



SNS COLLEGE OF TECHNOLOGY

An Autonomous Institution

Coimbatore-35



Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A++' Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF CIVIL ENGINEERING

23GET276 – VQAR II

II YEAR/ IV SEMESTER

UNIT 1 – QUANTITATIVE ABILITY III

TOPIC – RACES



RACES



1. **Races:** A contest of speed in running, riding, driving, sailing or rowing is called a race.
2. **Race Course:** The ground or path on which contests are made is called a race course.
3. **Starting Point:** The point from which a race begins is known as a starting point.
4. **Winning Point or Goal:** The point set to bound a race is called a winning point or a goal.
5. **Winner:** The person who first reaches the winning point is called a winner.
6. **Dead Heat Race:** If all the persons contesting a race reach the goal exactly at the same time, the race is said to be dead heat race.



RACES



7. **Start:** Suppose A and B are two contestants in a race. If before the start of the race, A is at the starting point and B is ahead of A by 12 metres, then we say that 'A gives B, a start of 12 metres'.

To cover a race of 100 metres in this case, A will have to cover 100 metres while B will have to cover only $(100 - 12) = 88$ metres.

In a 100 race, 'A can give B 12 m' or 'A can give B a start of 12 m' or 'A beats B by 12 m' means that while A runs 100 m, B runs $(100 - 12) = 88$ m.

8. **Games:** 'A game of 100, means that the person among the contestants who scores 100 points first is the winner'.

If A scores 100 points while B scores only 80 points, then we say that 'A can give B 20 points'.



RACES



In a 100 m race, A can give B 10 m and C 28 m. In the same race B can give C:

- A. 18 m
- B. 20 m
- C. 27 m
- D. 9 m

Answer: Option B

Explanation:

$$A : B = 100 : 90.$$

$$A : C = 100 : 72.$$

$$B : C = \frac{B}{A} \times \frac{A}{C} = \frac{90}{100} \times \frac{100}{72} = \frac{90}{72}.$$

When B runs 90 m, C runs 72 m.

$$\text{When B runs 100 m, C runs } \left(\frac{72}{90} \times 100 \right) \text{ m} = 80 \text{ m.}$$

∴ B can give C 20 m.



RACES



A and B take part in 100 m race. A runs at 5 kmph. A gives B a start of 8 m and still beats him by 8 seconds. The speed of B is:

- A. 5.15 kmph
- B. 4.14 kmph
- C. 4.25 kmph
- D. 4.4 kmph

Answer: Option **B**

Explanation:

$$\text{A's speed} = \left(5 \times \frac{5}{18} \right) \text{m/sec} = \frac{25}{18} \text{ m/sec.}$$

$$\text{Time taken by A to cover 100 m} = \left(100 \times \frac{18}{25} \right) \text{sec} = 72 \text{ sec.}$$

$$\therefore \text{Time taken by B to cover 92 m} = (72 + 8) = 80 \text{ sec.}$$

$$\therefore \text{B's speed} = \left(\frac{92}{80} \times \frac{18}{5} \right) \text{kmph} = 4.14 \text{ kmph.}$$



RACES



In a 500 m race, the ratio of the speeds of two contestants A and B is 3 : 4. A has a start of 140 m. Then, A wins by:

- A. 60 m
- B. 40 m
- C. 20 m
- D. 10 m

Answer: Option C

Explanation:

To reach the winning post A will have to cover a distance of $(500 - 140)$ m, i.e., 360 m.

While A covers 3 m, B covers 4 m.

While A covers 360 m, B covers $\left(\frac{4}{3} \times 360\right)$ m = 480 m.

Thus, when A reaches the winning post, B covers 480 m and therefore remains 20 m behind.

\therefore A wins by 20 m.



RACES



In a 100 m race, A beats B by 10 m and C by 13 m. In a race of 180 m, B will beat C by:

- A. 5.4 m
- B. 4.5 m
- C. 5 m
- D. 6 m

Answer: Option D

Explanation:

$$A : B = 100 : 90.$$

$$A : C = 100 : 87.$$

$$\frac{B}{C} = \frac{B}{A} \times \frac{A}{C} = \frac{90}{100} \times \frac{100}{87} = \frac{30}{29}.$$

When B runs 30 m, C runs 29 m.

$$\text{When B runs 180 m, C runs } \left(\frac{29}{30} \times 180 \right) \text{ m} = 174 \text{ m.}$$

\therefore B beats C by $(180 - 174) \text{ m} = 6 \text{ m}.$



RACES



At a game of billiards, A can give B 15 points in 60 and A can give C to 20 points in 60. How many points can B give C in a game of 90?

