TSD - 2

Contents

- Relative Speed
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Number of Questions : 25

Relative Speed

1. A man saw a train passing over a 10 km long bridge. The length of the train is one-fourth that of the bridge. If the train clears the bridge in 2.5 min, then speed of the train is
   (1) 150 km/hr   (2) 300 km/hr
   (3) 250 km/hr   (4) 120 km/hr

2. Two boats, traveling at 5 and 10 kms per hour, head directly towards each other. They begin at a distance of 20 kms from each other. How far apart are they (in kms) one minute before they collide.

   (1) $\dfrac{1}{12}$ (2) $\dfrac{1}{6}$

   (3) $\dfrac{1}{4}$ (4) $\dfrac{1}{3}$

3. If a train crosses a man in 10 sec and a 150 m long plateform in 22 sec, then its speed and length are
   (1) 12.5 m/sec, 125 m
   (2) 12 m/sec, 120 m
   (3) 13.5 m/sec, 135 m
   (4) 13 m/sec, 130 m

4. The distance between the two stations X and Y is 220 km. A train leaves station X for Y at a speed 80 km/hr. After half an hour, another train leaves station Y for X at a speed 100 km/hr. Find the distance of the point where the two trains meet from X.
   (1) 100 km   (2) 120 km
   (3) 80 km   (4) 140 km

5. Two trains start from A and B and head towards B and A respectively. Train from A starts at 11 p.m. and reaches B at 5 p.m. next day. Train from B starts at 10 p.m. the same day on which the train starts from station A and reaches A at 6 a.m. the next day. At what time (approximately) will they cross each other?
   (1) 4 a.m.   (2) 3.55 a.m.
   (3) 2.51 a.m.   (4) 3.51 a.m.

6. August Kranti Rajdhani Express leaves Delhi towards Mumbai at 12.20 p.m. and travels uniformly at 80 km/hr. Rajdhani Express leaves Chennai towards Delhi at 3.10 p.m. and travels uniformly at 120 km/hr. Both the trains cross at Baroda at 4.30 p.m. On a particular day, Rajdhani leaves at 3.20 p.m. and the other train leaves at its usual time. When will the two trains cross each other?
   (1) 4.32 p.m.   (2) 4.38 p.m.
   (3) 4.40 p.m.   (4) 4.36 p.m

7. X and Y are stationed at points A and B respectively. Everyday X and Y start simultaneously from A and B to reach B and A respectively. Everyday they cross each other at a point R. From the point R, the time taken by X to reach B and the time taken by Y to reach A is 36s and 16s respectively. One particular day Y started late and during that time X had covered 20 km. Find the distance between the point R and the point where they met on that day.
   (1) 12 km   (2) 10 km
   (3) 16 km   (4) 8 km

8. Singur, Nandigram and Kolkata are 3 villages on a straight road such that Singur is somewhere in between the other two villages. Distance of Kolkata from Singur is 10 km and the distance of Kolkata from Nandigram is 17 km. Buddha and Biman start running from Singur at 9:00 a.m. in opposite directions at 4 m/s and 3 m/s respectively. Mamta Starts from Nandigram in a car moving at 36 km/hr. towards Kolkata, but she started 10 minutes later than Buddha and Biman. If the interval between the time when Mamta met Buddha and the time when Mamta met Biman is approximately $15\frac{10}{21}$ mins, then find the distance (in km) between Buddha and Biman when Mamta meets Biman.

9. Nikhil reaches school everyday at 5 p.m. to pick up his children. On a Saturday, the school got over at 4 p.m. and the children started walking towards home. Nikhil met them on their way and returned home 30 min earlier. How long did the children walk?
   (1) 50 min   (2) 55 min
   (3) 45 min   (4) 30 min

Direction for questions 10 and 11: Answer the question on the basis of the information given below.

