

# Class 6 Geometry Worksheet

By Thinking Juggernaut

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Total Marks: 24

## 🎯 Class 6 Geometry Concepts

### Circle Terminology:

- **Radius (r):** Distance from center to any point on the circle
- **Diameter (d):** Distance across the circle through center ( $d = 2r$ )
- **Chord:** Line segment joining any two points on the circle
- **Circumference:** Perimeter of the circle =  $2\pi r$  or  $\pi d$  ( $\pi \approx 22/7$  or 3.14)
- **Arc:** Part of the circumference

THINKING

### Circle Formulas:

- Circumference =  $2\pi r = \pi d$
- Area of circle =  $\pi r^2$

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### Surface Area of 3D Shapes:

- **Cube:** Surface Area =  $6 \times (\text{side})^2$
- **Cuboid:** Surface Area =  $2(lb + bh + hl)$
- **Cylinder:** Curved Surface Area =  $2\pi rh$ , Total Surface Area =  $2\pi r(r + h)$

### Lines of Symmetry:

- Line that divides a figure into two identical halves
- Circle has infinite lines of symmetry
- Square has 4 lines of symmetry
- Rectangle has 2 lines of symmetry

### Basic Constructions:

- Perpendicular bisector of a line segment
- Angle bisector
- Circle with given radius

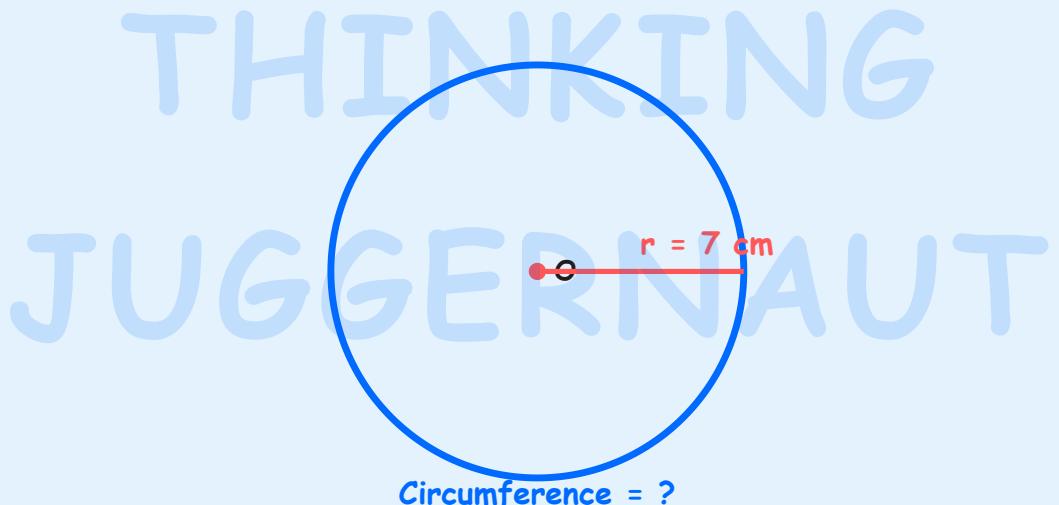
- Perpendicular to a line from a point

**Special Angle Pairs:**

- Linear Pair: Adjacent angles on a straight line (sum =  $180^\circ$ )
- Angles around a point: Sum =  $360^\circ$
- Reflex Angle: Angle between  $180^\circ$  and  $360^\circ$

**Sample Problem**

**Problem:** Find the circumference of a circle with radius 7 cm. (Use  $\pi = 22/7$ )

**Solution:**

$$\text{Circumference} = 2\pi r$$

$$\text{Circumference} = 2 \times (22/7) \times 7$$

$$\text{Circumference} = 2 \times 22$$

$$\text{Circumference} = 44 \text{ cm}$$

**Answer:** The circumference is 44 cm!

## Part A: Warm-up Questions

★ Easy Level

1. If the radius of a circle is 14 cm, what is its diameter?

2. How many lines of symmetry does a square have?

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3. True or False: The diameter is the longest chord in a circle.

True  False

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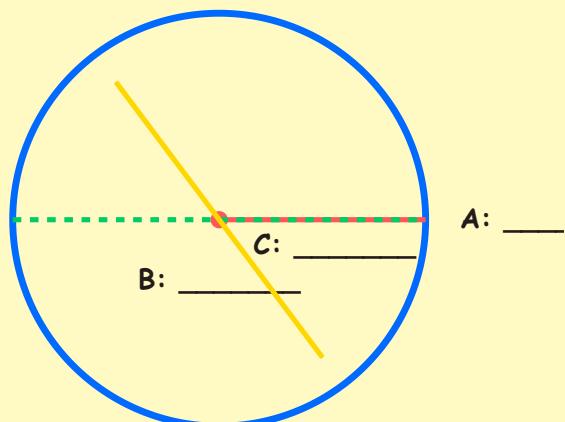
4. What is the sum of angles around a point?

