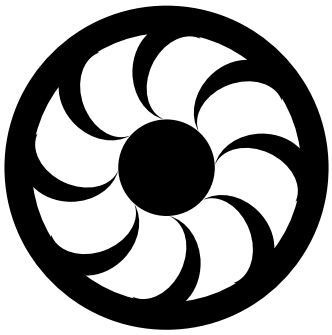
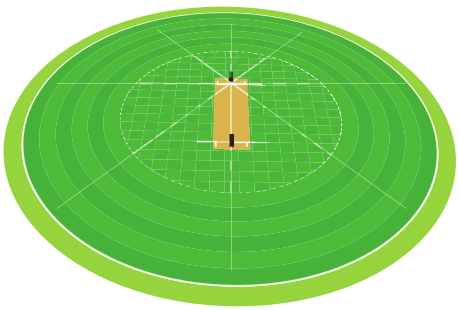
Circumference and Area of a Circle

Contents

1. Introduction

- **Circle** is very important shape in Geometry. Since it is used in various fields its study is important.
- Understanding the concepts of **Area and Circumference** of a Circle is crucial as it is applied in real life like Construction and even in our daily life measurements. Some of them are -





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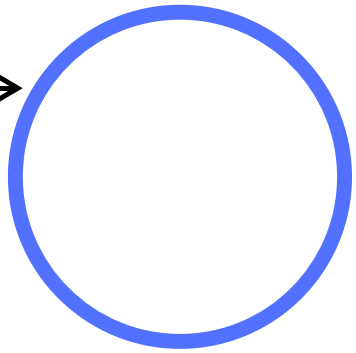
2. Circumference of A Circle

- The **Perimeter of a Circle** is **Circumference**. Basically it is the length of circle's **boundary**. It is one-dimensional.
- Circumference is used to find the length of a track or wheel's perimeter like problems in real life.
- We can find Circumference of a Circle using its radius with the help of following formula -

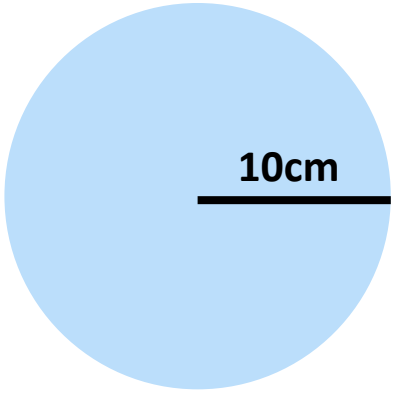
Circumference = π X d

(2 X r = Diameter)

Circumference = 2πr



Example: Find the Circumference of the Circle with radius 10cm.



Solution: Formula -

Circumference = 2πr

= (2 X 3.14 X 10)cm

= 62.8 cm

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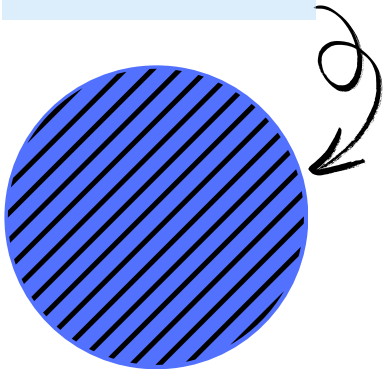
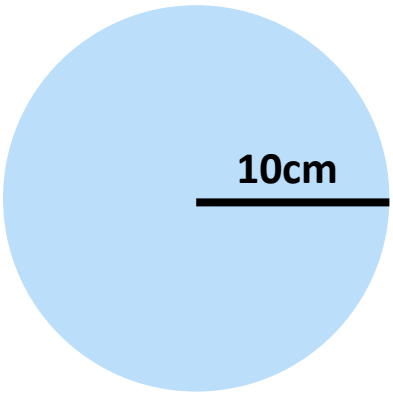
3. Area of A Circle

- The **space enclosed** by circumference of Circle is called its **Area**. It is two-dimensional.
- Used to measure the circular object's area present in real life.
- The formula of Area of circle is -

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



Example: Find the Area of the Circle with radius 10cm.



