ST. LAWRENCE HIGH SCHOOL

A JESUIT CHRISTIAN MINORITY INSTITUTION

CLASS 8

SUBJECT : Algebra & Geometry **Work sheet 17 answer key**

Marks:15 **Circles- 2**

Date:25.4.2020

Answer all the following questions(1×15=15)

MULTIPLE-CHOICE QUESTIONS (MCQ)

Choose the correct answer in each of the following:

1. The radius of a circle is 13 cm and the length of one of its chords is 10 cm. The distance of the chord from the centre is

(a) 11.5 cm (b) 12 cm

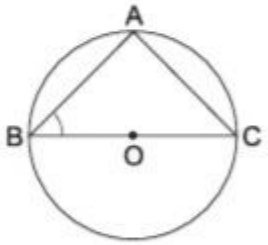
(c) $\sqrt{69}$ cm (d) 23 cm

2. A chord is at a distance of 8 cm from the centre of a circle of radius 17 cm. The length of the chord is

(a) 25 cm (b) 12.5 cm

(c) 30 cm (d) 9 cm

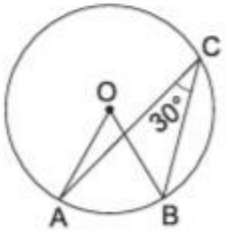
3. In the given figure, BOC is a diameter of a circle and $AB = AC$. Then, $\angle ABC = ?$



(a) 30° (b) 45°

(c) 60° (d) 90°

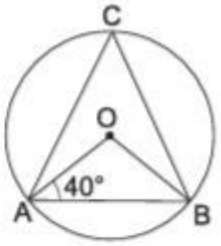
4. In the given figure, O is the centre of a circle and $\angle ACB = 30°$. Then, $\angle AOB = ?$



(a) 30° (b) 15°

(c) 60° (d) 90°

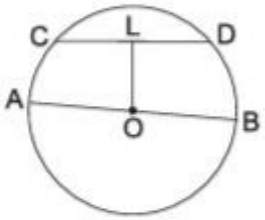
5. In the given figure, O is the centre of a circle. If $\angle OAB = 40°$ and C is a point on the circle then $\angle ACB = ?$



(a) 40° (b) 50°

(c) 80° (d) 100°

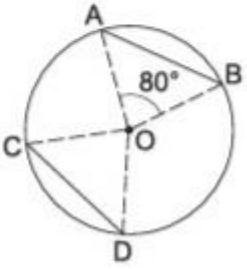
6. In the given figure, AOB is a diameter of a circle with centre O such that $AB = 34$ cm and CD is a chord of length 30 cm. Then, the distance of CD from AB is



(a) 8 cm (b) 15 cm

(c) 18 cm (d) 6 cm

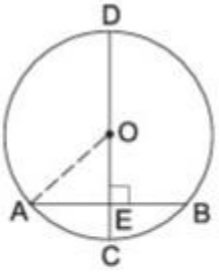
7. AB and CD are two equal chords of a circle with centre O such that $\angle AOB = 80°$. Then, $\angle COD = ?$



(a) 100° (b) 80°

(c) 120° (d) 40°

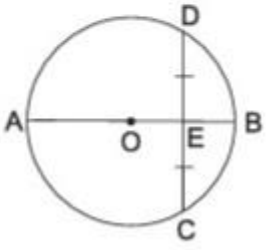
8. In the given figure, CD is the diameter of a circle with centre O and CD is perpendicular to chord AB. If $AB = 12$ cm and $CE = 3$ cm then radius of the circle is



(a) 6 cm (b) 9 cm

(c) 7.5 cm (d) 8 cm

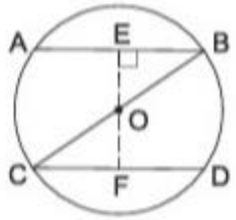
9. In the given figure, O is the centre of a circle and diameter AB bisects the chord CD at a point E such that $CE = ED = 8$ cm and $EB = 4$ cm. The radius of the circle is



