

PRACTICE PAPER 15 (2026-27)
CHAPTER-05
I'M UP AND DOWN AND ROUND AND ROUND

SUBJECT: MATHEMATICS
CLASS : IX

MAX. MARKS : 40
DURATION : 1½ hrs

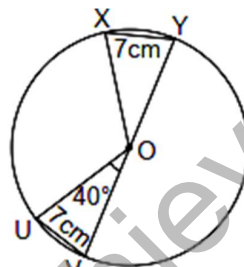
General Instructions:

- (i). All questions are compulsory.
- (ii). This question paper contains 20 questions divided into five Sections A, B, C, D and E.
- (iii). **Section A** comprises of 10 MCQs of 1 mark each. **Section B** comprises of 4 questions of 2 marks each. **Section C** comprises of 3 questions of 3 marks each. **Section D** comprises of 1 question of 5 marks each and **Section E** comprises of 2 Case Study Based Questions of 4 marks each.
- (iv). There is no overall choice.
- (v). Use of Calculators is not permitted

SECTION – A

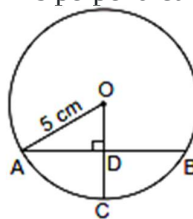
Questions 1 to 10 carry 1 mark each.

1. Given below is a circle with centre O.

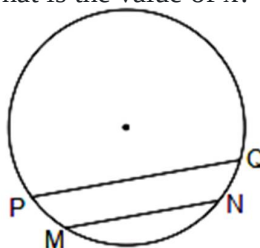


What is the measure of $\angle XOY$?

- (a) 40° (b) 140° (c) 80° (d) 90°
2. If $\angle A + \angle C = 180^\circ$ in quadrilateral ABCD, then ABCD is:
(a) A parallelogram (b) A trapezium (c) A cyclic quadrilateral (d) A rhombus
3. In figure, If $OA = 5$ cm, $AB = 8$ cm and OD is perpendicular to AB. Then CD is equal to

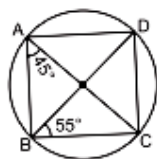


- (a) 2 cm (b) 3 cm (c) 4 cm (d) 5 cm
4. In a circle of radius 13 cm. PQ and MN two chords are of length 24 cm and x cm respectively. The distance between the chords is 7 cm. What is the value of x? [Understanding and Application]

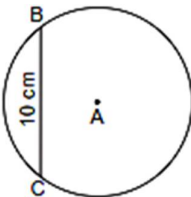


- (a) 10 cm (b) 5 cm (c) 11 cm (d) 6 cm

5. In the given figure, $\angle DBC = 55^\circ$, $\angle BAC = 45^\circ$ then $\angle BCD$ is
 (a) 45° (b) 55° (c) 100° (d) 80°



6. Given a circle with centre O and smallest chord AB is of length 3 cm, longest chord CD is of length 10 cm and chord PQ is of length 7 cm, then radius of the circle is
 (a) 1.5 cm (b) 6 cm (c) 5 cm (d) 3.5 cm
7. Two chords subtend angles 60° and 80° respectively at the center. Which chord is longer?
 (a) Chord with 60° (b) Chord with 80° (c) Both equal (d) Cannot be determined
8. Given below is a circle with centre A and chord BC.



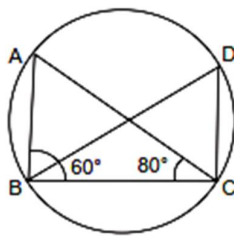
If radius of the chord is 13 cm, what is distance of the chord from the centre?

- (a) 10 cm (b) 13 cm (c) 12 cm (d) 5 cm

In the following questions 9 and 10, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.

- (a) Both A and R are true and R is the correct explanation of A.
 (b) Both A and R are true but R is not the correct explanation of A.
 (c) A is true but R is false.
 (d) A is false but R is true.

9. **Assertion (A):** In the given figure, $\angle ABC = 60^\circ$ and $\angle ACB = 80^\circ$. Then $\angle BDC = 40^\circ$



Reason (R): Angles in the same segment of a circle are equal.

