



Class 9 Maths – Chapter 5



Exercise 5.5 – Questions with Answer Key

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Exercise Set 5.5 has **2 questions**, based on the relationship between the **length of a chord**, the **radius of the circle**, and the **perpendicular distance of the chord from the centre**.



1. Find the Length of the Chord

Question:

Find the length of the chord of a circle where the **radius is 7 cm** and the **perpendicular distance from the centre is 6 cm**.



Solution:

Let:

- Radius, **$r = 7$ cm**
- Distance from centre to chord, **$d = 6$ cm**
- Half of the chord = **x**

Using the Baudhāyana–Pythagoras theorem:

$$r^2 = d^2 + x^2$$

So,

$$x^2 = r^2 - d^2$$

$$x^2 = 7^2 - 6^2$$

$$x^2 = 49 - 36$$

$$x^2 = 13$$

Therefore,

$$x = \sqrt{13} \text{ cm}$$

The full chord is twice the half-chord:

$$\text{Chord} = 2\sqrt{13} \text{ cm}$$

✓ **Answer:**

$$2\sqrt{13} \text{ cm}$$

Approximately:

$$7.21 \text{ cm}$$

2. ★ Derive the Chord-Length Formula

Question:

Explain why the following statement is true:

If the perpendicular distance of a chord from the centre is **d** and the radius is **r**, then the chord length is $2\sqrt{r^2 - d^2}$.

 **Solution:**

Let:

- **O** = centre of the circle
- **AB** = chord
- **OM** $\perp$ **AB**
- **OM** = **d**
- **OA** = **r**

The perpendicular from the centre to a chord **bisects the chord**.

Therefore:

$$\text{AM} = \text{MB}$$

Let:

$$\text{AM} = x$$

Then:

$$\text{AB} = 2x$$

Now consider right triangle **OMA**.

Using the Baudhāyana–Pythagoras theorem:

$$\mathbf{OA^2 = OM^2 + AM^2}$$

Substituting:

$$\mathbf{r^2 = d^2 + x^2}$$

Therefore:

$$\mathbf{x^2 = r^2 - d^2}$$

So:

$$\mathbf{x = \sqrt{(r^2 - d^2)}}$$

Since:

$$\mathbf{AB = 2x}$$

we get:

$$\mathbf{AB = 2\sqrt{(r^2 - d^2)}}$$

✅ **Answer:**

$$\mathbf{Chord\ length = 2\sqrt{(r^2 - d^2)}} \star$$

ANSWER KEY

Q1. $2\sqrt{13}\text{ cm} \approx 7.21\text{ cm}$

Q2. $\text{Chord length} = 2\sqrt{(r^2 - d^2)}$

★ **Remember**

Half chord $= \sqrt{(r^2 - d^2)}$

Full chord $= 2\sqrt{(r^2 - d^2)}$

Also, the chapter establishes that **the longer chord is closer to the centre**, while the diameter is the greatest possible chord.