TIME, SPEED & DISTANCE

SKILOGIC

A person drove 60 km at 30 kmph and returned at speed of 60 kmph. Compute his average speed (kmph) over his return journey.

Avg speed = Total Distance/Total time

Total distance = 60+60 = 120 Km

Time reqd for the first 60 km = 60/30 = 2 hour;

Time reqd for the return 60 km = 60/60 = 1 hour ;

Total time = 2 + 1 = 3 hour

Avg speed = 120/3 = 40 kmph

SKILOGIC

- Average Speed = Total Distance/ total Time

- When Distance is constant : Harmonic Mean
- When Time is constant : Arithmetic Mean

1. **Speed, Time and Distance:**

   Speed = $\left(\frac{\text{Distance}}{\text{Time}}\right)$, Time = $\left(\frac{\text{Distance}}{\text{Speed}}\right)$, Distance = (Speed x Time).

2. **km/hr to m/sec conversion:**

   x km/hr = $\left(x \times \frac{5}{18}\right)$ m/sec.

3. **m/sec to km/hr conversion:**

   x m/sec = $\left(x \times \frac{18}{5}\right)$ km/hr.

4. If the ratio of the speeds of A and B is $a : b$, then the ratio of the

   the times taken by then to cover the same distance is $\frac{1}{a} : \frac{1}{b}$ or $b : a$.

5. Suppose a man covers a certain distance at x km/hr and an equal distance at y km/hr. Then,

   the average speed during the whole journey is $\left(\frac{2xy}{x + y}\right)$ km/hr.

A person drove 75 km at 30 kmph. At what speed he must return, so that his average speed is 50 kmph.

SKILOGIC

Avg speed = Total Distance/Total time

Total distance = 75+75 = 150 Km

Time reqd for the first 75 km = 75/30 = 2.5 hour;

Time reqd for the 2nd 75 km = t hour (assume)

Avg speed = 50 kmph (given)

$50 = 150/(2.5 + t) \rightarrow t = 0.5$

Speed = Distance/ time = 75/0.5 = 150 kmph

SKILOGIC

A can give B a start of 50 meters or 10 sec in a kilometer race. How long does B take to complete the race?

- i.e. B takes 10 sec to run 50 m.
- Speed of B = distance / time = 50/10 = 5m/s
- Therefore, Time taken by B to run 1000 m = distance/speed = 1000/ 5 = 200 sec

DISTANCE = CONSTANT

- Distance between 2 cities or 2 given points
- Races
- D = Constant
- S1T1 = S2T2

SKILOGIC

- A boy increases his speed to 9/5 times of his original speed. By this he reaches his school 30 minutes before the usual time. How much time does he takes usually?

- Ramesh sees a thief at a distance of 80 m. Ramesh starts chasing the thief who is running at a speed of 5 m/s. Ramesh is chasing him with a speed of 7 m/s. How much distance does the thief covers before Ramesh catches him?

- Ajay and Vijay travel from A to B at 17 km/hr and 19 km/hr, respectively. A is 72km away from B. Vijay reaches B first and returns immediately and meets Ajay at C. Find B to C distance?

- Surendra travels from home to office by car. With an average speed of 50 km/hr, he is late by 30 minutes. But when he comes with a speed of 60 km/h, he reaches his office 10 minutes earlier. How far is his office from his home?

- Akshay drives from his home at a speed of 30 km/hr and reaches his bank 20 minutes late. Then the next day he increases his speed by 15 km/hr but still he is late by 8 minutes. How far is his bank from his home?