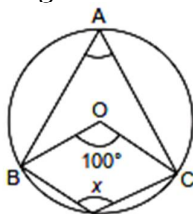
10. **Assertion (A):** The longest chord of a circle is a diameter of the circle.

Reason (R): Diameter of the circle always passes through the centre of a circle.

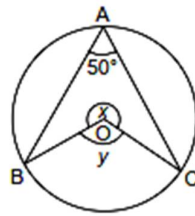
SECTION – B

Questions 11 to 14 carry 2 marks each.

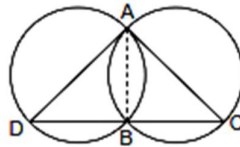
11. If $\angle BOC = 100^\circ$, then find x from the given figure.



12. Find x in the given figure.



13. Two circles intersect at two points A and B. AD and AC are diameters of the two circles. Prove that B lies on the line segment DC.



14. Find the radius of a circle passing through points A and B if the distance between A and B is 6 cm and the center lies on the perpendicular bisector at a distance 4 cm from midpoint of AB.

SECTION – C

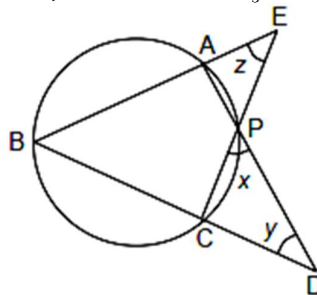
Questions 15 to 17 carry 3 marks each.

15. If two chords of a circle are equally inclined to the diameter passing through their point of intersection, prove that the chords are equal.
16. An isosceles triangle $\triangle ABC$ is inscribed in a circle with diameter AD. If $AB = AC$, prove that AD is the angle bisector of $\angle BAC$.
17. ABCD is a parallelogram. The circles through A, B and C intersect CD (produced, if necessary) at E. Prove that $AE = AD$.

SECTION – D

Questions 18 carry 5 marks.

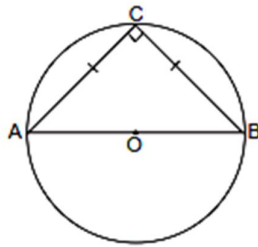
18. In the given figure, if $y = 32^\circ$ and $z = 40^\circ$, determine x . If $y + z = 90^\circ$, prove that $x = 45^\circ$.



SECTION – E (Case Study Based Questions)

Questions 19 to 20 carry 4 marks each.

19. Darts is a precision game that tests your accuracy and technique. The game involves throwing darts at a target board with a level of precision that will help you score better than your opponents. Three children were playing dart game to improve their concentration and threw dart on target board with radius 10 cm and centre O. Darts land on target board at positions A, B and C respectively. They drew lines to join AB, BC and CA and got a triangle shaped figure such that $AC = BC$.



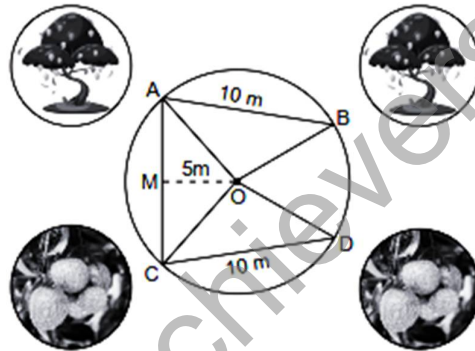
Based on the above information answer the following questions:

- (i) At what distance dart B is landed from the location of dart A?
- (ii) What type of triangle is formed by all three darts on the target board?
- (iii) (a) What is the measure of reflex $\angle AOB$?

OR

- (iii) (b) State one property of the circle used to measure $\angle ACB$?

- 20.** A farmer has a circular garden as shown in the picture. He has different types of trees, plants and flower plants in his garden. In the garden, there are two mango trees A and B at a distance $AB = 10$ m. Similarly, the garden has two Litchi trees at the same distance of 10 m as shown at C and D. AB subtends $\angle AOB = 80^\circ$ at centre O. The perpendicular distance of AC from centre is 5 m and radius of garden is 13 m.



Based on the above information answer the following questions:

- (i) What is the value of $\angle COD$?
- (ii) What is the distance between mango tree A and Litchi tree C?
- (iii) (a) If $\angle BOD = 70^\circ$ then show that $\angle CAB = 75^\circ$?

