



Class 9 Maths – Chapter 5



Exercise 5.3 – Important Questions with Answer Key

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Exercise Set 5.3 contains **3 questions** based on the midpoint and perpendicular-bisector properties of chords.



1. Converse of the Chord Theorem

Question:

Why does the perpendicular from the centre of a circle to a chord bisect the chord?



Answer:

Let **AB** be a chord of a circle with centre **C**.

Let **CM** $\perp$ **AB**.

Therefore:

$$\angle CMA = \angle CMB = 90^\circ$$

Also:

$$CA = CB$$

because both are radii of the same circle.

And:

$$CM = CM$$

(common side)

Therefore, by **RHS congruence**:

$$\triangle CMA \cong \triangle CMB$$

Hence:

$$AM = BM$$

Therefore, **CM bisects chord AB**.

★ **Answer:**

The perpendicular from the centre of a circle to a chord bisects the chord.

2. Isosceles Triangle Inscribed in a Circle

Question:

An isosceles triangle ABC is inscribed in a circle, with **AB = AC**. Show that the altitude from A to BC passes through the centre of the circle.

 **Answer:**

Let **AD** be the altitude from A to BC.

Since:

$$\mathbf{AB = AC}$$

$\triangle ABC$ is isosceles.

Therefore, the altitude from A also bisects BC:

$$\mathbf{BD = DC}$$

Let **O** be the centre of the circle.

Since D is the midpoint of chord BC, the line joining the centre O to the midpoint D of the chord is perpendicular to BC.

Thus:

$$\mathbf{OD \perp BC}$$

But:

$$\mathbf{AD \perp BC}$$

Through a point D, only one perpendicular can be drawn to BC.

Therefore:

A, D and O are collinear.

Hence, the altitude **AD** passes through the centre **O**. ★

3. ★ Parallel Chords

Question:

Two parallel chords of lengths **6 cm** and **8 cm** are on opposite sides of the centre of a circle. The radius of the circle is **5 cm**. Find the distance between the midpoints of the chords.



Solution:

For the **6 cm chord**:

$$\text{Half chord} = 6/2 = \mathbf{3 \text{ cm}}$$

$$\text{Radius} = \mathbf{5 \text{ cm}}$$

Using Pythagoras:

Distance from centre to the midpoint of the 6 cm chord:

$$= \sqrt{5^2 - 3^2}$$

$$= \sqrt{25 - 9}$$

$$= \mathbf{4 \text{ cm}}$$

For the **8 cm chord**:

$$\text{Half chord} = 8/2 = \mathbf{4 \text{ cm}}$$

Distance from centre to midpoint:

$$= \sqrt{5^2 - 4^2}$$

$$= \sqrt{25 - 16}$$

$$= \mathbf{3 \text{ cm}}$$

The chords are on **opposite sides** of the centre.

Therefore, distance between their midpoints:

$$= 4 + 3$$

$$= 7 \text{ cm}$$

✓ **Answer:**

7 cm

ANSWER KEY

- | Q | Answer |
|---|---|
| 1 | Perpendicular from centre to chord bisects the chord |
| 2 | Altitude from A passes through the centre |
| 3 | 7 cm |

★ **Chapter 5 Key Rule**

Centre $\rightarrow$ midpoint of chord $\Rightarrow$ perpendicular to chord

Centre $\rightarrow$ perpendicular to chord $\Rightarrow$ chord is bisected

These are the theorem and its converse developed immediately before Exercise 5.3.