

Circles

Part 1

Basics and Definitions

Circles are simple shapes consisting of those points in a plane which are at a constant distance, called the **radius**, from a fixed point, called the **center**.

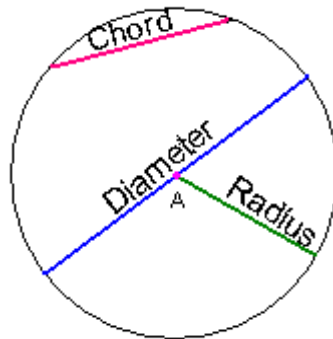
A **chord** of a circle is a line segment whose both endpoints lie on the circle.

A **diameter** is a chord passing through the center.

The diameter is the largest chord in a circle.

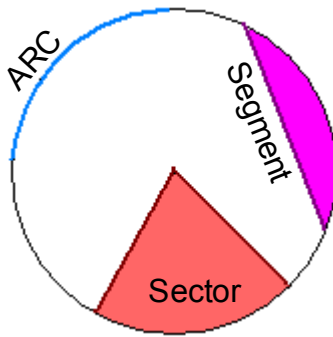
Guess: What is the length of the diameter of the circle, if the length of the radius is 'r' ?

In the figure A is the center of the circle. The green segment is the radius of the circle, blue segment is the diameter whereas pink segment is the cord of the circle.



Arc Segment and Sector

A piece of a circle between two points is called an **arc**. The region between a chord and either of its arcs is called a **segment** of the circle. The region between an arc and the two radii, joining the center to the end points of the arc is called a **sector**.



Areas and Length

(These are important properties that will help you in problem solving in GRE. Ensure that you have understood these concepts well.)

$$\begin{aligned}\text{Length of the circumference } C &= 2\pi r \\ &= \pi d\end{aligned}$$

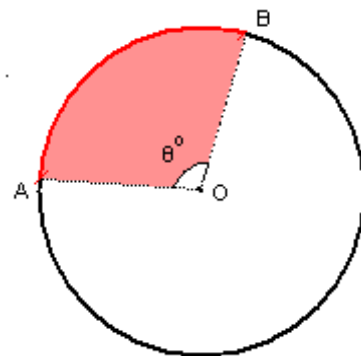
$$\text{Area of the Circle } A = \pi r^2$$

$$\text{Length of the arc} = 2\pi r \times (\theta / 360)$$

(where θ is the angle formed by the arc)

$$\text{Area of the sector} = \pi r^2 (\theta / 360)$$

(where θ is the angle formed by the two radii)



The value of π is approximately equal to $22/7$ or 3.14

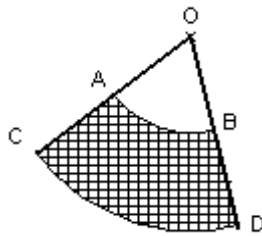
Points to remember:

- The circle centered at the origin with radius 1 is called the unit circle.
- The circumference of a circle is the perimeter of the circle.

Quiz

(Send your solutions to support@greedge.com)

1. If the radius of the circle is 1 cm,
 - a. length of the largest chord = _____
 - b. perimeter of the circle = _____
 - c. area of the circle = _____.
2. What is the area and perimeter of the unit circle?
3. The perimeter of a circle is 6π .
 - a. Radius of the circle = _____
 - b. Area of the circle = _____
4. The area of the circle is 12π .
 - a. What is the area of the sector made by two radii with an angle 60° between them ?
 - b. Length of the arc made by the sector = _____
5. Consider the figure. O is the center of the two circles. Line AB = 1 cm, line CD = 2 cm and $\angle AOB = 60^\circ$. Find the area of the shaded region.



Caution: Line AB is not the same as Arc AB. The length of line AB is given as 1 cm. The length of arc AB is not given. Similarly, the length of line CD is given as 2 cm. Length of arc CD is not given.