SKILOGIC

Tricky Race PUZZLE

A, B & C run in a 100 meters race

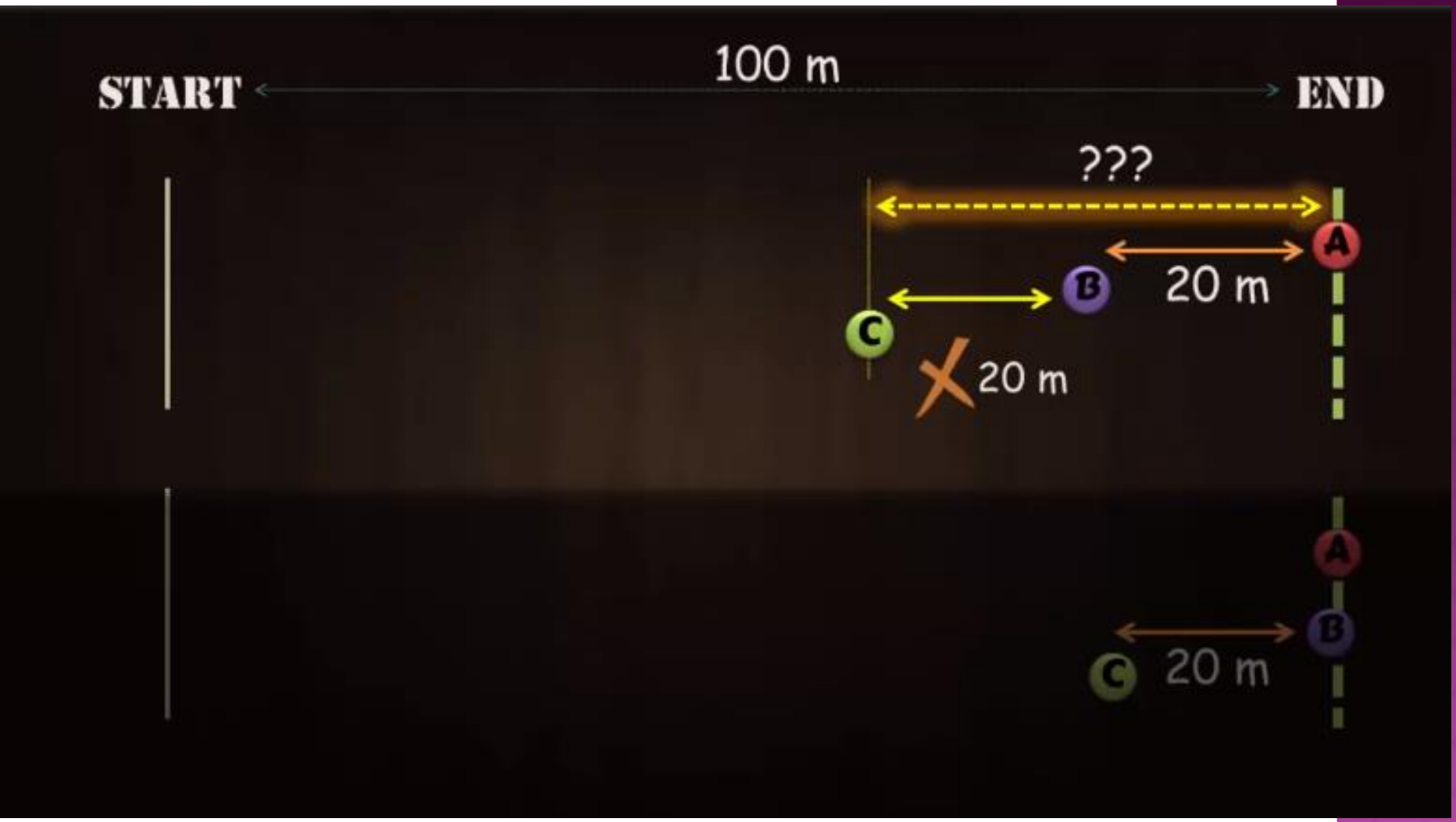
Each person runs at a constant speed throughout the race