OR

- (iii) (b) What is the value of $\angle OCD$?

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PRACTICE PAPER 15 (2026-27)
CHAPTER-05
I'M UP AND DOWN AND ROUND AND
ROUND (ANSWERS)

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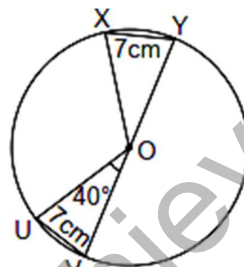
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- (iv). There is no overall choice.
- (v). Use of Calculators is not permitted

SECTION – A

Questions 1 to 10 carry 1 mark each.

1. Given below is a circle with centre O.



What is the measure of $\angle XOY$?

- (a) 40° (b) 140° (c) 80° (d) 90°

Ans. (a) Equal chords of a circle subtend equal angle at the centre.

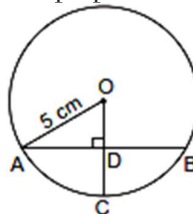
Here $XY = UV = 7$ cm are chords of the circle $\angle UOV = 40^\circ$, $\therefore \angle XOY = 40^\circ$

2. If $\angle A + \angle C = 180^\circ$ in quadrilateral ABCD, then ABCD is:

- (a) A parallelogram (b) A trapezium (c) A cyclic quadrilateral (d) A rhombus

Ans: (c) In a quadrilateral, if the sum of a pair of opposite angles is 180° , then the quadrilateral is cyclic.

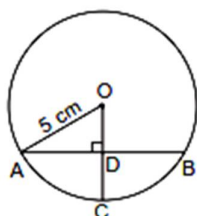
3. In figure, If $OA = 5$ cm, $AB = 8$ cm and OD is perpendicular to AB. Then CD is equal to



- (a) 2 cm (b) 3 cm (c) 4 cm (d) 5 cm

Ans:

(a)



$OD \perp AB$

$\Rightarrow AD = AB = 4 \text{ cm}$

In $\triangle OAD$,

$$OD^2 = OA^2 - AD^2 = 5^2 - 4^2$$

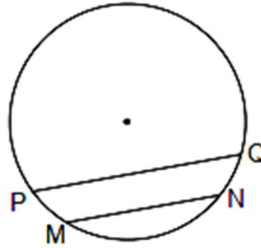
$$= (5 + 4)(5 - 4) = 9$$

$$\Rightarrow OD = 3 \text{ cm}$$

$OA = OC = 5 \text{ cm}$ (radii of circle)

$$\therefore CD = OC - OD = (5 - 3) = 2 \text{ cm}$$

4. In a circle of radius 13 cm, PQ and MN two chords are of length 24 cm and x cm respectively. The distance between the chords is 7 cm. What is the value of x? [Understanding and Application]



(a) 10 cm

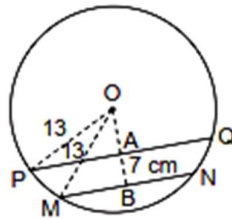
(b) 5 cm

(c) 11 cm

(d) 6 cm

Ans:

(a)



$AB = 7 \text{ cm}$, $PQ = 24 \text{ cm}$, $MN = x \text{ cm}$.

Construction: Join OA, OP and OM.

$OA \perp PQ$ and $OB \perp MN$

$$\Rightarrow \begin{aligned} PA &= 12 \text{ cm and } MB = \frac{x}{2} \text{ cm} \\ OM &= OP = 13 \text{ cm (radii)} \end{aligned}$$

In $\triangle OBM$, we have

$$OM^2 = OB^2 + MB^2$$

$$\Rightarrow 13^2 = (OA + 7)^2 + \left(\frac{x}{2}\right)^2 \quad \dots(i)$$

In $\triangle OPA$,

$$OP^2 = OA^2 + PA^2$$

$$\Rightarrow 13^2 = OA^2 + 12^2$$

$$\Rightarrow OA^2 = 13^2 - 12^2$$

$$= (13 + 12)(13 - 12) = 25$$

$$\Rightarrow OA = 5 \text{ cm}$$

Using $OA = 5 \text{ cm}$ in (i), we get

$$169 = (5 + 7)^2 + \left(\frac{x}{2}\right)^2$$

$$= 144 + \left(\frac{x}{2}\right)^2$$

$$\Rightarrow \left(\frac{x}{2}\right)^2 = 169 - 144 = 25$$

$$\Rightarrow \frac{x}{2} = 5 \Rightarrow x = 10 \text{ cm}$$

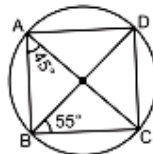
5. In the given figure, $\angle DBC = 55^\circ$, $\angle BAC = 45^\circ$ then $\angle BCD$ is

