
SPEED, TIME & DISTANCE EXERCISE

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| <p>1. An aeroplane flies along the four sides of a square at the speeds of 200, 400, 600 and 500 km/h. Find the average speed of the plane around the field.
(a) 384km/h (b) 370 km/h
(c) 368 km/h (d) None of these</p> <p>2. A monkey ascends a greased pole 12 metres high. He ascends 2 metres in first minute and slips down 1 metre in the alternate minute. In which minute, he reaches the top?
(a) 21st (b) 22nd
(c) 23rd (d) 24th</p> <p>3. A man walks a certain distance and rides back in $6\frac{1}{4}$ h. He can walk both ways in $7\frac{3}{4}$h. How long it would take to ride both ways?
(a) 5 hours (b) $4\frac{1}{2}$ hours
(c) $4\frac{3}{4}$ hours (d) 6 hours</p> <p>4. There are 20 poles with a constant distance between each pole. A car takes 24 seconds to reach the 12th pole. How much time will it take to reach the last pole?
(a) 25.25 s (b) 17.45 s
(c) 35.75 s (d) 41.45 s</p> <p>5. A man is walking at a speed of 10 km per hour. After every kilometer, he takes rest for 5 minutes. How much time will he take to cover a distance of 5 kilometres?
(a) 48 min. (b) 50 min.
(c) 45 min. (d) 55 min.</p> <p>6. On a Journey across Bombay, a tourist bus averages 10 km/h for 20% of the distance, 30 km/h for 60% of it and 20 km/h for the remainder. The average speed for the whole journey was</p> | <p>(a) 10 km/h (b) 30 km/h
(c) 5 km/h (d) 20 km/h</p> <p>7. In a 800 m race around a stadium having the circumference of 200 m, the top runner meets the last runner on the 5th minute of the race. If the top runner runs at twice the speed of the last runner, what is the time taken by the tope runner to finish the race?
(a) 20 min (b) 15 min
(c) 10 min (d) 5 min</p> <p>8. A man walks half of the journey at 4 km/h by cycle does tone third of journey at 12 km/h and rides the remainder journey in a horse cart at 9 km/h, thus completing the whole journey in 6 hours and 12 minutes. The length of the journey is
(a) 36 km (b) $\frac{1332}{67}$ km
(c) 40 km (d) 28 km</p> <p>9. A train does a journey without stoppage in 8 hours, if it had travelled 5 km/h faster, it would have done the journey in 6 hours 40 minutes. Find its original speed.
(a) 25 km/h (b) 40 km/h
(c) 45 km/h (d) 36.5 km/h</p> <p>10. A train leaves station X at 5 a.m. and reaches station Y at 9 a.m. Another train leaves station. Y at 7 a.m. and reaches station X at 10.30 a.m. At what time do the two trains cross each other?
(a) 7 : 36 am (b) 7 : 56 am
(c) 8 : 36 am (d) 8 : 56 am</p> <p>11. Cars C_1 and C_2 travel to a place at a speed of 30 km/h and 45 km/h respectively. If car C_2 takes $2\frac{1}{2}$ hours</p> |
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- less time than C_1 for the journey, the distance of the place is
 (a) 300 km (b) 400 km
 (c) 350 km (d) 225 km
12. A man covers a certain distance on a toy train. If the train moved 4 km/h faster, it would take 30 minutes less. If it moved 2 km/h slower, it would have taken 20 minutes more. Find the distance.
 (a) 60 km (b) 58 km
 (c) 55 km (d) 50 km
13. A goods train leaves a station at a certain time and at a fixed speed. After 6 hours, an express train leaves the same station and moves in the same direction at a uniform speed of 90 kmph. This train catches up the goods train in 4 hours. Find the speed of the goods train.
 (a) 36 kmph (b) 40 kmph
 (c) 30 kmph (d) 42 kmph
14. Without stoppages, a train travels certain distance with an average speed of 80 km/h, and with stoppages, it covers the same distance with an average speed of 60 km/h. How many minutes per hour the train stops?
 (a) 15 (b) 18
 (c) 10 (d) None of these
15. If a man walks to his office at $\frac{3}{4}$ of his usual rate, he reaches office $\frac{1}{3}$ of an hour later than usual. What is his usual time to reach office.
 (a) $\frac{1}{2}$ hr (b) 1 hr
 (c) $\frac{3}{4}$ hr (d) None of these
16. A train running between two stations A and B arrives at its destination 10 minutes late when its speed is 50 km/h and 50 minutes late when its speed is 30 km/h. What is the distance between the stations A and B?
 (a) 40 km (b) 50 km
 (c) 60 km (d) 70 km
17. A thief goes away with a Maruti car at a speed of 40 km/h. The theft has been discovered after half an hour and the owner sets off in another car at 50 km/h. When will the owner overtake the thief from the start.
 (a) $2\frac{1}{2}$ hours (b) 2 hr 20 min
 (c) 1 hr 45 min (d) cannot be determined
18. A starts 3 min after B for a place 4.5 km away. B on reaching his destination, immediately returns back and after walking a km meets A. If A walks 1 km in 18 minutes then what is B's speed?
 (a) 5 km/h (b) 4 km/h
 (c) 6 km/h (d) 3.5 km/h
19. A long distance runner runs 9 laps of a 400 metres track everyday. His timings (in minutes) for four consecutive days are 88, 96, 89 and 87 respectively. On an average, how many metres/minute does the runner cover?
 (a) 40m/min (b) 45m/min
 (c) 38m/min (d) 49m/min
20. It takes eight hours for a 600 km journey, if 120 km is done by train and the rest by car. It takes 20 minutes more, if 200 km is done by train and the rest by car. The ratio of the speed of the train to that of the speed of the car is :
 (a) 4 : 3 (b) 3 : 4
 (c) 3 : 2 (d) 2 : 3
21. In a flight of 600 km, an aircraft was slowed down due to bad weather. Its average speed for the trip was reduced by 200 km is done by train and the

