



Class 9 Maths – Chapter 6



Exercise 6.3 – Questions with Answer Key

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Instruction: Unless stated otherwise, use $\pi = 22/7$. For Questions 4, 5 and 8–10, use the approximations specifically given in the textbook.



1. Area of a Sector

Question: Find the area of a sector of a circle with radius **7 cm** and angle **60°**.



Solution:

Area of sector:

$$A = (\theta/360^\circ) \times \pi r^2$$

$$= (60/360) \times 22/7 \times 7^2$$

$$= 1/6 \times 22/7 \times 49$$

$$= 77/3 \text{ cm}^2$$



Answer:

$$77/3 \text{ cm}^2 \approx 25.67 \text{ cm}^2$$



2. Area of a Quadrant

Question: Find the area of a quadrant of a circle whose circumference is **44 cm**.



Solution:

Circumference:

$$2\pi r = 44$$

$$2 \times \frac{22}{7} \times r = 44$$

$$r = 7 \text{ cm}$$

Area of quadrant:

$$= \frac{1}{4} \times \pi r^2$$

$$= \frac{1}{4} \times \frac{22}{7} \times 49$$

$$= \frac{77}{2} \text{ cm}^2$$

 **Answer:**

$$38.5 \text{ cm}^2$$

3. Area Swept by a Clock Hand

Question: The minute hand of a clock is **7 cm** long. Find the area swept by the minute hand in **10 minutes**.

 **Solution:**

In 60 minutes, the minute hand completes **360°**.

In 10 minutes:

$$\theta = \frac{10}{60} \times 360^\circ$$

$$= 60^\circ$$

Area swept:

$$= \frac{60}{360} \times \frac{22}{7} \times 7^2$$

$$= \frac{77}{3} \text{ cm}^2$$

 **Answer:**

$$77/3 \text{ cm}^2 \approx 25.67 \text{ cm}^2$$

4. Minor and Major Sectors

Question: A chord of a circle of radius **10 cm** subtends **90°** at the centre. Find the areas of:

- (i) Minor sector
- (ii) Major sector

Use $\pi = 3.14$.

(i) Minor sector

Area:

$$= 90/360 \times 3.14 \times 10^2$$

$$= 1/4 \times 314$$

$$= 78.5 \text{ cm}^2$$

(ii) Major sector

Major angle:

$$360^\circ - 90^\circ$$

$$= 270^\circ$$

Area:

$$= 270/360 \times 3.14 \times 100$$

$$= 235.5 \text{ cm}^2$$

Answers:

(i) 78.5 cm^2

(ii) 235.5 cm^2

5. Minor and Major Segments

Question: A chord of a circle of radius **15 cm** subtends an angle of **60°** at the centre. Find the areas of the corresponding minor and major segments.

Use:

$$\pi = 3.14$$

and

$$\sqrt{3} \approx 1.73$$

Step 1: Area of the sector

Area of 60° sector:

$$= 60/360 \times 3.14 \times 15^2$$

$$= 117.75 \text{ cm}^2$$

Step 2: Area of triangle

The two radii and chord form an equilateral triangle because the central angle is 60°.

Side = 15 cm.

Area:

$$= \sqrt{3}/4 \times 15^2$$

$$= 1.73/4 \times 225$$

$$= 97.3125 \text{ cm}^2$$

Step 3: Minor segment

Minor segment:

$$= \text{Sector area} - \text{Triangle area}$$

$$= 117.75 - 97.3125$$

$$= 20.4375 \text{ cm}^2$$

Step 4: Major segment

Area of complete circle:

$$= 3.14 \times 15^2$$

$$= 706.5 \text{ cm}^2$$

Major segment:

$$= \text{Circle area} - \text{Minor segment}$$

$$= 706.5 - 20.4375$$

$$= 686.0625 \text{ cm}^2$$

✓ **Answers:**

Minor segment = 20.44 cm² approximately

Major segment = 686.06 cm² approximately

This is one of the most important applications in Exercise 6.3 because it combines **sector area + triangle area + circle area**.

6. Car Wipers

Question: A car has two wipers that do not overlap. Each wiper has a blade length of **28 cm** and sweeps through an angle of **120°**. Find the total area cleaned during each sweep.

 **Solution:**

Area cleaned by one wiper:

$$= 120/360 \times 22/7 \times 28^2$$

$$= 1/3 \times 22/7 \times 784$$

$$= 616/3 \text{ cm}^2$$

$$\approx 205.33 \text{ cm}^2$$

For two wipers:

$$= 2 \times 616/3$$

$$= 1232/3 \text{ cm}^2$$

$$\approx 410.67 \text{ cm}^2$$

✓ **Answer:**

410.67 cm² approximately

The textbook states that the two wipers do not overlap, so their swept sector areas can be added.