A spaceship A leaves Earth for Jupiter at noon on Monday travelling at 30,000 km/hr. After 6 hr another spaceship B leaves Jupiter for Earth travelling at 50,000 km/hr. The distance between Jupiter and Earth is 9,80,000 km. [Assume the spaceships move in straight lines and the planets are stationary with respect to each other.]

10. A spaceship C leaves Earth 12 hours after A and meets A at the same time as B What is the speed of C?
    (1) 1,00,000 km/hr   (2) 1,20,000 km/hr
    (3) 80,000 km/hr   (4) 96,000 km/hr

11. The absolute difference between the time at which a reaches Jupiter and B reaches Earth is
    (1) 5 hr 36 min   (2) 5 hr 6 min
    (3) 7 hr 4 min   (4) 6 hr 36 min

12. A and B start moving towards each other simultaneously in a straight line from cities P and Q respectively. After travelling some distance, B takes a 30° turn to his left with respect to his original direction. Two hour after B turned, A takes a 90° turn to his right. A travels 60 km after turning, before meeting B. They meet 10 hour after starting their journey. A and B together travel 170 km before turning and arrive at the meeting point simultaneously. How many hours after turning did A meet B?
    (1) 3.5 hr   (2) 3 hr
    (3) 4 hr   (4) 4.5 hr

13. A car overtakes a bus travelling from Bangalore to Chennai at 6:30 a.m. The car reaches Chennai at 8 a.m. After stopping there for 1 hour, it starts back towards Bangalore and meets the same bus at 9 : 30 a.m., which was moving towards Chennai at that time. If both the car and the bus travel at uniform speeds on the same route, then what will be the time when the bus would reach Chennai?
    (1) 10:00 a.m.   (2) 10:30 a.m.
    (3) 11:00 a.m.   (4) 9:45 a.m.

14. Consider a road with two cars at a distance of 500 km driving in the opposite direction. The left-side car drives at a speed of 40 km/hr and the right-side car at a speed of 60 km/hr. A bird starts from the same location as the right-side car and flies at a speed of 80 km/hr. When it reaches the left-side car, it turns its direction; and when it reaches the right-side car, it turns its direction again to the opposite, and so on. What is the total distance that the bird has covered till the moment the two cars reach each other?
(1) 200 km   (2) 400 km
(3) 450 km   (4) 300 km

15. A and B start simultaneously from P and reach R via Q along the same road. A travels at 15 km/hr from P to Q and at 20 km/hr from Q to R. B travels at 20 km/hr from P to Q and at 15 km/hr from Q to R. A reaches at R, 10 min before B reaches there. If the time taken to cover PQ to the time taken to cover QR by B is in the ratio 1:2, find the distance between P and R.
(1) 35 km   (2) 50 km
(3) 55 km   (4) 45 km

16. Only a single rail track exists between stations A and B on a railway line. One hour after the north- bound super fast train N leaves station A for station B, a south-bound passenger train S reaches station A from station B. The speed of the super fast train is twice that of a normal express train E, while the speed of a passenger train S is half that of E. On a particular day, N leaves for B from A, 20 min behind the normal schedule. In order to maintain the schedule, both N and S increased their speeds. If the super fast train doubles its speed, what should be the ratio (approximately) of the speeds of passenger train to that of the super fast train so that the passenger train S reaches exactly at the scheduled time at A on that day?

(1) 1 : 3   (2) 1 : 4
(3) 1 : 5   (4) 1 : 6

17. Navjivan Express from Ahmedabad to Chennai leaves Ahmedabad at 6.30 a.m. and travels at 50 kmph towards Baroda situated 100 km away. At 7.00 a.m. Howrah-Ahmedabad Express leaves Baroda towards Ahmedabad and travels at 40 kmph. At 7.30 a.m. Mr Shah, the traffic controller at Baroda realizes that both the trains are running on the same track. How much time does he have to avert a head-on collision between the two trains?
(1) 15 min   (2) 20 min
(3) 25 min   (4) 30 min