5. Find the surface area of a cube with side 5 cm.

$$\text{Surface Area} = 6 \times (\text{side})^2$$

$$\text{Surface Area} = \underline{\hspace{2cm}} \text{ cm}^2$$

6. Label the parts of the circle:



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7. Find the circumference of a circle with diameter 21 cm. (Use  $\pi = 22/7$ )

Circumference =  $\pi d$

Circumference = \_\_\_\_\_ cm

8. Three angles meet at a point. Two angles are  $110^\circ$  and  $120^\circ$ . Find the third angle.

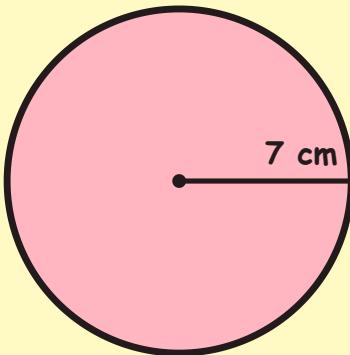
Sum of angles at a point =  $360^\circ$

Third angle = \_\_\_\_\_  $^\circ$

## Part B: Practice Questions

★★ Medium Level

9. Find the area of a circle with radius 7 cm. (Use  $\pi = 22/7$ )



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$$\text{Area} = \pi r^2$$

$$\text{Area} = (22/7) \times 7 \times 7 = \text{_____} \text{ cm}^2$$

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10. A cuboid has length 10 cm, width 6 cm, and height 4 cm. Find its total surface area.

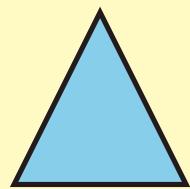
$$\text{Surface Area} = 2(lb + bh + hl)$$

$$\text{Surface Area} = 2(10 \times 6 + 6 \times 4 + 4 \times 10)$$

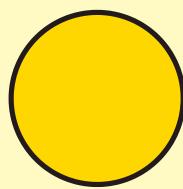
$$\text{Surface Area} = 2(60 + 24 + 40)$$

$$\text{Surface Area} = \text{_____} \text{ cm}^2$$

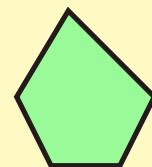
11. How many lines of symmetry does each shape have?



Equilateral Triangle



Circle



Pentagon

a) Equilateral Triangle: \_\_\_\_\_ lines

b) Circle: \_\_\_\_\_ lines

c) Regular Pentagon: \_\_\_\_\_ lines

12. The circumference of a circle is 44 cm. Find its radius. (Use  $\pi = 22/7$ )

$$\text{Circumference} = 2\pi r$$

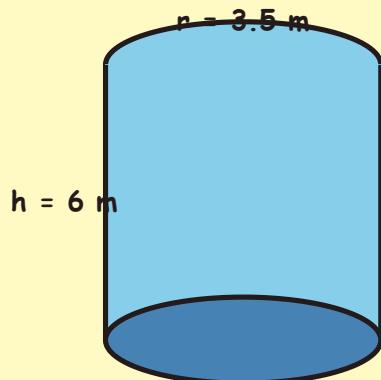
$$44 = 2 \times (22/7) \times r$$

$$r = \underline{\hspace{2cm}} \text{ cm}$$

13. True or False: A reflex angle is greater than  $180^\circ$  but less than  $360^\circ$ .

- True
- False

14. A cylindrical water tank has radius 3.5 m and height 6 m. Find its curved surface area. (Use  $\pi = 22/7$ )



Curved Surface Area =  $2\pi rh$

CSA = \_\_\_\_\_ m<sup>2</sup>

# THINKING

15. Find the reflex angle for an angle of  $75^\circ$ .

Reflex angle =  $360^\circ$  - given angle

Reflex angle = \_\_\_\_\_ °

16. A rectangular garden is 20 m long and 15 m wide. A circular fountain with diameter 7 m is built in the center. Find the remaining area. (Use  $\pi = 22/7$ )