(a) 45°

(b) 55°

(c) 100°

(d) 80°



Ans: (d) We have $\angle BAC = \angle BDC$ (Angles in the same segment of a circle are equal)

$\Rightarrow \angle BDC = 45^\circ$ Using angle sum property of triangle in $\triangle BDC$, we get

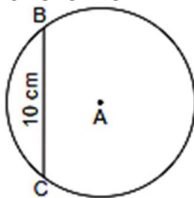
$$\angle DBC + \angle BDC + \angle BCD = 180^\circ$$

$$\Rightarrow 55^\circ + 45^\circ + \angle BCD = 180^\circ$$

$$\Rightarrow \angle BCD = 80^\circ$$

6. Given a circle with centre O and smallest chord AB is of length 3 cm, longest chord CD is of length 10 cm and chord PQ is of length 7 cm, then radius of the circle is
 (a) 1.5 cm (b) 6 cm (c) 5 cm (d) 3.5 cm
 Ans: (c) 5 cm
7. Two chords subtend angles 60° and 80° respectively at the center. Which chord is longer?
 (a) Chord with 60° (b) Chord with 80° (c) Both equal (d) Cannot be determined
 Ans: (b) Greater central angle $\Rightarrow$ longer chord.

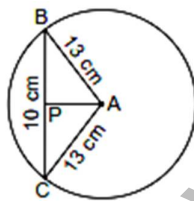
8. Given below is a circle with centre A and chord BC.



If radius of the chord is 13 cm, what is distance of the chord from the centre?

- (a) 10 cm (b) 13 cm (c) 12 cm (d) 5 cm

Ans:



(c) Construction: Draw $AP \perp BC$.

We know that the perpendicular drawn from the centre of a circle to the chords bisect the chord.

$$\therefore BP = PC = \frac{1}{2} BC = 5 \text{ cm}$$

In $\triangle APB$, we have

By Pythagoras Theorem.

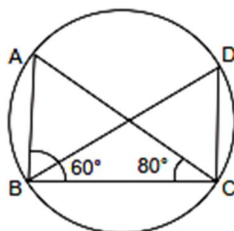
$$\begin{aligned} AP &= \sqrt{AB^2 - BP^2} = \sqrt{13^2 - 5^2} \\ &= \sqrt{(13+5)(13-5)} = \sqrt{18 \times 8} \\ &= \sqrt{144} = 12 \text{ cm} \end{aligned}$$

$\therefore$ Distance of chord from the centre = 12 cm.

In the following questions 9 and 10, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.

- (a) Both A and R are true and R is the correct explanation of A.
 (b) Both A and R are true but R is not the correct explanation of A.
 (c) A is true but R is false.
 (d) A is false but R is true.

9. **Assertion (A):** In the given figure, $\angle ABC = 60^\circ$ and $\angle ACB = 80^\circ$. Then $\angle BDC = 40^\circ$



Reason (R): Angles in the same segment of a circle are equal.

Ans. (a) Both A and R are true and R is the correct explanation of A.

10. Assertion (A): The longest chord of a circle is a diameter of the circle.

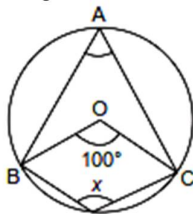
Reason (R): Diameter of the circle always passes through the centre of a circle.

Ans. (a) Both A and R are true and R is the correct explanation of A.
because diameter is twice of the radius.

SECTION – B

Questions 11 to 14 carry 2 marks each.