18. A train approaches a tunnel AB. Inside the tunnel is a cat located at a point that is $\frac{3}{8}$ of the distance AB measured from the entrance A. When the train whistles the cat runs. If the cat moves to the entrance of the tunnel A, the train catches the cat exactly at the entrance. If the cat moves to the exit B, the train catches the cat at exactly the exit. The speed of the train is greater than the speed of the cat by what order?
(1) 3 : 1   (2) 4 :1
(3) 5 : 1   (4) None of these

19. Ayesha started running from one end of a straight road at 0500 hrs. Bhumika, standing at the other end of the road, started running towards Ayesha at 0600 hrs and met Ayesha at a point P on the road. They continued running till they reached the opposite ends, turned back immediately and coincidently met again at the same point P. If they met at the point P for the first time at 0700 hrs, then what is the ratio of the speeds of Ayesha and Bhumika?
(1) 1 : 1   (2) $1 : \sqrt{2}$
(3) $\sqrt{2} : \sqrt{3}$ (4) $\sqrt{3} : 2$

20. A certain race is made up of three stretches: A, B and C, each 2 km long, and to be covered by a certain mode of transport. The following table gives these modes of transport for the stretches, and the minimum and maximum possible speeds (in km/hr) over these stretches. The speed over a particular stretch is assumed to be constant. The previous record for the race is 10 min.

		Min.	Max.
A	Car	40	60
B	Motorcycle	30	50
C	Bicycle	10	20

Mr Tortoise completes the race at an average speed of 20 km/hr. His average speed for the first two stretches is four times that for the last stretch. Find the speed over stretch C.
(1) 15 km/hr   (2) 12 km/hr
(3) 10 km/hr   (4) This is not possible

Escalators

21. A man can walk up in a moving escalator (upwards) in 30 s. The same man can walk down this moving 'up' escalator in 90 s. Assume that his walking speed is same in both upward and downward motion. How much time will he take to walk up the escalator when it is not moving?
(1) 30 s   (2) 75 s
(3) 60 s   (4) 45 s

22. An escalator is moving at 3 steps per second. Harish walks in the same direction as the moving escalator at 2 steps per second and takes 3 second less to get out of the escalator than when he was moving on the stationary escalator. How many steps are there in the stationary escalator?

23. Rajat takes 11 steps to reach the bottom of an escalator in 35 seconds. Sharad walks on the same escalator and takes 39 steps in 21 sec to reach the bottom. How many steps are visible on the escalator when it is not moving? (**Note:** The escalator is coming down in both the cases)

24. An escalator is coming down at a constant speed. Vivek takes 40 steps to reach to the bottom. The time in which he takes 15 steps, Samar manages to reach the bottom by taking 45 steps. If the escalator were turned off, how many steps would they have to take to walk down?

25. Shyama and Vyom walk up an escalator (moving stairway). The escalator moves at a constant speed. Shyama takes three steps for every two of Vyom's steps. Shyama gets to the top of the escalator after having taken 25 steps, while Vyom (because his slower pace lets the escalator do a little more of the work) takes only 20 steps to reach the top. If the escalator were turned off, how many steps would they have to take to walk up?

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1	2	2	3	3	1	4	2	5	4	6	4	7	1	8	–	9	3	10	2
11	3	12	3	13	3	14	2	15	2	16	4	17	2	18	1	19	2	20	3
21	4	22	–	23	–	24	–	25	–										

1. 2 Bridge Length = 10 km

Train Length = $\dfrac{10}{4}$ = 2.5 km

Total distance travelled by train to clear bridge
= 10 + 2.5 = 12.5 km
Time taken by train = 2.5 min

Speed = $\dfrac{\text{Distance}}{\text{time}}$ = $\dfrac{12.5}{2.5}$ = 5 km/min

= 5 × 60 km/hr = 300 km/hr

2. 3 The boats will be colliding after a time which is given by

t = $\dfrac{20}{5+10} = \dfrac{4}{3}$ hours = 80 minutes.