Area of garden =  $20 \times 15 =$  \_\_\_\_\_ m<sup>2</sup>

Radius of fountain =  $7 \div 2 =$  \_\_\_\_\_ m

Area of fountain =  $\pi r^2 =$  \_\_\_\_\_ m<sup>2</sup>

Remaining area = \_\_\_\_\_ m<sup>2</sup>

17. Match the terms with their definitions:

Column A (Term)	Column B (Definition)
a) Chord	i) Distance from center to circumference
b) Radius	ii) Line segment joining two points on circle
c) Arc	iii) Part of the circumference

Write your answers: a-\_\_\_\_, b-\_\_\_\_, c-\_\_\_\_

18. The surface area of a cube is  $294 \text{ cm}^2$ . Find the length of its edge.

$$\text{Surface Area} = 6 \times (\text{side})^2$$

$$294 = 6 \times (\text{side})^2$$

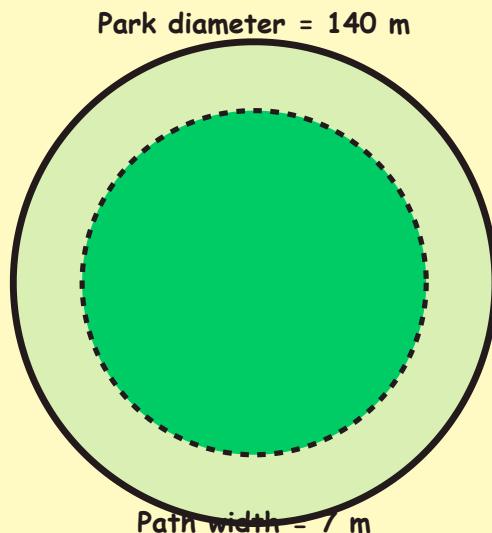
$$(\text{side})^2 = 294 \div 6 = \underline{\hspace{2cm}}$$

$$\text{side} = \underline{\hspace{2cm}} \text{ cm}$$

### Part C: Challenge Questions

★★★ Hard Level

19. A circular park has a diameter of 140 m. A path 7 m wide runs around the outside of the park. Find the area of the path. (Use  $\pi = 22/7$ )



$$\text{Radius of park} = 140 \div 2 = \underline{\hspace{2cm}} \text{ m}$$

$$\text{Radius of park + path} = 70 + 7 = \underline{\hspace{2cm}} \text{ m}$$

$$\text{Area of park + path} = \pi \times 77^2 = \underline{\hspace{2cm}} \text{ m}^2$$

$$\text{Area of park only} = \pi \times 70^2 = \underline{\hspace{2cm}} \text{ m}^2$$

$$\text{Area of path} = \underline{\hspace{2cm}} \text{ m}^2$$

**20.** A room is 8 m long, 6 m wide, and 4 m high. Find the cost of painting its four walls and ceiling at ₹25 per m<sup>2</sup>.

$$\text{Area of four walls} = 2h(l + w)$$

$$\text{Area of walls} = 2 \times 4 \times (8 + 6) = \underline{\hspace{2cm}} \text{ m}^2$$

$$\text{Area of ceiling} = l \times w = 8 \times 6 = \underline{\hspace{2cm}} \text{ m}^2$$

$$\text{Total area} = \underline{\hspace{2cm}} + \underline{\hspace{2cm}} = \underline{\hspace{2cm}} \text{ m}^2$$

$$\text{Cost} = \underline{\hspace{2cm}} \times ₹25 = ₹\underline{\hspace{2cm}}$$

**21.** A wire is bent to form a circle of radius 28 cm. If the same wire is bent to form a square, what will be the side of the square? (Use  $\pi = 22/7$ )

Circumference of circle =  $2\pi r$

Length of wire =  $2 \times (22/7) \times 28 = \underline{\hspace{2cm}}$  cm

Perimeter of square = Length of wire

$4 \times \text{side} = \underline{\hspace{2cm}}$

Side of square =  $\underline{\hspace{2cm}}$  cm

**22.** The minute hand of a clock is 10.5 cm long. How far does its tip move in 20 minutes? (Use  $\pi = 22/7$ )

Hint: In 60 minutes, the tip travels the full circumference

Circumference =  $2\pi r = 2 \times (22/7) \times 10.5 = \underline{\hspace{2cm}}$  cm

In 20 minutes, distance =  $(20/60) \times \text{circumference}$

Distance =  $(1/3) \times \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$  cm

**23.** A cylinder and a cube have the same height of 10 cm. The radius of the cylinder is 7 cm. If both have the same total surface area, find the side of the cube. (Use  $\pi = 22/7$ )