11. If $\angle BOC = 100^\circ$, then find x from the given figure.



Ans. Here O is the centre of the circle

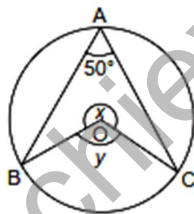
$$\therefore \angle BAC = \frac{1}{2} \angle BOC = \frac{1}{2} \times 100^\circ = 50^\circ$$

$$\text{Also } \angle x + \angle BAC = 180^\circ$$

(sum of opposite angles of cyclic quadrilateral)

$$\Rightarrow \angle x + 50^\circ = 180^\circ \Rightarrow x = 130^\circ$$

12. Find x in the given figure.



Ans. Here O is the centre of the circle

$$\therefore \angle BAC = \frac{1}{2} \angle y \text{ (By degree measure theorem)}$$

$$\Rightarrow 50 = \frac{1}{2} \angle y$$

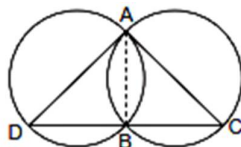
$$\Rightarrow \angle y = 100^\circ$$

$$\text{Also } \angle x + \angle y = 360^\circ \text{ (Angle at the centre of a circle)}$$

$$\Rightarrow \angle x + 100^\circ = 360^\circ$$

$$\Rightarrow \angle x = 360^\circ - 100^\circ = 260^\circ$$

13. Two circles intersect at two points A and B. AD and AC are diameters of the two circles. Prove that B lies on the line segment DC.



Ans. Given: Two circles intersect at A and B. AD and AC are diameters.

To prove: B lies on DC

Construction: Join AB

Proof: AD is the diameter of a circle.

$$\therefore \angle ABD = 90^\circ \dots (i) \text{ (Angle in a semicircle)}$$

AC is the diameter of another circle.

$$\therefore \angle ABC = 90^\circ \dots (ii) \text{ (Angle in a semicircle) Adding (i) and (ii)}$$

$$\angle ABD + \angle ABC = 90^\circ + 90^\circ = 180^\circ$$

$\therefore$ These two angles form a linear pair angles.

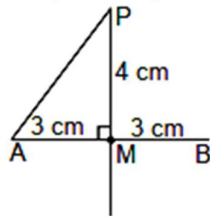
$\Rightarrow$ DBC is a line. Hence point B lies on line segment DC.

14. Find the radius of a circle passing through points A and B if the distance between A and B is 6 cm and the center lies on the perpendicular bisector at a distance 4 cm from midpoint of AB.

Ans. Let M be the midpoint of AB.

$\Rightarrow AM = 3$ cm.

In right triangle PMA,



$$PA = \sqrt{4^2 + 3^2} = \sqrt{16 + 9} = \sqrt{25} = 5 \text{ cm}$$

SECTION – C

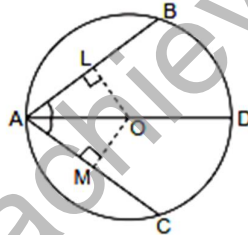
Questions 15 to 17 carry 3 marks each.

15. If two chords of a circle are equally inclined to the diameter passing through their point of intersection, prove that the chords are equal.

Ans. Given: Two chords AB and AC of a circle are equally inclined to diameter AOD, i.e.

$\angle DAB = \angle DAC$

Construction: Draw $OL \perp AB$ and $OM \perp AC$



Proof: In $\triangle OLA$ and $\triangle OMA$

$\angle OLA = \angle OMA$ (each 90°)

$AO = AO$ (common)

$\angle OAL = \angle OAM$ (given)

$\triangle OLA \cong \triangle OMA$ (AAS rule)

$\Rightarrow OL = OM$ (CPCT)

$\Rightarrow AB = AC$

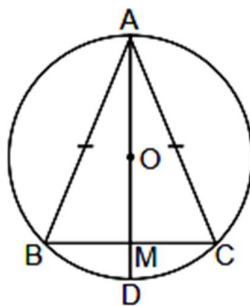
(chords equidistant from the centre are equal)

16. An isosceles triangle $\triangle ABC$ is inscribed in a circle with diameter AD. If $AB = AC$, prove that AD is the angle bisector of $\angle BAC$.