Aftger this time of 80 minutes, boat (1) has covered

$80 \times \dfrac{5}{60}$ kms = $\dfrac{20}{3}$ kms, whereas boat (2) has covered

$80 \times \dfrac{10}{60}$ kms = $\dfrac{40}{3}$ kms.

After 79 minutes, distance covered by the first boat

= $d_1 = \left(\dfrac{20}{3} - \dfrac{10}{60}\right)$ kms

After 79 minutes, distance covered by the second

boat = $d_2 = \left(\dfrac{40}{3} - \dfrac{10}{60}\right)$ kms

So the separeation between the two boats

= $20 - (d_1 + d_2) = \dfrac{1}{4}$ kms.

Alternative method:
Relative speed of two boats = 5 + 10 = 15 km/hr
i.e. in 60 min they cover (together) = 15 km

∴ in 1 min they will cover (together) $\dfrac{15}{60} = \dfrac{1}{4}$ km

3. 1 Let s be the speed and x be the length of the train. Then

$\dfrac{x}{s} = 10 \Rightarrow x = 10s$ … (i)

and $\dfrac{150 + x}{s} = 22 \Rightarrow 150 + x = 22s$ … (ii)

From (i) and (ii), we get
s = 12.5 m/sec and x = 125 m.

4. 2 Distance travelled by 1st train in 30 minutes

= $80 \times \dfrac{1}{2} = 40$ km.

So, they will meet after = $\dfrac{220 - 40}{100 + 80} = \dfrac{180}{180} = 1$ hours.

Hence, the distance = 40 + 80 × 1 = 120 km.

5. 4 We see that the trains take 18 hr and 8 hr respectively to complete their journeys.
Let the distance between the stations be LCM(18, 8), i.e. 72 km.
∴ Speed of the first train = 4 km/hr.
Speed of the second train = 9 km/hr.
By the time the train from A starts, train from B already would have travelled 9 km in 1 hr.
Now the distance between the trains = 72 – 9 = 63 km.
Relative speed of the trains = 9 + 4 = 13 km/hr.

∴ They will take $\dfrac{63}{13}$ hr after 11 p.m.

i.e. approximately at 3.51 a.m.

6. 4 At 4.30 p.m. August Kranti Rajdhani Express crosses Baroda. On the particular day, Rajdhani Express, which is late by 10 min, would be 20 km away from August Kranti Rajdhani Express at 4.30 pm. Hence, they cross when they together travel 20 km.
Relative speed = 120 + 80 = 200 km/hr.
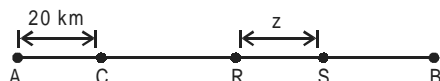They cover 20 km in 6 min. Hence, they meet at 4.36 p.m.

7. 1

t_y = 16 seconds, t_x = 36 seconds
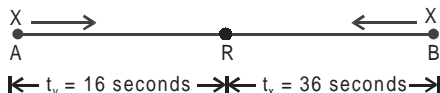
Let speed of X be a km/hr and that of Y be b km/hr. X and Y start simultaneously from A and B respectively to reach R.

$$\frac{a}{b} = \sqrt{\frac{16}{36}} = \frac{2}{3} \Rightarrow \frac{AR}{RB} = \frac{2}{3}$$

Let Ar = 2K BR = 3k
When Y starts late; X had already covered a distance of 20 km, to reach C. This time both of them meet at a point S.
Let the distance RS be z km.

After X reaches C, Y is still at B. We can assume that X and Y start their respective journeys to meet at point S.
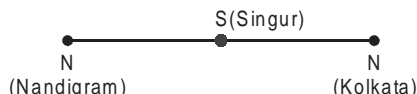
We have $\frac{CS}{BS} = \frac{2}{3}$

or, $\frac{(AR - AC) + RS}{BR - RS} = \frac{2}{3}$ or, $\frac{(2k - 20) + z}{3k - z} = \frac{2}{3}$

$\Rightarrow$ 6k − 60 + 3z = 6k − 2z
$\Rightarrow$ 5z = 60
$\Rightarrow$ z = 12 km.

