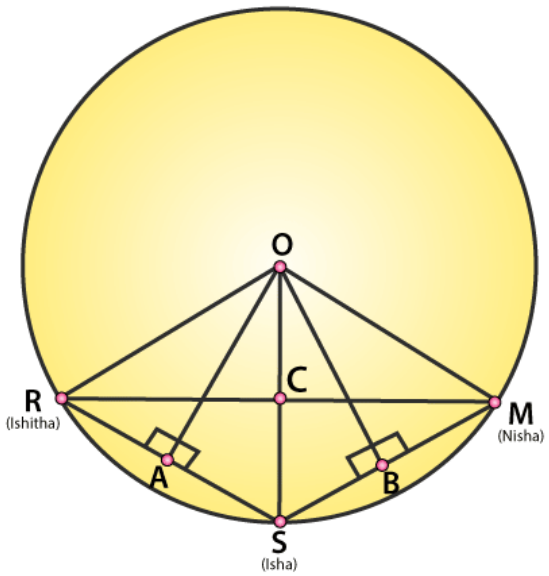
Exercise 16.3 Page No: 16.40

Question 1: Three girls Ishita, Isha and Nisha are playing a game by standing on a circle of radius 20 m drawn in a park. Ishita throws a ball to Isha, Isha to Nisha and Nisha to Ishita. If the distance between Ishita and Isha and between Isha and Nisha is 24 m each, what is the distance between Ishita and Nisha.

Solution:

Let R, S and M be the position of Ishita, Isha and Nisha respectively.



Since OA is a perpendicular bisector on RS, so AR = AS = 24/2 = 12 cm

Radii of circle = OR = OS = OM = 20 cm (Given)

In ΔOAR:
By Pythagoras theorem,

$OA^2+AR^2=OR^2$

$OA^2+12^2=20^2$

$OA^2 = 400 – 144 = 256$

Or OA = 16 m …(1)

From figure, OABC is a kite since OA = OC and AB = BC. We know that, diagonals of a kite are perpendicular and the diagonal common to both the isosceles triangles is bisected by another diagonal.

So in ΔRSM, ∠RCS = 90^0 and RC = CM …(2)

Now, Area of ΔORS = Area of ΔORS

=>1/2×OA×RS = 1/2 x RC x OS

=> OA ×RS = RC x OS

=> 16 x 24 = RC x 20

=> RC = 19.2

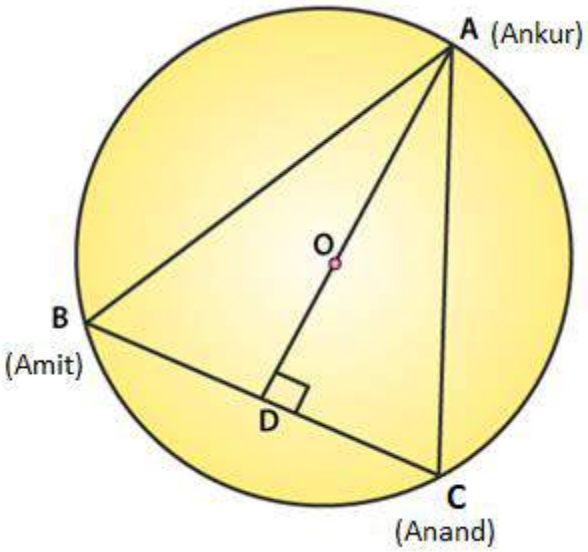
Since RC = CM (from (2), we have

RM = 2(19.2) = 38.4

So, the distance between Ishita and Nisha is 38.4 m.

Question 2: A circular park of radius 40 m is situated in a colony. Three boys Ankur, Amit and Anand are sitting at equal distance on its boundary each having a toy telephone in his hands to talk to each other. Find the length of the string of each phone.

Solution:



Since, AB = BC = CA. So, ABC is an equilateral triangle

Radius = OA = 40 m (Given)

We know, medians of equilateral triangle pass through the circumcentre and intersect each other at the ratio 2 : 1.

Here AD is the median of equilateral triangle ABC, we can write:

OA/OD = 2/1

or 40/OD = 2/1

or OD = 20 m

Therefore, AD = OA + OD = (40 + 20) m = 60 m

Now, In ΔADC:

By Pythagoras theorem,

$AC^2 = AD^2 + DC^2$

$AC^2 = 60^2 + (AC/2)^2$

$AC^2 = 3600 + AC^2 / 4$

$3/4\ AC^2 = 3600$

$AC^2 = 4800$

or $AC = 40\sqrt{3}$ m

Therefore, length of string of each phone will be $40\sqrt{3}$ m.