Ans. Given: $\triangle ABC$ is an isosceles triangle and AD is the diameter through A on BC. $AB = AC$.

To show: AD is the angle bisector of $\angle A$.

i.e. $\angle BAD = \angle CAD$



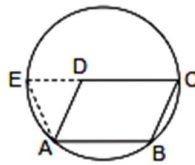
Proof: Diameter AD meets BC at M.
 Now, $OM \perp BC \Rightarrow BM = MC$
 Now in $\triangle ABM$ and $\triangle AMC$,
 we have, $AB = AC$ (Given)
 $\angle ABM = \angle ACM$ [Angles of isosceles triangle]
 $BM = MC$
 $\therefore$ By SAS, $\triangle ABM \cong \triangle AMC$
 $\Rightarrow \angle BAM = \angle CAM$ (By CPCT)
 $\Rightarrow AM$ is the angle bisector of $\angle A$.
 $\Rightarrow AD$ is the angle bisector of $\angle A$.

17. ABCD is a parallelogram. The circles through A, B and C intersect CD (produced, if necessary) at E. Prove that $AE = AD$.

Ans. Given: ABCD is a parallelogram. A circle passes through A, B and C intersect side CD produced at E.

To Prove: $AE = AD$

Construction: Join AE



Proof: ABCD is a ||gm

$\therefore \angle ADC = \angle ABC$

[Opposite angles of parallelogram] ... (i)

$\angle ADC + \angle ADE = 180^\circ$... (ii)

(Angles on straight line)

Also, $\angle ABC + \angle AEC = 180^\circ$... (iii) [(Angles of cyclic quadrilateral ABCE by construction)]

On equating (ii) and (iii)

$\angle ADC + \angle ADE = \angle ABC + \angle AEC$

$\Rightarrow \angle ADE = \angle AEC$

(As $\angle ADC = \angle ABC$ opposite angles of ||gm)

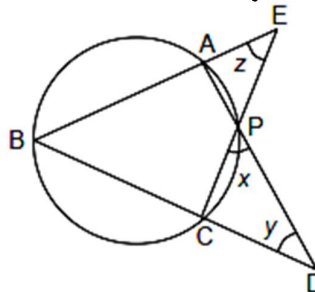
$\Rightarrow AD = AE$

(Sides opposite to equal angles are equal)

SECTION – D

Questions 18 carry 5 marks.

18. In the given figure, if $y = 32^\circ$ and $z = 40^\circ$, determine x. If $y + z = 90^\circ$, prove that $x = 45^\circ$.



Ans. Given: $y = 32^\circ$ and $z = 40^\circ$.

Proof: Let the line segments AD and CE cut each other at P.

Since, $\angle APE = \angle CPD$ [Vertically opposite angles]

$\therefore \angle APE = x$

Now, $\angle BCP = \angle CDP + \angle CPD$ [Exterior angle]

and $\angle PAB = \angle PEA + \angle APE$ [Exterior angle]

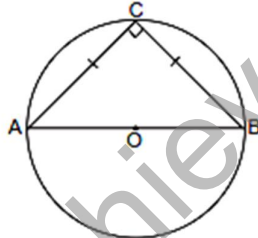
$\therefore \angle BCP = x + y$... (i)

and $\angle PAB = x + z \dots (ii)$
 Since, ABCP is a cyclic quadrilateral
 $\therefore \angle BCP + \angle PAB = 180^\circ$
 $\Rightarrow x + y + x + z = 180^\circ$
 or $2x + (y + z) = 180^\circ \dots (iii)$
 or $2x + (40^\circ + 32^\circ) = 180^\circ$
 or $2x = 180^\circ - 72^\circ$
 $= 108^\circ$ or $x = 54^\circ$
 Since, from (iii), we get
 $2x + (y + z) = 180^\circ$
 and $y + z = 90^\circ$ [Given]
 $\therefore 2x + 90^\circ = 180^\circ$ or $2x = 90^\circ$
 $\therefore x = 45^\circ$.

SECTION – E (Case Study Based Questions)

Questions 19 to 20 carry 4 marks each.

