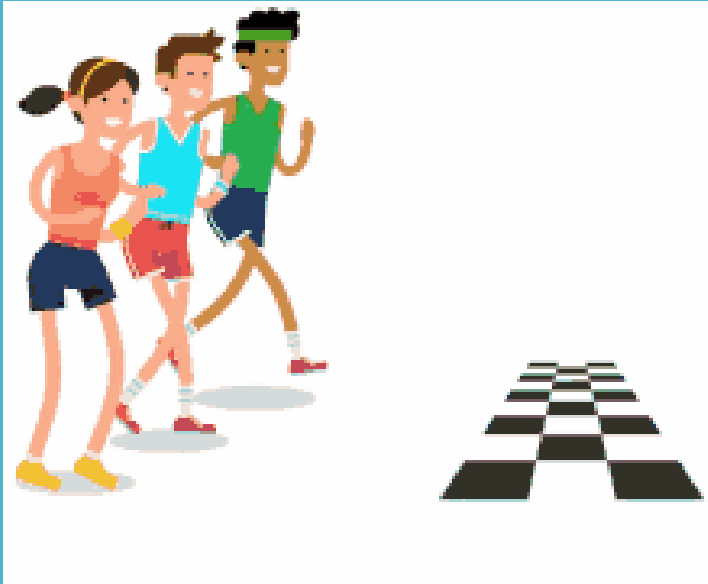


Time, Speed and Distance

Part II-Races & Games



Races & Games



Dead Heat:

Finishing time is same

A beats B by 10 meters:

A has reached finishing point & B is 10 meters behind the finishing point.

A beats B by 5 seconds:

A has reached finishing point and B will take another 5 seconds to reach the finishing point.

A gives B a start of 20 meters:

A at the starting point and B starts at 20 meters ahead of A.

A gives B a start of 15 seconds:

A starts the race when B has already ran for 15 seconds.

1. In a one Km race Anu beats Binu by 50 meters or by 10 seconds.
Find the time taken by Anu to complete the race?

a. 200 sec.

b. 250 sec

c. 240 sec.

d. 190 sec. 



2. A, B & C participate in a 100m race. A beats B by 20m and B beats C by 10m.
By how many meters does A beat C?

a. 30 m

b. 25 m

c. 22 m

d. 28 m 

3. In a 100 meters race, A starts from 10 meters behind B and beats B by 10 meters. If B starts from 10 meters behind the start line, then by how many meters does A beat B?
- a. 30
 - b. 19
 - c. $28 \frac{2}{11}$ 
 - d. $18 \frac{2}{11}$
4. In a race between Teja, Pooja and Roja, for every 10 steps of Teja, Pooja takes 12 steps and Roja takes 11 steps. If the distance travelled by Teja in 6 steps is equal to the distance travelled by Pooja in 8 steps or the distance travelled by Roja in 7 steps, who won the race?
- a. Teja
 - b. Pooj 
 - c. Roja
 - d. cannot be determined

5. Buvana walks up a staircase. She finds that if she walks up 25 steps, she requires 11 seconds more to reach the top and if she walks up 40 steps, she needs only 8 seconds more to reach the top. Find the number of steps in the staircase.

a. 100

b. 80

c. 75

d. 120



6. An escalator is moving downwards. Arya takes 20 steps to reach the bottom from the top and Bhavya takes 60 steps to reach the top from the bottom. The speeds of Arya and Bhavya are equal. What is the total number of steps in the escalator from bottom to top?



a. 30

b. 42

c. 38

d. 40



7. The length of a swimming pool is 100 m. A and B start swimming from opposite ends of the length of the pool and return after reaching an end. If the speed of A and B are 10 m/s and 15 m/s respectively, then how many times do they meet, when A travels 1000 m?
- a. 13
 - b. 12 
 - c. 14
 - d. 11
8. Akhil overtakes Nikhil at 6 am when both are travelling towards city P. Akhil reaches P at 9 am and starts on the return journey after one hour. On the way back he meets Nikhil at 11 am. At what time will Nikhil reach P?
- a. 1:00 pm
 - b. 1:30 pm
 - c. 1:45 pm 
 - d. 2:05 pm

Circular Motion



If two people A & B start from the same point, at the same time and move along a circular track D meters with a speed of x kmph and y kmph respectively, then

❖ Time of the First meeting = $\frac{\text{Circumference of the circle}}{\text{Relative speed}}$

❖ Time of the First meeting at the starting point
= $LCM\left(\frac{D}{x}, \frac{D}{y}\right)$, i.e., LCM of the time taken to cover one lap.

- The faster runner will meet slower only when he will have a lead equal to the length of the track when running in the same direction.
- When running in opposite direction they will meet when they together covers distance equal to length of the track.

Circular Motion



Circular motion with three people:

❖ Time of the First meeting = $LCM \left(\frac{D}{x-y}, \frac{D}{x-z} \right)$

I.e., LCM of the relative time taken.

❖ = Time of the First meeting at the starting point
= $LCM \left(\frac{D}{x}, \frac{D}{y}, \frac{D}{z} \right)$,

I.e., LCM of the time taken to cover one lap,
where D is the circumference of the track and x, y, z are
speeds of the three people, respectively.

9. Sanal & Vimal are running around a $1\frac{1}{2}$ km circular track with speeds 6 kmph and 10 kmph respectively.
- a. When will they meet first at the starting point?
15 minutes or 900 sec.
 - b. When they will meet for the first at any point, if they are running in the same direction?
7.5 minutes or 450 sec.
 - c. When they will meet for the first time at any point, if they are running in the opposite direction?
112.5 sec.

10. Raju, Madhu & Somu are running around a 1200 m circular track with a speed of 9, 18, and 36 kmph respectively. If they start at the same time and run in the same direction,

a. When will they meet for the first time?

8 minutes or 480 sec.

a. When they will meet first time at the starting point.

8 minutes or 480 sec.

Thank You

*Narayan
CIR*