

TDS

RACE & CIRCULAR
MOTION

Linear Race



1. In a circular race of 840 m, A and B start running in the same direction at the same time from the same point at the speeds of 6 m/s and 12 m/s, respectively. After how much time will they meet next?

SSC CGL C/2024 T-1 (SET-I)

A. 140 sec

B. 20 sec

C. 40 sec

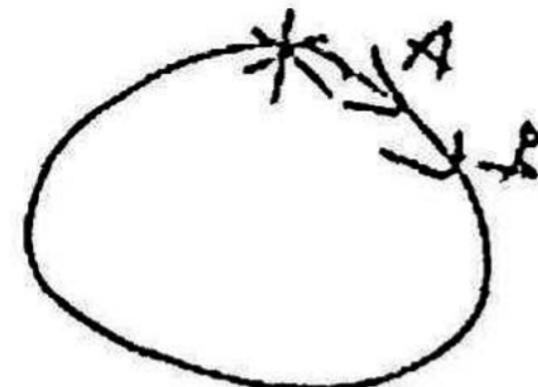
D. 70 sec

$$D = ST$$

$$T = \frac{D}{S}$$

$$= \frac{840 \text{ m}}{6 \text{ m/s}}$$

$$= 140 \text{ s}$$



2. Varun and Sandeep started for a car race from the same point, in the same direction, and at the same time on a circular track of length 1635 m with the speeds of 90 km/h and 108 km/h, respectively. After how much time (in seconds) will they meet again for the first time?

SSC CGL 09/09/2014 Tier 1 (Shift 2)

A. 324 ✓

B. 325 ↗

C. 327

D. 326

$$T = D/S$$

$$= \frac{1635}{108}$$

$$= 32 \frac{2}{3}$$

3. In a circular race of 750 m, X and Y start from the same point and at the same time with speeds of 9 km/h and 13.5 km/h , respectively. If they are running in the same direction, then when will they meet again for the first time on the track? ssc cgl 10/09/2024 Tier I (Shift 3)

A. 750 sec

B. 900 sec

C. 500 sec

D. 600 sec

$$T = \frac{750}{13.5 - 9} \text{ sec}$$
$$= \frac{750}{4.5} \text{ sec}$$
$$= 150 \times 2$$

Linear
race

4. Atul gives Vishu a head start of 20 seconds in a 900 m race and beats him by 135 m. While running the same race again, Atul gives a start of 189 m and beats him by 8 seconds. In how much time can Vishu complete the full race of 900 m? SSC CGL 21/09/2021 Tier I (Shift 1)

A. 3 minutes 30 seconds B. 2 minutes 50 seconds C. 3 minutes 20 seconds D. 3 minutes 10 seconds

$$\begin{array}{l}
 \text{A} \rightarrow t \rightarrow 900 \text{ m} \\
 \checkmark \quad V \rightarrow t + 20 \rightarrow 765 \text{ m} \\
 \quad \quad V \rightarrow t + 8 \rightarrow 711 \text{ m}
 \end{array}$$

$$\begin{array}{r}
 891 \\
 900 - 189 \\
 \hline
 711
 \end{array}$$

$$\begin{array}{l}
 \text{Vishu} \rightarrow 12 \rightarrow 54 \text{ m} \\
 T = \frac{100}{900 \text{ m}} \quad S = \frac{54 \text{ m}}{12 \text{ s}} \\
 \frac{100}{984 \text{ m}} \times \frac{7 \text{ s}}{2} = 200 \text{ s}
 \end{array}$$

$$\begin{array}{r}
 250 \\
 60 \\
 = 3 \text{ min} \\
 20 \text{ sec}
 \end{array}$$

5. M and N walk along a circular track. They start at 5:00 a.m. from the same point in opposite directions. M and N walk at a speed of 5 rounds per hour and 2 rounds per hour, respectively. How many times will they cross each other before 6.30 a.m. on the same day?

SSC CGL 13/09/2024 Tier 1 (Shift 1)

60 min \rightarrow 7

A. 10

B. 3

C. 5

D \rightarrow 2

30 min \rightarrow 3.5

Opp

M \rightarrow 5 rph
N \rightarrow 2 rph

90 min \rightarrow 10

RS \rightarrow + \rightarrow 7 rph

Onehour \rightarrow 7 meeting
7 crossing

$\frac{1}{2} \rightarrow 1$
 $\frac{1}{2} \rightarrow 1+1$

(A \rightarrow 1 rph)

(B \rightarrow 2 rph)



6. P and Q start running in opposite directions on a circular track from the same point. If their speeds are 10 m/s and 8 m/s, respectively, then after what time will they meet if the length of the track is 1620 m? ssc CGL 13/09/2024 Tier I (Shift 2)

A. 110 sec

B. 70 sec

C. 120 sec

D. 90 sec

$$T = \frac{1620}{18} \text{ sec}$$

- ~~time~~
7. Arvind and Chetan started running simultaneously from the same point in the same direction on a circular track of length 210 m. If Arvind takes ~~180 seconds~~ to complete one round, and Chetan takes ~~420 seconds~~ to complete one round, after how much time will they meet for the first time at the starting point on the track?