- A beats B by 20 meters
- B beats C by 20 meters

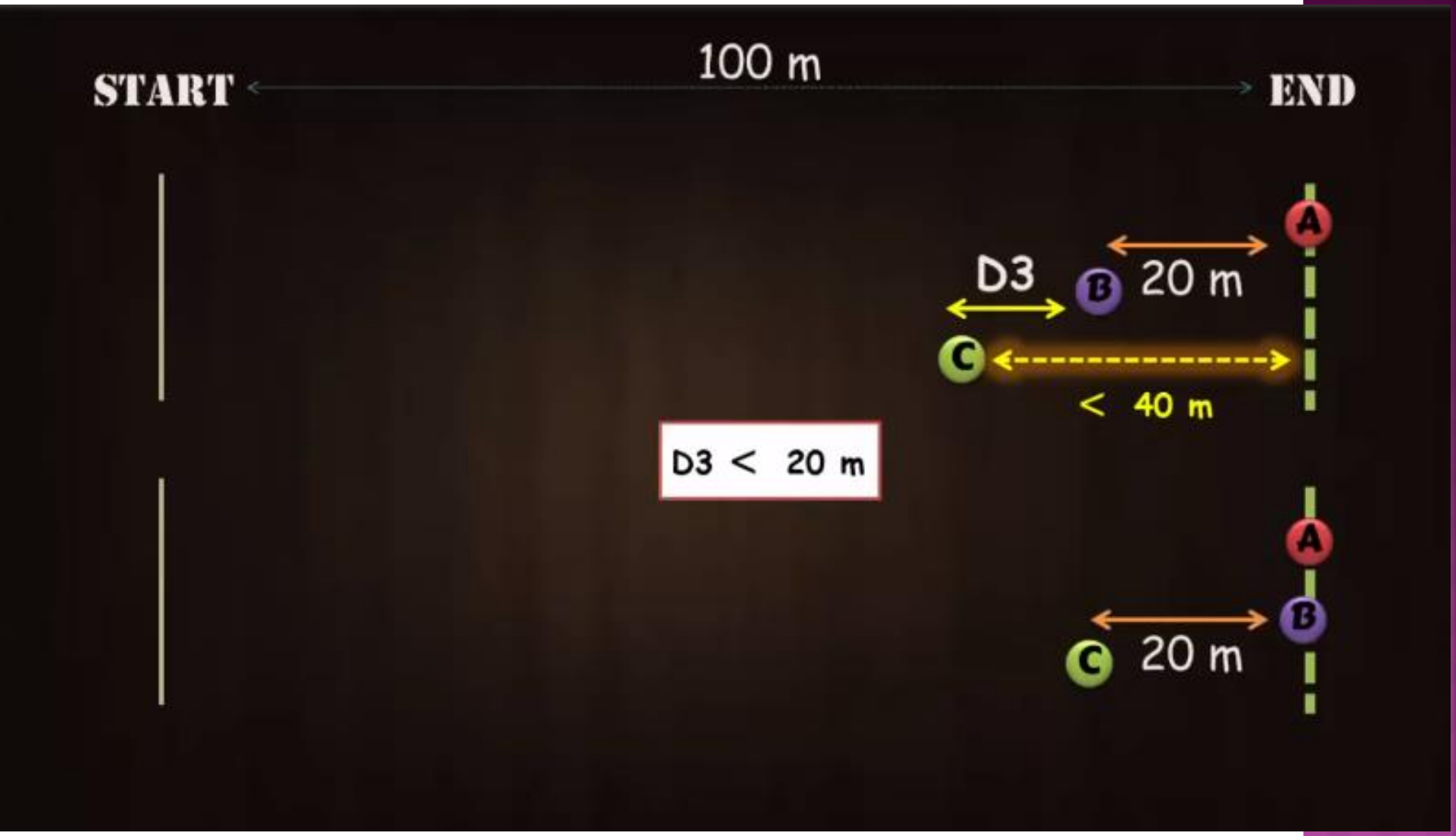
By how many meters does A beat C ?