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- rest by car. The ratio of the speed of the train to that of the speed of the car is:
- (a) 1 hour (b) 2 hours
(c) 3 hours (d) 4 hours
22. Points A and B are 70 km apart on a highway. One car starts from A and the another one from B at the same time. If they travel in the same direction, they meet in 7 hours. But if they travel towards each other, they meet in one hour. The speeds of the two cars are, respectively.
(a) 45 and 25 km/h (b) 70 and 10 km/h
(c) 40 and 30 km/h (d) 60 and 40 km/h
23. Anil calculated that it will take 45 minutes to cover a distance of 60 km by his car. How long will it take to cover the same distance if the speed of his car is reduced by 15 km.hr?
(a) 36 min (b) 55.38 min
(c) 48 min (d) 40 min
24. The jogging track in a sports complex is 726 metres in circumference. Pradeep and his wife start from the same point and walk in opposite directions at 4.5 km/h and 3.75 km/h, respectively. They will meet for the first time in :
(a) 5.5 min (b) 6.0 min
(c) 5.28 min (d) 4.9 min
25. A river 3 m deep and 40 m wide is flowing at the rate of 2 km per hour. How much water (in litres) will fall into the sea in a minute?
(a) 4,00,000 (b) 40,00,000
(c) 40,000 (d) 4,000
26. The speed of a boat in still water is 15 km/h and the rate of stream is 5 km/h. The distance travelled downstream in 24 minutes is
(a) 4 km (b) 8 km
(c) 6 km (d) 16 km
27. A person can swim in still water at 4 km/h. If the speed of water is 2 km/h, how many hours will the man take to swim back against the current for 6 km.
(a) 3 (b) 4
(c) $4\frac{1}{2}$ (d) Insufficient data
28. A boat running downstream covers a distance of 16 km in 2 hours while for covering the same distance upstream, it takes 4 hours. What is the speed of the boat in still water?
(a) 4 km/h (b) 6 km/h
(c) 8 km/h (d) Data Inadequate
29. A boat goes 24 km upstream and 28 km downstream in 6 hours. It goes 30 km upstream and 21 km of downstream in 6 hours and 30 minutes. The speed of the boat in still water is :
(a) 10 km/h (b) 4 km/h
(c) 14 km/h (d) 6 km/h
30. A man who can swim 48m/min in still water swims 200m against the current and 200 m with the current. If the difference between those two times is 10 minutes, find the speed of the current.
(a) 30 m/min (b) 29 m/min
(c) 31 m/min (d) 32 m/min
31. A circular running path is 726 metres in circumference. Two men start from the same point and walk in opposite directions at 3.75 km/h and 4.5 km/h, respectively. When will they meet for the first time?
(a) After 5.5 min (b) After 6.0 min