(a) 10 cm (b) 12 cm

(c) 6 cm (d) 8 cm

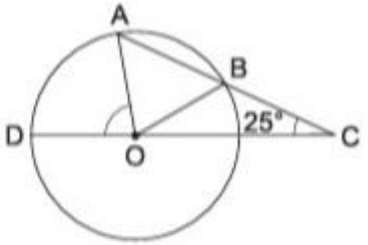
10. In the given figure, BOC is a diameter of a circle with centre O. If AB and CD are two chords such that $AB \parallel CD$ and $AB = 10$ cm then $CD = ?$



(a) 5 cm (b) 12.5 cm

(c) 15 cm (d) 10 cm

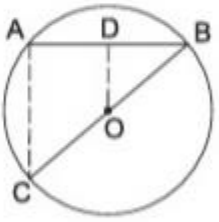
11. In the given figure, AB is a chord of a circle with centre O and AB is produced to C such that $BC = OB$. Also, CO is joined and produced to meet the circle in D. If $\angle ACD = 25°$ then $\angle AOD = ?$



(a) 50° (b) 75°

(c) 90° (d) 100°

12. In the given figure, AB is a chord of a circle with centre O and BOC is a diameter. If $OD \perp AB$ such that $OD = 6$ cm then $AC = ?$



(a) 9 cm (b) 12 cm

(c) 15 cm (d) 7.5 cm

13. An equilateral triangle of side 9 cm is inscribed in a circle. The radius of the circle is

(a) 3 cm (b) $3\sqrt{2}$ cm (c) $3\sqrt{3}$ cm (d) 6 cm

14. The angle in a semicircle measures

(a) 45° (b) 60° (c) 90° (d) 36°

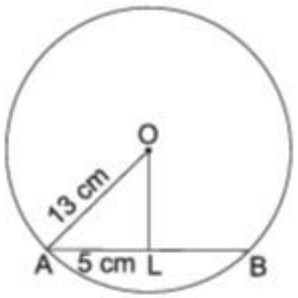
15. Angles in the same segment of a circle are

(a) equal (b) complementary

(c) supplementary (d) none of these

ANSWERS (MCQ) 1. (b) 2. (c) 3. (b) 4. (c) 5. (b) 6. (a) 7. (b) 8. (c) 9. (a) 10. (d) 11. (b) 12. (b) 13. (c) 14. (c) 15. (a)

1. Let O be the centre of a circle with radius $OA = 13$ cm.
Let AB be the chord of length 10 cm. Draw $OL \perp AB$.
Then, L is the midpoint of AB. Thus, $AL = 5$ cm.

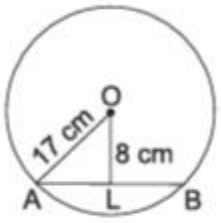


$$OL^2 = OA^2 - AL^2 = (13)^2 - (5)^2 = 169 - 25 = 144$$

$\Rightarrow \quad OL = \sqrt{144} = 12$ cm.

Distance of the chord from the centre = 12 cm.

2. Here $OA = 17$ cm and $OL = 8$ cm.



$\therefore \quad AL^2 = OA^2 - OL^2 = (17)^2 - (8)^2 = 289 - 64 = 225.$

$\Rightarrow \quad AL = \sqrt{225} = 15$

$\Rightarrow \quad AB = (2 \times AL) = (2 \times 15)$ cm $= 30$ cm.

3. Since an angle in a semicircle is a right angle, $\angle BAC = 90°$.

$\therefore \quad \angle ABC + \angle ACB = 90°$.

Now, $AB = AC \Rightarrow \angle ABC = \angle ACB = 45°$.

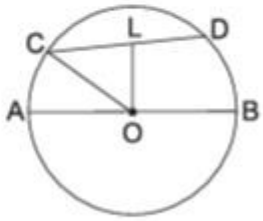
4. Clearly, $\angle AOB = (2 \times \angle AOC) = (2 \times 30°) = 60°$.