- *Rohit Patil*

SKILOGIC



- ***Rohit Patil***



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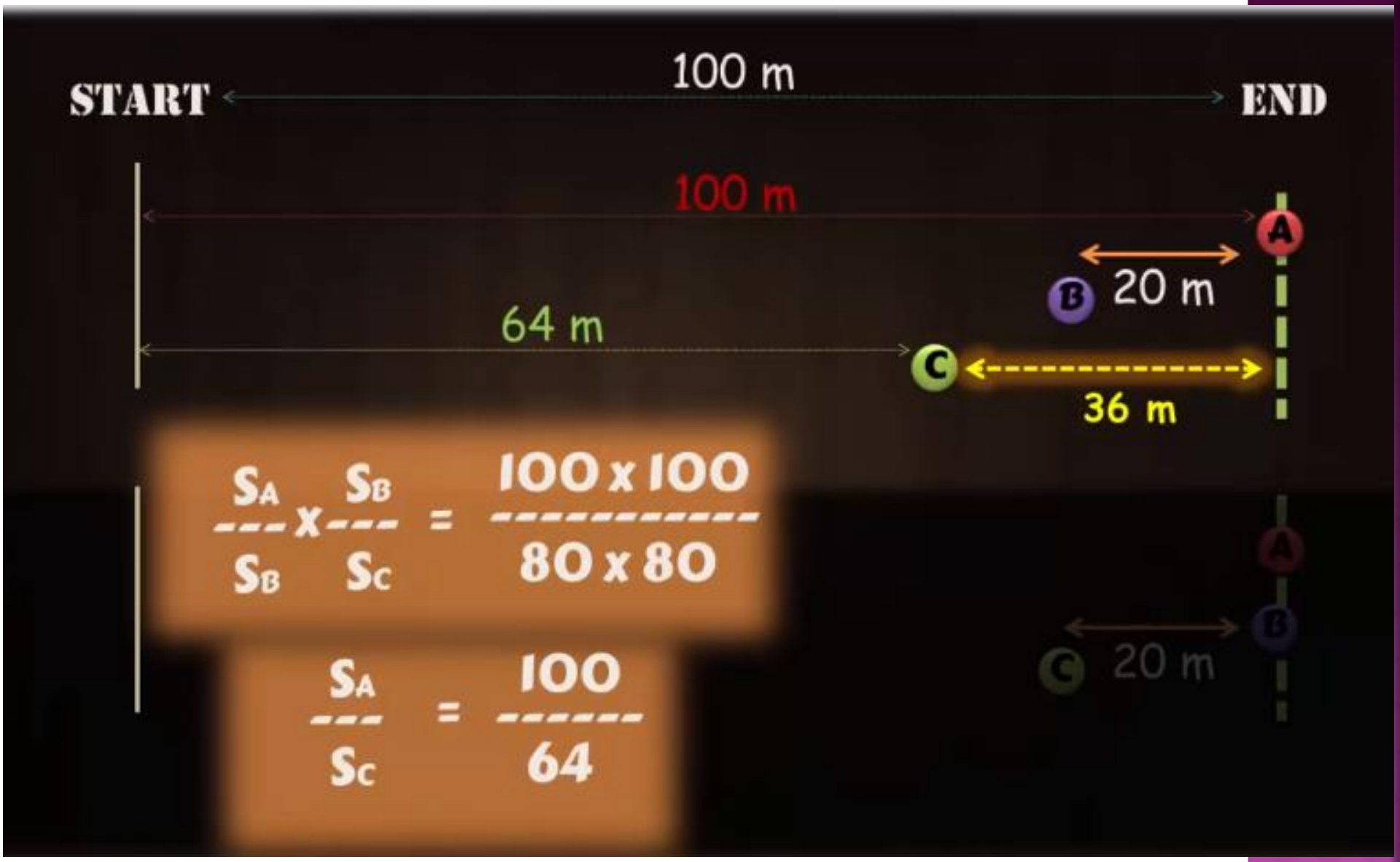
START
100 m
END
100 m
A
B
20 m
64 m
C
36 m
$\frac{S_A}{S_B} \times \frac{S_B}{S_C} = \frac{100 \times 100}{80 \times 80}$
$\frac{S_A}{S_C} = \frac{100}{64}$
A
B
C
20 m

- ***Rohit Patil***