- 19.** Darts is a precision game that tests your accuracy and technique. The game involves throwing darts at a target board with a level of precision that will help you score better than your opponents. Three children were playing dart game to improve their concentration and threw dart on target board with radius 10 cm and centre O. Darts land on target board at positions A, B and C respectively. They drew lines to join AB, BC and CA and got a triangle shaped figure such that $AC = BC$.



Based on the above information answer the following questions:

- (i) At what distance dart B is landed from the location of dart A?
- (ii) What type of triangle is formed by all three darts on the target board?
- (iii) (a) What is the measure of reflex $\angle AOB$?

OR

- (iii) (b) State one property of the circle used to measure $\angle ACB$?

Ans. (i) Distance, $AB = \text{diameter of the circle} = 20 \text{ cm}$

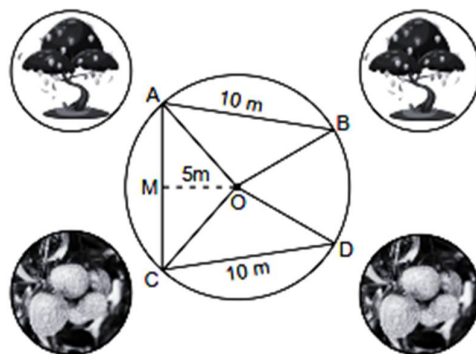
(ii) Right angle isosceles triangle.

(iii) (a) Reflex $\angle AOB = 180^\circ$

OR

(iii) (b) Angle in semicircle is a right angle.

- 20.** A farmer has a circular garden as shown in the picture. He has different types of trees, plants and flower plants in his garden. In the garden, there are two mango trees A and B at a distance $AB = 10 \text{ m}$. Similarly, the garden has two Litchi trees at the same distance of 10 m as shown at C and D. AB subtends $\angle AOB = 80^\circ$ at centre O. The perpendicular distance of AC from centre is 5 m and radius of garden is 13 m.



Based on the above information answer the following questions:

(i) What is the value of $\angle COD$?

(ii) What is the distance between mango tree A and Litchi tree C?

(iii) (a) If $\angle BOD = 70^\circ$ then show that $\angle CAB = 75^\circ$?

OR

(iii) (b) What is the value of $\angle OCD$?

Ans. (i) $\angle COD = 80^\circ$ because equal chord subtend equal angle at the centre.

(ii) Given: $OM = 5$ m, $AO = 13$ m

By Pythagoras theorem

$$AO^2 = AM^2 + OM^2$$

$$13^2 = AM^2 + 5^2$$

$$AM = \sqrt{169 - 25} = 12$$

$$\text{So, } AC = 2 AM = 2 \times 12 = 24 \text{ m.}$$

(iii) (a) In $\triangle AOB$, $\angle AOB = 80^\circ$ (Given)

$OA = OB = 13$ m (radius of circle)

$\Rightarrow \triangle AOB$ is an isosceles triangle

$\Rightarrow \angle OAB = \angle OBA = x$ [Angle opposite to equal side of triangle]

Now, $\angle OAB + \angle OBA + \angle AOB = 180^\circ$

$$\Rightarrow 2x + 80^\circ = 180^\circ$$

$$\Rightarrow 2x = 100^\circ \dots (1)$$

Again, $\angle AOC + \angle AOB + \angle BOD + \angle COD = 360^\circ$

$$\Rightarrow \angle AOC + 80^\circ + 70^\circ + 80^\circ = 360^\circ$$

$$\Rightarrow \angle AOC = 130^\circ \dots (2)$$

Again, $\triangle AOC$ is an isosceles triangle

because $OA = OC = 13$ cm (radius of circle)

$\therefore \angle OAC = \angle OCA = y$ (Angle opposite to equal sides)

So, $\angle OAC + \angle OCA + \angle AOC = 180^\circ$

$$\Rightarrow y + y + 130^\circ = 180^\circ$$

$$\Rightarrow y = 25^\circ \dots (3)$$

Therefore, $\angle CAB = \angle OAB + \angle OAC = x + y$

$$\Rightarrow \angle CAB = 50^\circ + 25^\circ = 75^\circ$$

OR

(iii) (b) In the same manner for obtaining eq. (1)

in the part (iii) (a), we find, $\angle OCD = 50^\circ$

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