then $\angle AOB = \angle AO'B$.

Solution:
The equal chords of congruent circle subtend equal angles at the respective centers.
Hence, the given statement is true.

4. Through three collinear points a circle can be drawn.

Solution:
A circle can pass through only two collinear points but not through three collinear points.
Hence, the given statement is false.

5. A circle of radius 3 cm can be drawn through two points A, B such that AB = 6 cm.

Solution:
As we know that radii of circle is half of the diameter. So,
Radii of circle = $\frac{6}{2}\text{cm} = 3\text{cm}$
Hence, the given statement is true.

6. If AOB is a diameter of a circle and C is a point on the circle, then $AC^2 + BC^2 = AB^2$.

Solution:
Given: AOB is a diameter of a circle and C is a point on the circle.
So, $\angle ACB = 90°$ [Angle in a semicircle is a right angle]

In right triangle ABC,
$AC^2 + BC^2 = AB^2$ [By Pythagoras theorem]
Hence, the correct option is true.

7. ABCD is a cyclic quadrilateral such that $\angle A = 90°$, $\angle B = 70°$, $\angle C = 95°$ and $\angle D = 105°$.

Solution:
Given: ABCD is a cyclic quadrilateral such that $\angle A = 90°$, $\angle B = 70°$, $\angle C = 95°$ and $\angle D = 105°$.

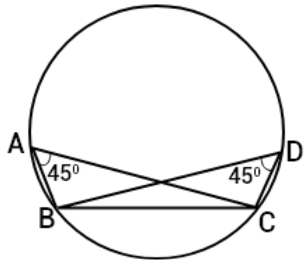
Now, sum of the opposite site of angle of quadrilateral is:
$\angle A + \angle C = 90° + 95° = 185°$
And, $\angle B + \angle D = 70° + 105° = 175°$
Since, sum of opposite angles is not equal to $180°$. So, ABCD is not a cyclic quadrilateral.
Hence, the given statement is true.

8. If A, B, C, D are four points such that $\angle BAC = 30°$ and $\angle BDC = 60°$, then D is the center of the circle through A, B and C.

Solution:
There can be many points D, such that ∠BDC = 60° and each such point cannot be the centre of the circle through A, B and C.
Hence, the given statement is false.

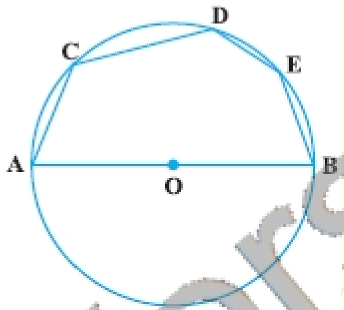
9. If A, B, C and D are four points such that $\angle BAC = 45°$ and $\angle BDC = 45°$, then A, B, C, D are concyclic.

Solution:
Given: $\angle BAC = 45°$ and $\angle BDC = 45°$

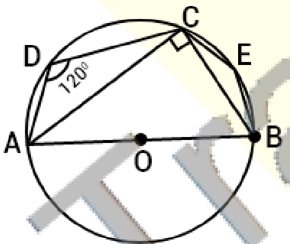


As we know that, angles in the same segment of a circle are equal. Hence, A, B, C and D are concyclic.
Hence, the given statement is true.

10. In Fig., if AOB is a diameter and ∠ADC = 120°, then ∠CAB = 30°.



Solution:
See the given figure, AOB is a diameter of circle with center O.
$\angle ADC + \angle ABC = 180°$ [ABCD is a cyclic quadrilateral]
$120° + \angle ABC = 180°$



$\angle ABC = 180° - 120° = 60°$

In triangle ABC,
$\angle ACB = 90°$ [Angle in a semicircle and $\angle ABC = 60°$ (proved above)]
So, $\angle CAB = 180° - (90° + 60°) = 30°$
Hence, the given statement is true.