Solution: Formula -

$$\text{Area} = \pi r^2$$
$$= (3.14 \times 10 \times 10)\,cm^2$$
$$= 314\ cm^2$$

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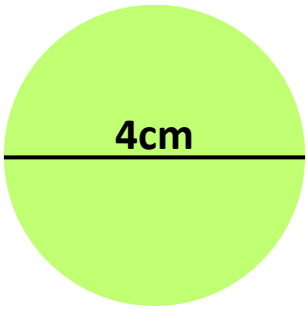
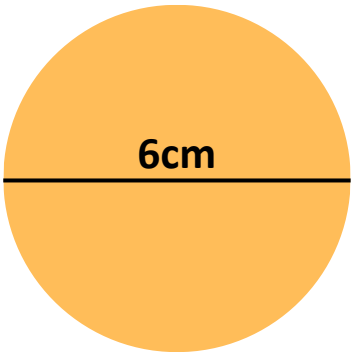
4. Solved Examples of Area and Circumference of A Circle

Example: Find out the Circumference and area of the following circles using there diameters -

(a)



(b)



Solution: First we find the radius of the circle -

(a) Diameter = 4cm

Radius = $\frac{4}{2}$ = **2cm**

Circumference = 2πr

Circumference = (2 X 3.14 X 2)cm

Circumference = 8.56 cm

Area = πr^2

Area = (3.14 X 2 X 2) cm^2

Area = 12.56 cm^2 **(using π = 3.14)**

(b) Diameter = 6cm

Radius = $\frac{6}{2}$ = **3cm**

Circumference = 2πr

Circumference = (2 X 3.14 X 3)cm

Circumference = 18.84 cm

Area = πr^2

Area = (3.14 X 3 X 3) cm^2

Area = 28.26 cm^2 **(using π = 3.14)**

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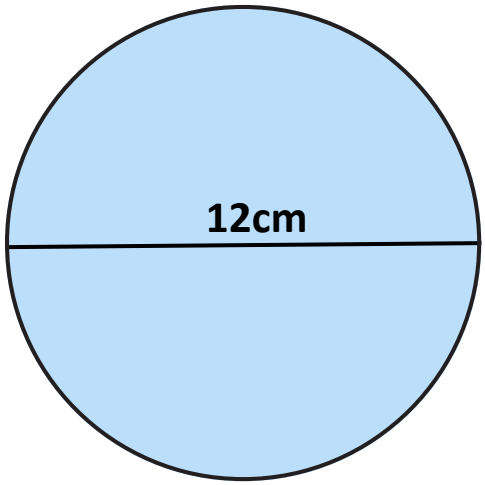
Example: Find out the Circumference and area of the circle in terms of π -



Solution: The diameter of the circle is given using it we can find the circumference -

Circumference = π X diameter

Circumference = (π X 12) cm

Circumference = 12π cm

To find the Area we need to find the diameter first, So -

Diameter = 12cm, Radius = $\frac{12}{2}$ = **6cm**

Area = πr^2

Area = π (6)^2

Area = 36π cm^2

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Example: Fill in the blanks -

Sr. No.	RADIUS	DIAMETER	AREA	CIRCUMFERENCE
1	.....	20cm	.....	.....
2	.....	.....	.....	56.52cm
3	5cm	.....	.....	.....

Solution:

(1) The Diameter of the Circle is 20cm, So -

$$\text{Radius} = \frac{20}{2} = 10\text{cm}$$

$$\text{Circumference} = \pi \times \text{diameter}$$

$$\text{Circumference} = (3.14 \times 20)\text{cm}$$

$$\text{Circumference} = 62.8\text{cm}$$

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

$$\text{Area} = 3.14 \times (10)^2\ \text{cm}^2$$

$$\text{Area} = 314\text{cm}^2 \qquad (\text{using } \pi = 3.14)$$

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(2) The Circumference is given with which we can find the diameter of Circle -

Circumference = 56.52cm

We can write - π X diameter = 56.52

3.14 X diameter = 56.52

$$\text{diameter} = \frac{56.52}{3.14} = 18\text{cm}$$

From diameter, $$\text{radius} = \frac{18}{2} = 9\text{cm}$$

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

$\text{Area} = 3.14 \times (9)^2$

$\text{Area} = 254.34\text{cm}^2$ (using $\pi = 3.14$)

(3) The Radius of the Circle is 5cm, So -

Diameter = 5 X 2 = 10cm

Circumference = π X diameter

Circumference = (3.14 X 10)cm

Circumference = 31.4cm

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

$\text{Area} = 3.14 \times (5)^2\ \text{cm}^2$

$\text{Area} = 78.50\text{cm}^2$ (using $\pi = 3.14$)

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Final answer:

Sr. No.	RADIUS	DIAMETER	AREA	CIRCUMFERENCE
1	10cm	20cm	$314cm^2$	$62.8cm^2$
2	9cm	18cm	$254.34cm^2$	56.52cm
3	5cm	10cm	$78.50cm^2$	31.4cm