8.

NS = 7000 m and SK = 10,000 m
Speed of the car of Mamta = 36 kmph = 10 m/s.
Case I: Buddha moves towards Nandigram and Biman moves towards Kolkata.
Case II: Biman moves towards Nandigram and Buddha moves towards Kolkata.
Time taken for Mamta and Buddha to meet from the instant Mamta starts moving

$= \frac{(7000 - 600 \times 4)}{14} = \frac{2300}{7}$ s. (when the condition is as stated in Case I).

Time taken for Mamta and Buddha to meet from the instant Mamta starts moving

$= \frac{(7000 - 600 \times 4)}{6} = \frac{4700}{3}$ s. (when the condition is as stated in Case II).

Time taken for Mamta and Biman to meet from the instant Mamta start moving

$\frac{(7000 - 600 \times 3)}{7} = \frac{8800}{7}$ s. (when the condition is as stated in Case I).

Time taken for Mamta and Biman to meet from the instant Mamta start moving

$\frac{(7000 - 600 \times 3)}{13} = 400$ s. (when the condition is as stated in Case II).

The required time interval between the time when Mamta met Buddha and Mamta met Biman is $13\frac{2}{21}$ s,

therefore the condition is as stated in Case I.
Total time elapsed from the instant Biman started moving till the instant Mamta meets Biman

$= 600 + \frac{8800}{7} = \frac{13000}{7}$ s.

Distance between Buddha and Biman when Mamta meets Biman = $\frac{13000}{7} \times (4 + 3)$ = 13000 m = 13 km.

9. 3

We see that the car reduces its travel time by 30 min.

So it reduces its one-way travelling time by $\frac{30}{2}$

= 15 min. Thus, it would have met the children 15 min earlier, i.e. 4.45 p.m. Now this means that the children walked from 4 p.m. to 4.45 p.m., i.e. 45 min.

10. 2

Spaceships A and B meet 10 hr after B leaves Jupiter. Distance travelled by A in 10 + 6 = 16 hr is 16 × 30,000 = 4,80,000 km. Time taken by C is 16 − 12 = 4 hr.

Hence, speed of C is $\frac{480000}{4}$ = 1,20,000 km/hr.

11. 3

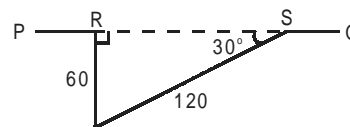After they meet, A has to travel a further 9,80,000 − 4,80,000 = 5,00,000 km.

Hence, time is $\frac{500000}{30000}$ = 16.66 hr = 16 hr 40 min.

B has to travel 4,80,000 km further.

Hence B's time is $\frac{480000}{50000}$ = 9.6 hr = 9 hr 36 min.

Hence, the difference in the time is 7 hr and 4 min.

12. 3

	Before turning	After turning
A	(10 − t) hr	t hr
B	(8 − t) hr	(t + 2) hr

Let V_A and V_B be their velocities. Then
$V_A t = 60$ and $V_B(t + 2) = 120$
Also $V_A (10 - t) + V_B (8 - t) = 170$
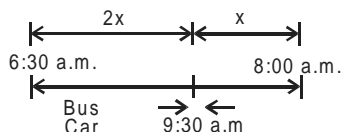$\Rightarrow 10V_A - 60 + 8V_B - (120 - 2V_B) = 170$

$\Rightarrow V_A + V_B = 35$

$\therefore \dfrac{60}{t} + \dfrac{120}{(t+2)} = 35 = V_A + V_B$

Solving, we get $t = 4$.