5. $OA = OB \Rightarrow \angle OBA = \angle OAB = 40°$.

$\therefore \quad \angle AOB = 180° - (40° + 40°) = 100°$.

$\therefore \quad \angle ACB = \frac{1}{2}\angle AOB = \frac{1}{2} \times 100° = 50°$.

6. Join OC. Then, OC = radius = 17 cm.



$CL = \frac{1}{2}CD = \left(\frac{1}{2} \times 30\right)$ cm $= 15$ cm.

$OL^2 = OC^2 - CL^2 = (17)^2 - (15)^2 = (17 + 15)(17 - 15) = (32 \times 2) = 64$

$\Rightarrow \quad OL = \sqrt{64} = 8$ cm.

$\therefore \quad$ distance of CD from $AB = 8$ cm.

7. Since equal chords of a circle subtend equal angles at the centre, so $\angle COD = \angle AOB = 80°$.

8. Let $OA = OC = r$ cm. Then, $OE = (r - 3)$ cm and $AE = \frac{1}{2}AB = 6$ cm.

Now, $OA^2 = OE^2 + AE^2 \Rightarrow r^2 = (r - 3)^2 + 6^2$

$\Rightarrow \quad 6r = 45 \Rightarrow r = \frac{45}{6} = 7.5$ cm.

9. Let the radius of the circle be r cm.

Then, $OD = OB = r$ cm, $OE = (r-4)$ cm, $ED = 8$ cm.

Now, $OD^2 = OE^2 + ED^2 \Rightarrow r^2 = (r-4)^2 + 8^2$

$\therefore \quad 8r = 80 \Rightarrow r = 10$ cm.

10. Draw $OE \perp AB$ and $OF \perp CD$.

Then, $\triangle OEB \cong \triangle OFC$

$[\because OB = OC = r, \angle BOE = \angle COF$(vert. opp. $\measuredangle$s) and $\angle OEB = \angle OFC = 90°]$.

$\therefore \quad OE = OF$.

But, the chords equidistant from the centre are equal.

$\therefore \quad CD = AB = 10$ cm.

11. $OB = BC \Rightarrow \angle BOC = \angle BCO = 25°$

Ext. $\angle OBA = \angle BOC + \angle BCO = 25° + 25° = 50°$.

$OA = OB \Rightarrow \angle OAB = \angle OBA = 50°$.

In $\triangle AOC$, side CO has been produced to D.

$\therefore \quad$ ext. $\angle AOD = \angle OAC + \angle ACO = \angle OAB + \angle BCO = 50° + 25° = 75°$.

12. $OD \perp AB \Rightarrow D$ is the midpoint of AB.

Also, O is the midpoint of BC.

Now, in $\triangle BAC$, D is the midpoint of AB and O is the midpoint of BC.

$\therefore \quad OD = \frac{1}{2}AC \Rightarrow AC = 2 \times OD = (2 \times 6)\text{cm} = 12$ cm.

13. Let $\triangle ABC$ be an equilateral triangle of side 9 cm.

Let AD be one of its medians.

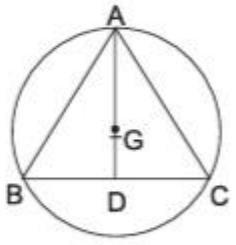
Then, $AD \perp BC$ and $BD = 4.5$ cm.

$\therefore \quad AD = \sqrt{AB^2 - BD^2} = \sqrt{(9)^2 - \left(\frac{9}{2}\right)^2} = \sqrt{\frac{243}{4}} = \frac{9\sqrt{3}}{2}$ cm.

Let G be the centroid of $\triangle ABC$.

Then, $AG : GD = 2 : 1$.

$\therefore \quad$ radius $= AG = \frac{2}{3}AD = \left(\frac{2}{3} \times \frac{9\sqrt{3}}{2}\right)\text{cm} = 3\sqrt{3}$ cm.



14. The angle in a semicircle measures 90°.

15. The angles in the same segment of a circle are equal.