# CHAPTER TWELVE

## THE CIRCLE



- 1) <u>The Circumference</u>: This is the distance around the circle.
- 2) <u>Chord</u>: This is a straight line which joins two points on the circumference.
- 3) <u>The diameter</u>: This is a special chord which passes through the centre of the circle.
- 4) <u>The radius</u>: This is a line drawn from the centre, to a point on the circumference.
- 5) <u>Arc</u>: This refers to a portion of the circumference.
- 6) <u>The segment</u>: This is the region between a chord and an arc.
- 7) <u>The sector</u>: This refers to the region between two radii.

#### Note:

- i. For any circle, the radius  $\times 2 =$  the diameter i.e. twice the radius gives us the diameter.
- ii. Half a circle is referred to as a semi circle.



iii. A quadrant refers to one quarter of the area of a circle.

i.e.



- iv. For a circle, C =  $2\pi r$ , where C= the circumference, r = the radius and  $\pi = 3.14 \text{ or } 3.142 \text{ or } \frac{22}{7}$ .
- Q1) A circle has a radius of 14cm. Determine the distance round it.

## **Solutions**

 $C = 2\pi r \implies C = 2 \times 3.14 \times 14 = 88 cm.$ 

Q2) A city is circular in shape and its diameter is 30km. Determine the distance covered by a man, who walked twice round this city.

## Solution

The distance covered by a man who did walk round the city once = the circumference.

D = 30km, =>r =  $\frac{30}{2} = 15$ km.

C=  $2\pi r$ , => C= $2\times 3.14\times 15=94$ km.

Distance covered by walking round the city twice=  $2 \times 94 = 188$ km.

Q3) A racing bike is travelling round a circular track whose radius is 40km, at a speed of 20km/h. Determine the time it will take to travel

- a) once round the track.
- b) thrice round the track.

#### **Solution**

- (a) The distance covered by travelling once round the track = the circumference =  $2\pi r = 2 \times 3.14 \times 40 = 251$  km.
- a) the speed of racing bike = 20km/h

: If 20km = 1hour

then 251km  $=\frac{251}{20} \times 1 = 12.6$ hrs.

b) Distance travelled by travelling thrice round this track =  $3 \times 251 = 753$  km.

Speed of bike = 20km/h

If 20km = 1 hour

Then 753km =  $\frac{753}{20} \times 1 = 38$ hrs.



Two cyclists, Addo and John are supposed to travel round two different circular tracks. Addo is to travel in track A at a speed of 40km/h and John is to travel in track B at a speed of 60km/h.

- a) Determine which of these men will be the first to complete his journey.
- b) Express the distance travelled by Addo as a fraction of the distance travelled by John.

## <u>Solution</u>

The distance travelled by Addo = the circumference of track A=  $2\pi r$  =2×3.14×12=75km.

Speed of Addo = 40km/h.

If 40km=1 hour

$$=>75$$
km  $=\frac{75}{40}\times 1=1.9$ .

 $\therefore$  Time taken by Addo to move round his track = 1.9 hrs.

Distance travelled by John = the circumference of track

 $B = 2\pi r = 2 \times 3.14 \times 20 = 126$ km.

Speed of John = 60km/h.

If 60km = 1 hour

$$=>126$$
km  $=\frac{126}{60} \times 1 = 2.1$ 

John will complete his journey in 2.1 hours..

#### Addo will finish first

b)Distance travelled by Addo = 75km and distance travelled by John = 126km Distance travelled by Addo as a fraction of that travelled by John =  $\frac{75}{126} = \frac{25}{42}$