



CLASS 9 MATHEMATICS – CHAPTER 5

FREE WORKSHEET



I'M UP AND DOWN, AND ROUND AND ROUND

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Name: _____

Class: 9 _____

Date: _____

Marks: 40



Topics Covered: Circle, radius, diameter, chords, symmetry, circumcircle, circumcentre, chord properties, distance of chords, arcs, angles subtended by arcs, angle in a semicircle, concyclic points and cyclic quadrilaterals.



SECTION A – MCQs

1 mark each × 10 = 10 marks

1. A chord passing through the centre of a circle is called:

- A. Radius
- B. Diameter
- C. Arc
- D. Tangent

2. The longest chord of a circle is:

- A. Radius
- B. Minor chord
- C. Diameter
- D. Arc

3. A circle has:

- A. 2 lines of symmetry
- B. 4 lines of symmetry
- C. 8 lines of symmetry
- D. Infinitely many lines of symmetry

4. The centre of a circle passing through three non-collinear points is found at the intersection of:

- A. Medians
- B. Angle bisectors
- C. Perpendicular bisectors
- D. Altitudes

5. Equal chords of a circle subtend:

- A. Equal angles at the centre
- B. Unequal angles at the centre
- C. Right angles always
- D. Supplementary angles

6. The perpendicular drawn from the centre of a circle to a chord:

- A. Doubles the chord
- B. Bisects the chord
- C. Is parallel to the chord
- D. Has no relation to the chord

7. If two chords of a circle have equal lengths, they are:

- A. At different distances from the centre
- B. Equidistant from the centre
- C. Always diameters
- D. Parallel

8. The angle subtended by an arc at the centre is:

- A. Half the angle at the circle
- B. Equal to the angle at the circle
- C. Twice the angle at the circle
- D. Four times the angle at the circle

9. The angle subtended by a diameter at any point on the circle is:

- A. 45°
- B. 60°

- C. 90°
- D. 180°

10. The opposite angles of a cyclic quadrilateral are:

- A. Equal
 - B. Complementary
 - C. Supplementary
 - D. Always 90°
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SECTION B – FILL IN THE BLANKS

1 mark each $\times$ 5 = 5 marks

- 11. The distance from the centre of a circle to any point on the circle is called the _____.
 - 12. A line segment joining two points on a circle is called a _____.
 - 13. A circle passing through the three vertices of a triangle is called its _____.
 - 14. Points lying on the same circle are called _____ points.
 - 15. The sum of two opposite angles of a cyclic quadrilateral is _____.
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SECTION C – VERY SHORT ANSWER QUESTIONS

2 marks each $\times$ 5 = 10 marks

- 16. A circle has radius 7 cm. Find its diameter.
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- 17. What is the relationship between the centre of a circle and the perpendicular bisector of a chord?
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18. Two chords of a circle have lengths 8 cm and 8 cm. What can you say about their distances from the centre? Give a reason.

19. What is the difference between a minor arc and a major arc?

20. Three points A, B and C are non-collinear. How many circles can pass through all three points? Explain briefly.

SECTION D – APPLICATION-BASED QUESTIONS

3 marks each × 3 = 9 marks

21. A circle has radius 13 cm. A chord is at a perpendicular distance of 5 cm from the centre.
Find the length of the chord.

22. An arc of a circle subtends an angle of 120° at the centre.
Find the angle subtended by the same arc at a point on the remaining part of the circle.

23. ABCD is a cyclic quadrilateral. If:

$$\angle A = 75^\circ$$

and

$$\angle B = 110^\circ$$

find:

a) $\angle C$

b) $\angle D$

SECTION E – CASE-BASED QUESTION

6 marks

Case Study: Chords of a Circle

A circular garden has centre O. Two chords AB and CD are drawn inside the garden. The perpendicular distances of AB and CD from O are equal. Another chord EF is longer than AB.

Answer the following:

24 (a). What can you say about the lengths of AB and CD?
(1 mark)

24 (b). If $AB = 12$ cm, find CD.
(1 mark)

24 (c). Which is closer to the centre: chord AB or chord EF?
(1 mark)

24 (d). State the theorem used in part (c).
(1 mark)

24 (e). If a perpendicular from O meets AB at M, what can you say about AM and MB?
(1 mark)

24 (f). State the theorem used in part (e).
(1 mark)

BONUS CHALLENGE

25. A cyclic quadrilateral has two opposite angles:

$$(2x + 10)^\circ$$

and

$$(3x - 20)^\circ$$

Find:

- a) the value of x
 - b) both angles
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QUICK REVISION BOX

Before submitting, make sure you remember:

- ☐ Diameter = $2 \times \text{radius}$
 - ☐ Diameter is the longest chord.
 - ☐ Equal chords $\rightarrow$ equal central angles.
 - ☐ Equal chords $\rightarrow$ equal distance from centre.
 - ☐ Perpendicular from centre to chord $\rightarrow$ bisects chord.
 - ☐ Longer chord $\rightarrow$ closer to centre.
 - ☐ Central angle = $2 \times \text{angle at circle}$.
 - ☐ Angle in a semicircle = 90° .
 - ☐ Opposite angles of cyclic quadrilateral = 180° .
 - ☐ Three non-collinear points determine a unique circle.
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ANSWER KEY

Section A

1. **B**
2. **C**
3. **D**
4. **C**
5. **A**
6. **B**

- 7. **B**
- 8. **C**
- 9. **C**
- 10. **C**

Section B

- 11. **Radius**
- 12. **Chord**
- 13. **Circumcircle**
- 14. **Concyclic**
- 15. **180°**

Section C

16.

$$\text{Diameter} = 2 \times 7 = 14 \text{ cm}$$

17.

The centre lies on the perpendicular bisector of every chord.

18.

They are equidistant from the centre because equal chords of a circle are equidistant from the centre.

19.

A minor arc is the smaller arc between two points; a major arc is the larger arc between the same two points.

20.

Exactly **one circle** can pass through three non-collinear points.

Section D

21.

$$\text{Chord} = 2\sqrt{r^2 - d^2}$$

$$= 2\sqrt{13^2 - 5^2}$$

$$= 2\sqrt{144}$$

$$= 24 \text{ cm}$$

22.

$$\text{Angle at circle} = 120^\circ / 2$$

$$= 60^\circ$$

23.

$$\angle A + \angle C = 180^\circ$$

$$\angle C = 180^\circ - 75^\circ = 105^\circ$$

$$\angle B + \angle D = 180^\circ$$

$$\angle D = 180^\circ - 110^\circ = 70^\circ$$

Section E

24(a). $AB = CD$

24(b). $CD = 12 \text{ cm}$

24(c). EF is closer to O.

24(d). The longer chord is closer to the centre.

24(e). $AM = MB$

24(f). The perpendicular from the centre to a chord bisects the chord.

Bonus

$$(2x + 10) + (3x - 20) = 180$$

$$5x - 10 = 180$$

$$5x = 190$$

$$x = 38$$

Angles:

$$2(38) + 10 = 86^\circ$$

$$3(38) - 20 = 94^\circ$$

✓ **Answer:** $x = 38$; angles = 86° and 94° .