13. 3

Let the distance of Chennai from the point the car had over taken the bus, be $3x$ km. So, the car travels $3x$ km in 90 minutes. The car starts from Chennai at 9:00 a.m. and meets the bus once again in another 30 minutes. The car travelled only x km in 30 minutes. Obviously, the bus travelled only $2x$ km in 3hours while the bus met the car again. So the bus will travel

$3x$ km in $4\dfrac{1}{2}$ hours. It will reach Chennai at 11:00 a.m.

14. 2 The two cars meet $\dfrac{100}{60-40} = 5$ hr later. During these 5 hr, the bird travels at 80 km/hr. So the total distance travelled by the bird = $80 \times 5 = 400$ km.

15. 2 For B, let the time taken to cover PQ, QT and TR be t_1, t_2 and t_3 respectively.
$t_1 : (t_2 + t_3) = 1 : 2$.
Also since PQ = TR

$\therefore (t_1)20 = t_3(15)$. So $t_3 = \dfrac{4}{3}t_1$.
We know that $QT = y = 10$ km

$\therefore t_2 = \dfrac{10}{15} = \dfrac{2}{3}$hrs.

$\therefore \dfrac{t_1}{(t_2 + t_3)} = \dfrac{t_1}{\dfrac{4}{3}t_1 + \dfrac{2}{3}} = \dfrac{1}{2}$

Hence $2t_1 = \dfrac{4}{3}t_1 + \dfrac{2}{3}$ (or) $\dfrac{2}{3}t_1 = \dfrac{2}{3}$ or $t_1 = 1$hr.

So $t_1 = 1$hr; $t_2 = \dfrac{2}{3}$hr; $t_3 = \dfrac{4}{3}$hr.

$\Rightarrow (t_2 + t_3) = 2$ hr
Total distance (PR) = $t_1 \times 20 + (t_2 + t_3) \times 15$
= $1 \times 20 + 2 \times 15 = 50$ km

16. 4 If speed of N = 4, speed of S = 1,
$\Rightarrow$ Average speed = $\dfrac{2 \times 4 \times 1}{4 + 1} = 1.6$

Since time available is $\dfrac{2}{3}$, speed = $\dfrac{3}{2}$

Now average speed = 2.4
Now speed of N = 8
Now speed of S = y

$\dfrac{2 \times 8 \times y}{8 + y} = 2.4 \Rightarrow y = 1.3$

Required ratio = $1.3 : 8 \approx 1 : 6$

17. 2 At 7.30 a.m., Navjivan Express is at 50 km from A and at the same time, Howrah-Ahmedabad Express is at 20 km from B.
Hence, distance between the trains at 7.30 a.m. is 30 km.
Relative speed = 50 + 40 = 90 kmph

Hence, time left = $\dfrac{30}{90} = \dfrac{1}{3}$ hr = 20 min.

18. 1 Let tunnel = 8 km and speed of cat = 1 km/hr
Time taken to reach entrance of tunnel by cat = 3 hr
Time taken to reach exit of tunnel by cat = 5 hr
Train will cover the sum (length of tunnel) = 2 hr
Therefore, ratio of speeds of train and cat = 4 : 1
$\Rightarrow$ Speed of the train is greater by 3 : 1 than that of the cat.

19. 2
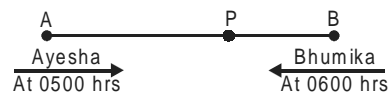
Let the speeds of Ayesha and Bhumika be 'a' and 'b' units respectively.
Since Bhumika started running at 0600 hrs and they met at 0700 hrs, the ratio of the distance AP : PB = 2a : b
It is also given that they met at the same point P while coming back.
Thus, 2AP : 2PB = b : a

$\therefore \dfrac{2a}{b} = \dfrac{b}{a} \Rightarrow \left(\dfrac{a}{b}\right)^2 = \dfrac{1}{2}$ or $\dfrac{a}{b} = \dfrac{1}{\sqrt{2}}$.