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- (c) After 5.28 min (d) After 4.9 min
32. A train after travelling 150 km meets with an accident and then proceeds with $\frac{3}{5}$ of its former speed and arrives at its destination 8 h late. Had the accident occurred 360 km further, it would have reached the destination 4 h late. What is the total distance travelled by the train?
(a) 840 km (b) 960 km
(c) 870 km (d) 1100 km
33. A man swimming in a stream which flows $1\frac{1}{2}$ km/hr., finds that in a given time he can swim twice as far with the stream as he can against it. At what rate does he swim?
(a) $5\frac{1}{2}$ km/hr (b) $4\frac{1}{2}$ km/hr
(c) $7\frac{1}{2}$ km/hr (d) None of these
34. Two persons start from the opposite ends of a 90 km straight track and run to and fro between the two ends. The speed of first person is 30 m/s and the speed of other is $\frac{125}{6}$ m/s. They continue their motion for 10 hours. How many times they pass each other?
(a) 10 (b) 9
(c) 12 (d) None of these
35. A man starts from B to K, another from K to B at the same time. After passing each other they complete their journeys in $3\frac{1}{3}$ and $4\frac{4}{5}$ hours, respectively. Find the speed of the second man if the speed of the first is 12 km/hr.
(a) 12.5 kmph (b) 10 kmph
(c) 12.66 kmph (d) 20 kmph
36. A train 100 metres long moving at a speed of 50km/hr. crosses a train 120 metres long coming from opposite direction in 6 sec. The speed of the second train is
(a) 60 km/hr. (b) 82 km/hr.
(c) 70 km/hr. (d) 74 km/hr.
37. A passenger sitting in a train of length 100 m, which is running with speed of 60 km/h passing through two bridges, notices that he crosses the first bridge and the second bridge in time intervals which are in the ratio of 7 : 4 respectively. If the length of first bridge be 280 m, then the length of second bridge is:
(a) 490 m (b) 220 m
(c) 160 m (d) Can't be determined
38. A man can row a certain distance against the stream in six hours. However, he would take two hours less to cover the same distance with the current. If the speed of the current is 2 kmph, then what is the rowing speed in still water?
(a) 10 kmph (b) 12 kmph
(c) 14 kmph (d) 8 kmph
39. A boat, while going downstream in a river covered a distance of 50 mile at an average speed of 60 miles per hour. While returning, because of the water resistance, it took one hour fifteen minutes to cover the same distance. What was the average speed of the boat during the whole journey?
(a) 40 mph (b) 48 mph
(c) 50 mph (d) 55 mph
40. Two trains, 130 m and 110 m long, are going in the same direction. The faster train takes one minute to pass the other completely. If they are moving in opposite directions, they

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- pass each other completely in 3 seconds. Find the speed of each train.
(a) 38m/sec, 36m/sec (b) 42 m/sec, 38 m/sec
(c) 36m/sec, 42m/sec (d) None of these
41. A passenger sitting in a train of length 100 m, which is running with speed of 60 km/h passing through two bridges, notices that he crosses the first bridge and the second bridge in time intervals which are in the ratio of 7 : 4 respectively. If the length of first bridge be 280 m, then the length of second bridge is:
(a) 490 m (b) 220 m
(c) 160 m (d) Can't be determined
42. If a train runs at 70 km/hour, it reaches its destination late by 12 minutes. But if it runs at 80 km/hour, it is late by 3 minutes. The correct time to cover the journey is
(a) 58 minutes (b) 2 hours
(c) 1 hour (d) 59 minutes
43. A car covers four successive 6 km stretches at speeds of 25 kmph, 50 kmph, 75 kmph and 150 kmph respectively. Its average speed over this distance is
(a) 25 kmph (b) 50 kmph
(c) 75 kmph (d) 150 kmph
44. A is faster than B. A and B each walk 24 km. The sum of their speed is 7 km/hr and the sum of time taken is 14 hours. A's speed is
(a) 4 km/hr (b) 3 km/hr
(c) 5 km/hr (d) 7 km/hr
45. In a 1 km race A beats B by 40 meters or 7 seconds. Find A's time over the course.
(a) 172 sec (b) 150 sec
(c) 160 sec (d) 168 sec
46. A hare sees a dog 100 meters away from her and scuds off in the opposite direction at the speed of 12 km/hr. A minute later the dog sees her and chases her at a speed of 16 km/hr. How soon will the dog overtake her?
(a) 240 sec (b) 360 sec
(c) 270 sec (d) 180 sec
47. On reducing my speed to 3 km/hr. I reach office 10 minutes late. I usually travel at 133% of this speed and reach early by the same margin. How far is my office?
(a) 4 km (b) 6 km
(c) 3.5 km (d) 4.5 km
48. A monkey climbs a slippery pole 12 m height rises. 1 m in every 1 min and slips $\frac{1}{2}$ metre in a every next minute. Find how soon it will reach the top.
(a) 45 min (b) 40 min
(c) 35 min (d) 48 min
49. It takes 8 hours for a 600 km journey, if 120 km is done by train and the rest by car. It takes 20 minutes more if 200 km is down by train and the rest by car. The ratio of the speed of the train to that of the car is
(a) 2 : 3 (b) 3 : 2
(c) 3 : 4 (d) 4 : 3

ANSWER KEY

1	(a)	17	(a)
2	(a)	18	(a)
3	(c)	19	(a)
4	(d)	20	(b)
5	(b)	21	(a)
6	(d)	22	(c)

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7	(c)	23	(b)
8	(a)	24	(c)
9	(b)	25	(b)
10	(b)	26	(b)
11	(d)	27	(a)
12	(a)	28	(b)
13	(a)	29	(a)
14	(a)	30	(d)
15	(b)	31	(c)
16	(b)	32	(c)
33	(b)	42.	(c)
34	(c)	43.	(b)
35	(b)	44.	(b)
36	(b)	45.	(a)
37	(c)	46.	(d)
38	(a)	47.	(c)
39	(b)	48.	(a)
40	(b)	49.	(a)
41.	(c)		

SPEED, TIME & DISTANCE HINTS & EXPLANATIONS

1. (a) Let each side of the square be x km
and let the average speed of the plane around the field be y km/h.