7. Minor Segment Formula

Question: A chord of a circle of radius r subtends 60° at the centre. Show that the area of the corresponding minor segment is

$$\pi r^2/6 - (\sqrt{3}/4)r^2$$

 **Proof:**

Area of 60° sector:

$$= 60/360 \times \pi r^2$$

$$= \pi r^2/6$$

The two radii and the chord form an **equilateral triangle**.

Area of equilateral triangle:

$$= \sqrt{3}/4 r^2$$

Therefore:

Minor segment area

$$= \text{Sector area} - \text{Triangle area}$$

$$= \pi r^2/6 - \sqrt{3}r^2/4$$

✓ **Answer:**

$$\text{Minor segment area} = \pi r^2/6 - (\sqrt{3}/4)r^2$$

This is exactly the result requested in Question 7.

8. Equilateral Triangle Inscribed in a Circle

Question: An equilateral triangle is inscribed in a circle of radius r . Show that the ratio of the area of the triangle to the area of the circle is:

$$3\sqrt{3} / 4\pi \approx 0.413$$

 **Solution:**

The three radii divide the circle into three 120° sectors.

For an equilateral triangle inscribed in the circle, its side is:

$$\sqrt{3}r$$

Area of equilateral triangle:

$$= \sqrt{3}/4 \times (\sqrt{3}r)^2$$

$$= \sqrt{3}/4 \times 3r^2$$

$$= 3\sqrt{3}r^2/4$$

Area of circle:

$$= \pi r^2$$

Therefore:

Ratio:

$$= (3\sqrt{3}r^2/4)/(\pi r^2)$$

$$= 3\sqrt{3}/4\pi$$

Using $\sqrt{3} \approx 1.73$:

$$\approx 0.413$$

✓ **Answer:**

$$3\sqrt{3} : 4\pi$$

or

$$3\sqrt{3}/(4\pi) \approx 0.413$$

9. Square Inscribed in a Circle

Question: A square is inscribed in a circle of radius r . Show that the ratio of the area of the square to the area of the circle is:

$$2/\pi \approx 0.637$$

 **Solution:**

The diagonal of the square is the diameter of the circle.

Therefore:

$$\text{Diagonal} = 2r$$

For a square:

$$d^2 = 2a^2$$

So:

$$(2r)^2 = 2a^2$$

$$4r^2 = 2a^2$$

$$a^2 = 2r^2$$

Therefore, area of square:

$$2r^2$$

Area of circle:

$$\pi r^2$$

Ratio:

$$= 2r^2/\pi r^2$$

$$= 2/\pi$$

$$\approx 0.637$$

✓ **Answer:**

$$2/\pi \approx 0.637$$

10. Regular Hexagon Inscribed in a Circle

Question: A hexagon is inscribed in a circle of radius r . Show that the ratio of the area of the hexagon to the area of the circle is:

$$3\sqrt{3} / 2\pi \approx 0.827$$

 **Solution:**

A regular hexagon inscribed in a circle can be divided into **6 equilateral triangles**.

Each triangle has side r .

Area of one equilateral triangle:

$$= \sqrt{3}r^2/4$$

Area of six triangles:

$$= 6 \times \sqrt{3}r^2/4$$

$$= 3\sqrt{3}r^2/2$$

Therefore:

Area of hexagon:

$$3\sqrt{3}r^2/2$$

Area of circle:

$$\pi r^2$$

Ratio:

$$= (3\sqrt{3}r^2/2)/(\pi r^2)$$

$$= 3\sqrt{3}/2\pi$$

$$\approx 0.827$$

✓ **Answer:**

$$3\sqrt{3}/2\pi \approx 0.827$$

The textbook also asks you to notice that this result is **exactly twice the answer to Question 8**.



COMPLETE ANSWER KEY

Q.	Answer
1	$77/3 \text{ cm}^2 \approx 25.67 \text{ cm}^2$
2	38.5 cm^2
3	$77/3 \text{ cm}^2 \approx 25.67 \text{ cm}^2$
4(i)	78.5 cm^2
4(ii)	235.5 cm^2
5	Minor segment $\approx 20.44 \text{ cm}^2$; Major segment $\approx 686.06 \text{ cm}^2$
6	$\approx 410.67 \text{ cm}^2$
7	$\pi r^2/6 - \sqrt{3}r^2/4$
8	$3\sqrt{3}/4\pi \approx 0.413$
9	$2/\pi \approx 0.637$
10	$3\sqrt{3}/2\pi \approx 0.827$

★ **Chapter 6.3 Must-Remember**

 **Area of circle = πr^2**

 **Area of sector = $(\theta/360^\circ) \times \pi r^2$**

 **Minor segment = Minor sector – Triangle**

 **Major segment = Circle – Minor segment**

 **Equilateral triangle area = $\sqrt{3}a^2/4$**

 **Square inscribed in circle: diagonal = diameter = $2r$**

 **Regular hexagon inscribed in circle: it forms **6 equilateral triangles****

The textbook's Chapter 6 summary gives the sector-area formula and the circle-area formula used throughout this exercise.