TSA of cylinder =  $2\pi r(r + h)$

TSA =  $2 \times (22/7) \times 7 \times (7 + 10) = \underline{\hspace{2cm}}$  cm<sup>2</sup>

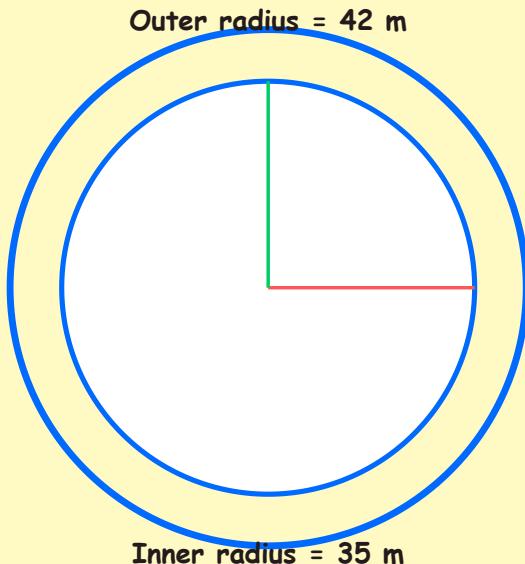
TSA of cube =  $6 \times (\text{side})^2$

$6 \times (\text{side})^2 = \underline{\hspace{2cm}}$

$(\text{side})^2 = \underline{\hspace{2cm}}$

side =  $\underline{\hspace{2cm}}$  cm (approximately)

**24.** Complex Problem: A circular running track has an inner radius of 35 m and an outer radius of 42 m. Find:



a) Area of the track (Use  $\pi = 22/7$ )

$$\text{Outer area} = \pi \times 42^2 = \underline{\hspace{2cm}} \text{ m}^2$$

$$\text{Inner area} = \pi \times 35^2 = \underline{\hspace{2cm}} \text{ m}^2$$

$$\text{Track area} = \underline{\hspace{2cm}} - \underline{\hspace{2cm}} = \underline{\hspace{2cm}} \text{ m}^2$$

b) Difference between outer and inner circumferences

$$\text{Outer circumference} = 2\pi \times 42 = \underline{\hspace{2cm}} \text{ m}$$

$$\text{Inner circumference} = 2\pi \times 35 = \underline{\hspace{2cm}} \text{ m}$$

$$\text{Difference} = \underline{\hspace{2cm}} \text{ m}$$



## Answer Key

### Part A: Warm-up Questions

1. Diameter =  $2 \times \text{radius} = 2 \times 14 = 28 \text{ cm}$

2. 4 lines of symmetry (2 diagonals + 2 lines through midpoints of opposite sides)
3. True (The diameter is the longest chord in a circle)
4.  $360^\circ$
5. Surface Area =  $6 \times 5^2 = 6 \times 25 = 150 \text{ cm}^2$
6. A: Radius, B: Diameter, C: Chord
7. Circumference =  $(22/7) \times 21 = 66 \text{ cm}$
8. Third angle =  $360^\circ - 110^\circ - 120^\circ = 130^\circ$

### Part B: Practice Questions

9. Area =  $(22/7) \times 7 \times 7 = 154 \text{ cm}^2$
10. Surface Area =  $2(60 + 24 + 40) = 2 \times 124 = 248 \text{ cm}^2$
11. a) 3 lines; b) Infinite lines; c) 5 lines
12.  $44 = 2 \times (22/7) \times r \rightarrow r = 44 \times 7 / (2 \times 22) = 7 \text{ cm}$
13. True
14. CSA =  $2 \times (22/7) \times 3.5 \times 6 = 132 \text{ m}^2$
15. Reflex angle =  $360^\circ - 75^\circ = 285^\circ$
16. Garden area =  $300 \text{ m}^2$ ; Fountain radius =  $3.5 \text{ m}$ ; Fountain area =  $(22/7) \times 3.5^2 = 38.5 \text{ m}^2$ ; Remaining =  $300 - 38.5 = 261.5 \text{ m}^2$
17. a-ii, b-i, c-iii
18.  $(\text{side})^2 = 49$ ; side =  $7 \text{ cm}$

### Part C: Challenge Questions

19. Park radius = 70 m; Outer radius = 77 m; Outer area =  $(22/7) \times 77^2 = 18,634 \text{ m}^2$ ;  
 Park area =  $(22/7) \times 70^2 = 15,400 \text{ m}^2$ ; Path area = 3,234  $\text{m}^2$

