

CHAPTER 12

Areas Related to Circles

Introduction:

In this chapter, we will learn how to find the perimeter and areas related to circular figures and we will apply this knowledge to find the areas of some special parts of a circular region like sector, segment and combinations of plane figures.

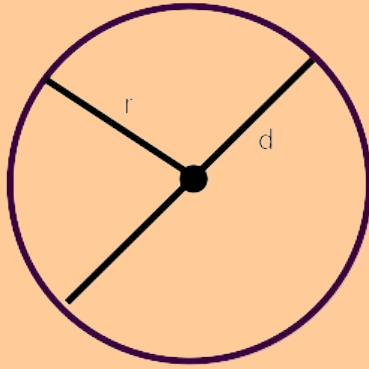
Perimeter and areas of a circle:

Definition of perimeter:

The distance covered by travelling once around the circle is called perimeter.

The perimeter of a circle is called its circumference.

$$\therefore \text{Circumference of circle} = \pi \times \text{diameter}$$



Where diameter is 2 times of radius. (i.e. $d = 2r$)

$$= \pi \times 2r$$

$$= 2\pi r$$

Here, 'Pi' is constant.

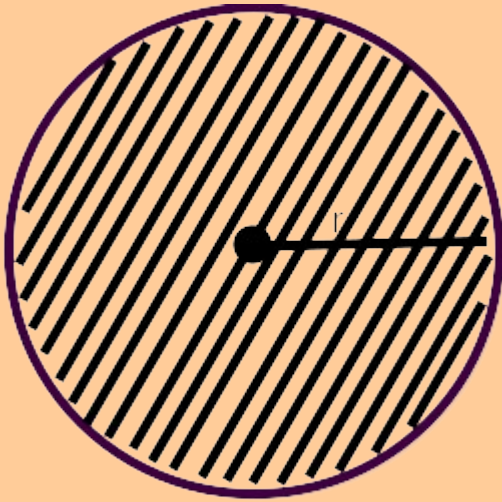
The approximate value of π is taken as $\frac{22}{7}$ or 3.14.

' π ' is defined as the ratio of circumference of a circle to its diameter.

$$\text{i.e. } \pi = \frac{\text{Circumference of a circle}}{\text{Diameter of a circle}}$$

Area of circle:

The area of a circle is the region covered or enclosed within its boundary.



∴ Area of circle = πr^2 , where r is radius of circle.

In terms of diameter area of circle is, $\frac{\pi d^2}{4}$

Where ' d ' is diameter of circle

Let us recall the formulae of the area of some geometrical figures.

Two parts of opposite sides are equal. So,

Rectangle:

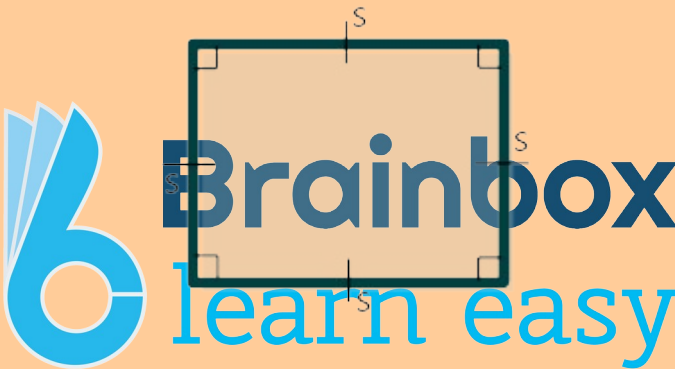
Area of rectangle = $l \times b$



Square:

All four sides are equal. So,

Area of square = Side $\times$ Side



Triangle:

The dimensions of triangle are base and height or altitude.

$$\therefore \text{Area of triangle} = \frac{1}{2} \times \text{base} \times \text{height}$$

$$= \frac{1}{2} \times bh$$