SSCCAT 23/07/2024 Tier 3 (Shift 2)

A. 10 mins

B. 15 mins

C. 21 mins

D. 28 mins

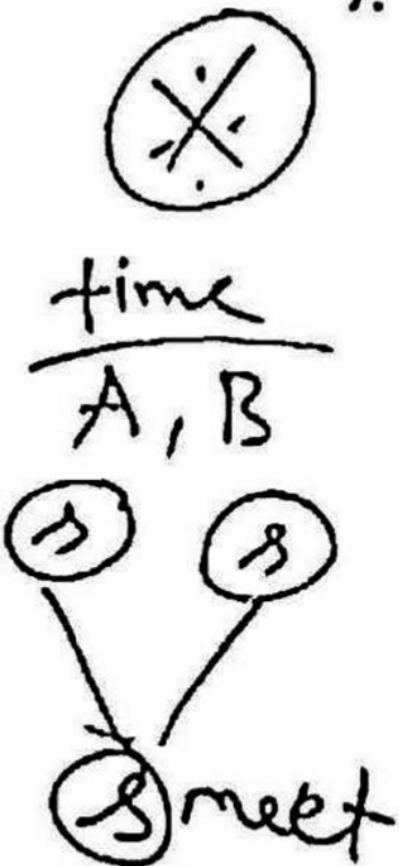
LCM

$$T = \frac{210}{m}$$

$$A \rightarrow 180 \text{ s}$$

$$C \rightarrow 420 \text{ s}$$

$$\begin{array}{r} 3 \times 180 \\ 7 \times 6 \cancel{420} \\ \hline 2 \times 10 \times 6 \end{array} \quad \begin{array}{r} 2 \times 10 \times 6 \\ \cancel{\times 60} \\ \hline \cancel{60} \end{array}$$



8. In a circular race of 4800m, A and B start from the same point and at the same time with speeds of 36 km/h and 54 km/h. When will they meet again for the first time on the track if they are running in the opposite direction?

SSC CGL 18/07/2024 Tier I (Shift 2)

A. 200 sec

B. 205 sec

C. 178 sec

D. 192 sec

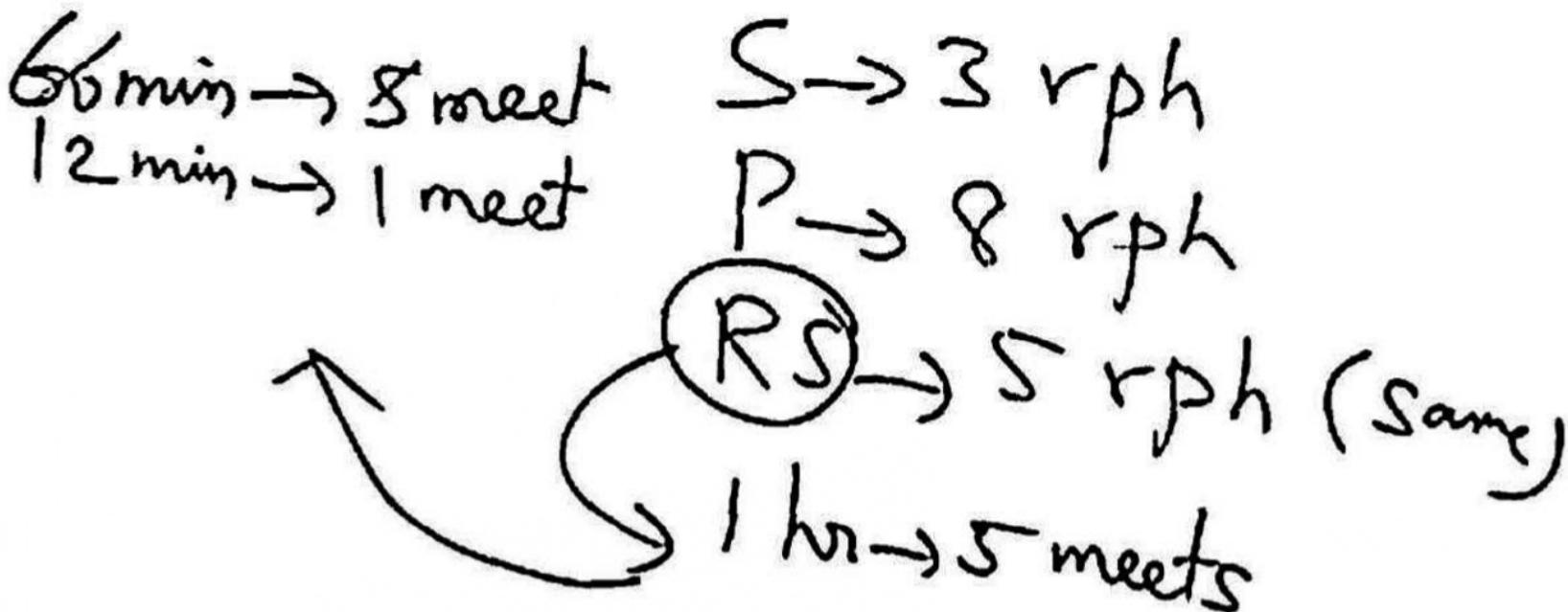
$$T = \frac{4800 \text{ m}}{190 \times 5 \text{ m/s}}$$
$$= \frac{4800}{950} \text{ s}$$