20. Walls =  $2 \times 4 \times 14 = 112 \text{ m}^2$ ; Ceiling = 48  $\text{m}^2$ ; Total = 160  $\text{m}^2$ ; Cost =  $160 \times ₹25 = ₹4,000$

21. Wire length =  $2 \times (22/7) \times 28 = 176 \text{ cm}$ ; Side =  $176 \div 4 = 44 \text{ cm}$

22. Circumference =  $2 \times (22/7) \times 10.5 = 66 \text{ cm}$ ; Distance in 20 min =  $(1/3) \times 66 = 22 \text{ cm}$

23. Cylinder TSA =  $2 \times (22/7) \times 7 \times 17 = 748 \text{ cm}^2$ ;  $6 \times (\text{side})^2 = 748$ ;  $(\text{side})^2 \approx 124.67$ ;  
 side  $\approx 11.16 \text{ cm}$

24. a) Outer area =  $(22/7) \times 1764 = 5,544 \text{ m}^2$ ; Inner area =  $(22/7) \times 1225 = 3,850 \text{ m}^2$ ; Track = 1,694  $\text{m}^2$ . b) Outer C = 264 m; Inner C = 220 m; Difference = 44 m

## Scoring Guide

Total Questions: 24 | Total Marks: 24

Score Range	Performance Level	What to Do Next
20-24	 Excellent!	<b>Outstanding performance!</b> You've mastered Class 6 geometry. <b>Next steps:</b> Explore advanced circle theorems, learn about sectors and segments, study properties of parallel lines and transversals, practice advanced constructions (angle trisection, regular polygons), and begin exploring mensuration of irregular shapes.
15-19	 Very Good!	<b>Great job!</b> You understand circles and surface area well. <b>Focus on:</b> Master circle formulas (circumference and area). Practice surface area problems for all 3D shapes. Work on complex word problems involving circles. Understand the relationship between radius, diameter, and circumference. Practice constructions with compass and ruler.

10-14	⭐ Good Effort!	<b>Good start!</b> You're learning advanced concepts. <b>Work on:</b> Memorize $\pi = 22/7$ and practice using it in formulas. Learn surface area formulas one shape at a time. Practice identifying parts of a circle (radius, diameter, chord, arc). Understand lines of symmetry in regular shapes. Do simpler circle problems before complex ones.
0-9	Keep Trying!	<b>Don't give up!</b> These concepts need practice. <b>Start with:</b> Learn the relationship between radius and diameter first. Practice circumference before area. Understand what $\pi$ represents. Draw circles and label all parts. Work on basic surface area (cube) before complex shapes. Ask your teacher for extra help on fundamental concepts.



### Tips for Mastering Class 6 Geometry:

- **Circle Formulas - Critical:**

- Remember: diameter =  $2 \times$  radius ( $d = 2r$ )
- Circumference =  $2\pi r$  OR  $\pi d$  (both work!)
- Area =  $\pi r^2$  (radius must be squared)
- Use  $\pi = 22/7$  for calculations (unless told to use 3.14)

- **Surface Area Formulas - Must Know:**

- Cube:  $SA = 6a^2$  (6 faces, each face =  $a^2$ )
- Cuboid:  $SA = 2(lb + bh + hl)$
- Cylinder:  $CSA = 2\pi rh$ ,  $TSA = 2\pi r(r + h)$
- Remember: Surface area is total area of all faces

- **Circle Parts - Essential Vocabulary:**

- Radius: Center to edge (half of diameter)
- Diameter: Longest chord, passes through center
- Chord: Any line joining two points on circle
- Arc: Part of the circle's edge
- Circumference: Distance around the circle (perimeter)

- **Symmetry Rules:**

- Circle: Infinite lines of symmetry
- Square: 4 lines (2 diagonals + 2 through midpoints)
- Rectangle: 2 lines (through midpoints of opposite sides)
- Equilateral triangle: 3 lines
- Regular pentagon: 5 lines, hexagon: 6 lines

- **Problem-Solving Tips:**

- For "path around" problems: Find outer area - inner area

- For wire bending problems: Perimeter stays same
  - Always check units: convert cm to m if needed
  - Draw diagrams for word problems
  - Label all given information on your diagram
- **Common Mistakes to Avoid:**
    - Don't confuse radius and diameter
    - Area formulas use  $r^2$ , not  $r$
    - Don't forget to multiply by  $\pi$  in circle formulas
    - Surface area needs ALL faces, not just one
    - Cancel  $\pi/7$  with 7 before multiplying large numbers
  - **Construction Skills:** Practice with compass and ruler. Learn to draw circles, perpendicular bisectors, and angle bisectors accurately

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