- A. 30 points
- B. 20 points
- C. 10 points
- D. 12 points

Answer: Option C

Explanation:

A : B = 60 : 45.

A : C = 60 : 40.

$$\therefore \frac{B}{C} = \left(\frac{B}{A} \times \frac{A}{C} \right) = \left(\frac{45}{60} \times \frac{60}{40} \right) = \frac{45}{40} = \frac{90}{80} = 90 : 80.$$

\therefore B can give C 10 points in a game of 90.



RACES



In 100 m race, A covers the distance in 36 seconds and B in 45 seconds. In this race A beats B by:

- A. 20 m
- B. 25 m
- C. 22.5 m
- D. 9 m

Answer: Option A

Explanation:

$$\text{Distance covered by B in 9 sec.} = \left(\frac{100}{45} \times 9 \right) \text{m} = 20 \text{ m.}$$

∴ A beats B by 20 metres.



RACES



In a game of 100 points, A can give B 20 points and C 28 points. Then, B can give C:

- A. 8 points
- B. 10 points
- C. 14 points
- D. 40 points

Answer: Option **B**

Explanation:

$$A : B = 100 : 80.$$

$$A : C = 100 : 72.$$

$$\therefore \frac{B}{C} = \left(\frac{B}{A} \times \frac{A}{C} \right) = \left(\frac{80}{100} \times \frac{100}{72} \right) = \frac{10}{9} = \frac{100}{90} = 100 : 90.$$

\therefore B can give C 10 points.



RACES



In a 200 metres race A beats B by 35 m or 7 seconds. A's time over the course is:

- A. 40 sec
- B. 47 sec
- C. 33 sec
- D. None of these

Answer: Option C

Explanation:

B runs 35 m in 7 sec.

∴ B covers 200 m in $\left(\frac{7}{35} \times 200 \right) = 40$ sec.

B's time over the course = 40 sec.

∴ A's time over the course $(40 - 7)$ sec = 33 sec.



RACES



In a 100 m race, A can beat B by 25 m and B can beat C by 4 m. In the same race, A can beat C by:

- A. 21 m
- B. 26 m
- C. 28 m
- D. 29 m

Answer: Option C

Explanation:

$$A : B = 100 : 75$$

$$B : C = 100 : 96$$

$$\therefore A : C = \left(\frac{A}{B} \times \frac{B}{C} \right) = \left(\frac{100}{75} \times \frac{100}{96} \right) = \frac{100}{72} = 100 : 72$$

$$\therefore A \text{ beats } C \text{ by } (100 - 72) \text{ m} = 28 \text{ m.}$$



RACES



In a race of 200 m, A can beat B by 31 m and C by 18 m. In a race of 350 m, C will beat B by:

- A. 22.75 m
- B. 25 m
- C. 19.5 m
- D. $7\frac{4}{7}$ m

Answer: Option B

Explanation:

$$A : B = 200 : 169.$$

$$A : C = 200 : 182.$$

$$\frac{C}{B} = \left(\frac{C}{A} \times \frac{A}{B} \right) = \left(\frac{182}{200} \times \frac{200}{169} \right) = 182 : 169.$$

When C covers 182 m, B covers 169 m.

$$\text{When C covers 350 m, B covers } \left(\frac{169}{182} \times 350 \right) \text{ m} = 325 \text{ m.}$$

Therefore, C beats B by $(350 - 325) \text{ m} = 25 \text{ m}$.



RACES



In a 300 m race A beats B by 22.5 m or 6 seconds. B's time over the course is:

- A. 86 sec
- B. 80 sec
- C. 76 sec
- D. None of these

Answer: Option B

Explanation:

B runs $\frac{45}{2}$ m in 6 sec.

\therefore B covers 300 m in $\left(6 \times \frac{2}{45} \times 300 \right) \text{ sec} = 80 \text{ sec}.$



THANK YOU