20. 3 Let his average speed over the last stretch be x. Hence, his average speed for first two stretches = 4x.
So the total time taken to cover the three stretches

$= \dfrac{4}{4x} + \dfrac{2}{x}$

His average speed over the race is 20 km/hr.

Hence, the time taken to complete the race = $\dfrac{6}{20}$

Hence, we have the equation $\dfrac{4}{4x} + \dfrac{2}{x} = \dfrac{6}{20}$

Solving this equation, we get $x = 10$ km/hr.

21. 4 An escalator can be considered similar to a stream. The only difference is that a stream usually flows down, and this escalator is moving up.

So in this case, we can apply the same formula as that of boats and streams, except for the fact that the downstream condition here would correspond to a man moving up (since he is moving up with the escalator) and the upstream condition would correspond to a man moving down (as he is moving down against the direction of the escalator).

Now, let the distance to be covered on the escalator be 'x'. Hence, his downstream speed = $\dfrac{x}{30}$ and his upstream speed = $\dfrac{x}{90}$.

Therefore, his speed when the escalator is not moving (corresponds to speed of boat in still water)

$$= \dfrac{(\text{Upstream speed} + \text{Downstream speed})}{2}$$

$$= \dfrac{\left(\dfrac{x}{30} + \dfrac{x}{90}\right)}{2} = \dfrac{2x}{90}$$

Hence, time taken by him at this speed = $\dfrac{x}{\left(\dfrac{2x}{90}\right)}$ = 45s

22. Due to movement of the escalator, the speed has become $\dfrac{5}{2}$ of original speed. Hence, time should become $\dfrac{2}{5}$ of the original time, thereby saving $\dfrac{3}{5}$ of original time. Therefore, $\dfrac{3}{5}$ of original time = 3 sec

$\Rightarrow$ Original time = 5 sec.

So, in 5 sec, Harish can cover 5 × 2 = 10 steps.

$\therefore$ There are 10 steps in the escalator.

23. Let the speed of the escalator be x steps/sec. It is given that Rajat covers 11 steps in 35sec. So in these 35 sec escalator will cover 35x steps. Therefore, the total number of steps on the escalator must be 11 + 35x.   …(i)

Similarly, Sharad takes 21 sec and covers 39 steps. So in these 21sec escalator will cover 21x steps. Therefore, total steps on the escalator must be 39 + 21x.   ...(ii)

Solving (i) and (ii) we get;

11 + 35x = 39 + 21x

$\Rightarrow$ x = 2

Hence, total number of steps = 81.

24. In the time Samar takes 45 steps, Vivek takes 15 steps. Therefore, for every 3 steps of Samar, Vivek takes 1 step.

If Samar takes 1 min for every 3 steps, then he takes $\dfrac{1}{3}$ min for every step.

For 45 steps, he takes $\dfrac{45}{3}$ = 15 min.

So, Vivek takes 1 minute for every step.

For 40 steps, he takes 40 min.

Difference between their times = 25 min

Difference between the number of steps covered = 45 − 40 = 5

i.e. the escalator covers 5 steps in 25 min

which means, speed of the escalator is $\dfrac{1}{5}$ steps/min.

If the escalator is moving, Samar climbs 45 steps and the escalator covers 15 × $\dfrac{1}{5}$ = 3 steps.

Hence, total number of steps = 45 + 3 = 48.

25. If Shyam takes 1 min for every 3 steps, then he takes 1/3 min for every step.

For 25 steps, he takes 25/3 min, i.e. 8.33 min.

So Vyom takes 1/3 min for every step.

For 20 steps, he takes 20/2 min, i.e. 10 min.

Difference between their time = 1.66 min.

Escalator takes 5 steps in 1.66 min and difference in number of steps covered = 5

Speed of escalator is 1 step for 0.33 min,

i.e. 3 steps per minute.

If escalator is moving, then Shyam takes 25 steps and escalator also takes 25 steps.

Hence, total number of steps = 50.

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