9. Seema walks around a circular field at the rate of 3 rounds per hour, while Priya runs around it at the rate of 8 rounds per hour. They start in the same direction from the same point at 11:54 p.m. They shall first cross each other at:

SSC CGL 23/03/2024 Tier I (Shift 3)

$$\begin{array}{r} + 12 \\ \hline \end{array}$$

- A. 12:06 p.m B. 12:00 a.m C. 12:06 a.m D. 11:59 p.m



10. Two athletes are participating in a race on a circular track of 220 m. Ravi runs at the speed of 22 m/s, while Kapil runs at the speed of 11 m/s. They start from the same point, at the same time, and in the same direction. After how many seconds will they meet for the first time? ssc ccl 26/09/2024 Test 1 (Shift 1)

A. 15 sec

B. 16 sec

C. 20 sec

D. 24 sec

$$T = \frac{20}{220 - 11} \text{ m/s}$$

11. In a circular race of 1600 m in length, Bhaskar and Vinay start with speeds of 27 km/h and 45 km/h starting at the same time from the same point. When will they meet for the first time on the track when running in the opposite directions and the same direction, respectively? ssc CGL 26/09/2024 11:11:1 (Shift 3)

A. 1 min 20 sec

B. 1 min 40 sec

C. 2 min 0 sec

D. 5 min 20 sec

E. 5 min 40 sec

$$T = \frac{1600 \text{ m}}{45 \times \frac{5}{18}}$$

$$T = 80 \text{ s}$$
$$= 1 \text{ min } 20 \text{ s}$$

$$T = \frac{1600 \text{ m}}{18 \times \frac{5}{18}}$$
$$= \frac{320}{60} \text{ s}$$
$$= 5 \text{ min } 20 \text{ s}$$

12. On a 2200 m long circular track, Sarita and Kavita drove their cycles from the same point but in opposite directions with the speeds 20 km/hr and 16 km/hr, respectively. After how much time will they meet again for the first time? ssc cct 26/07/2024 tier 1 (SSM 1)

- A. 2 min 20 sec B. 3 mins 20 sec C. 2 mins 50 sec D. 3 mins 40 sec

$$T = \frac{2200}{\cancel{36} \times \cancel{8}}$$
$$= 220 \text{ s}$$
$$= 3 \text{ min } 40 \text{ s}$$

13. P and Q take part in 400 m race. P runs at 12 km/hr. P gives Q a start of 20 m and still beats him by 13 seconds. The speed of Q is: (Round up to two decimal places.) ssc CGL 25/09/2024 T1 (SHRNJ)

- A. 11.38 km/hr B. 10.29 km/hr C. 11.61 km/hr D. 10.87 km/hr

$$\textcircled{P} \rightarrow t \rightarrow 400 \text{ m} \left(\frac{12 \text{ km}}{\text{hr}} \right)$$

$$\textcircled{Q} \rightarrow t+13 \rightarrow 380 \text{ m} \left(\quad \right)$$

$$\frac{380 \text{ m} \times 18}{133 \text{ s} \times 5} = \frac{S}{T}$$

$$= \frac{76 \times 18}{133} \cancel{\text{ s}}$$

$$= 45.6 \cancel{\text{ s}}$$

$$= 10.3 \cancel{\text{ s}}$$

$$2 \cancel{12 \frac{\text{km}}{\text{hr}}} = \frac{200}{400} \cancel{\text{ m}}$$

$$= \frac{1}{2} \cancel{\text{ s}} \times \frac{18}{5} \cancel{\frac{\text{km}}{\text{hr}}}$$

$$t = 120 \text{ s}$$