Then,

$$\frac{x}{200} + \frac{x}{400} + \frac{x}{600} + \frac{x}{800} = \frac{4x}{y}$$

$$\Rightarrow \frac{25x}{2400} = \frac{4x}{y} \Rightarrow y = \frac{2400 \times 4}{25} = 384$$

/ Average speed = 384 km/h.

2. (a) In 2 minutes, he ascends = 1 metre

/ 10metres, he ascends in 20 minutes.

/ He reaches the top in 21st minute.

3. (c) We know that, the relation in time

taken with two different modes of transport is

$$t_{\text{walk both}} + t_{\text{ride both}} = 2(t_{\text{walk}} + t_{\text{ride}})$$

$$\frac{31}{4} + t_{\text{ride both}} = 2 \times \frac{25}{4}$$

$$\Rightarrow t_{\text{ride both}} = \frac{25}{2} - \frac{31}{4} = \frac{19}{4} =$$

$$4\frac{3}{4} \text{ hrs}$$

4. (d) Let the distance between each pole be

x m. Then, the distance up to 12th pole = 11 m

$$\text{Speed} = \frac{\frac{11x}{24} \text{ m}}{s}$$

Time taken to covers the total distance of 19x

$$= \frac{19x \times 24}{11x} = 41.45s$$

5. (b) Rest time = Number of rest \times Time

for each rest = $4 \times 5 = 20$ minutes

Total time to cover 5 km

$$= \left(\frac{5}{10} \times 60 \right) \text{ minutes} + 20 \text{ minutes} = 50 \text{ minutes.}$$

6. (d) Let the average speed be x km/h.

and total distance be y km.

Then,

$$\frac{0.2}{10}y + \frac{0.6}{30}y + \frac{0.2}{20}y = \frac{y}{x}$$

$$\Rightarrow x = \frac{1}{0.05} = 20 \text{ km/h}$$

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7. (c) After 5 minutes (before meeting), the

top runner covers 2 rounds i.e., 400 m and the last runner covers 1 round i.e., 200 m. Top runner covers 800 m race in 10 minutes.

8. (a) Let the length of the journey = x km

/Journey rides by horse cart =

$$x \left(1 - \frac{1}{2} - \frac{1}{3} = \frac{1}{6}x \text{ km.}\right)$$

Then, total time taken to complete

$$\text{Journey} = \frac{31}{5} \text{ hr}$$

$$\rightarrow t_1 + t_2 + t_3 = \frac{31}{5}$$

$$\rightarrow \frac{x}{2} \times \frac{1}{4} + \frac{x}{3} \times \frac{1}{12} + \frac{x}{6 \times 9} = \frac{31}{5}$$

$$\rightarrow x = \frac{31}{5} \times \frac{216}{37} = 36.2 \text{ km} \approx 36 \text{ km}$$

9. (a) Let original speed = S km/h
Here, distance to be covered is constant

$$/S \times 8 = (S + 5) \frac{20}{3}$$

$$\rightarrow 8S - \frac{20}{3}S = \frac{100}{3} \rightarrow S =$$

$$\frac{100}{4} = 25 \text{ km/h}$$

10. (b) Let the distance between X and Y be x

km. Then, the speed of A is $\frac{x}{4}$

km/h and that of B is $\frac{2x}{7}$ km/h.

$$\frac{\frac{2x}{7} \text{ km/h}}{h} \quad \begin{array}{c} \leftarrow \text{---} \text{---} \text{---} \rightarrow \\ x \text{ km} \end{array} \quad \frac{x}{4} \text{ km/h}$$

Relative speeds of the trains

$$= \frac{x}{4} + \frac{2x}{7} = \frac{15x}{28} \text{ km/h}$$

Therefore the distance between the trains at 7 a.m. = $x - \frac{x}{2} =$

$$\frac{x}{2} \text{ km}$$

Hence, time taken to cross each other

$$= \frac{\frac{x}{2}}{\frac{15x}{28}} = \frac{x}{2} \times \frac{28}{15x} = \frac{14}{15} \times 60 =$$

$$56 \text{ min}$$

Thus, both of them meet at 7 : 56 a.m.

11. (d) Let C1 takes t hrs. Then,

/ Distance is same

$$/30t = 45 \left(t - \frac{5}{2}\right)$$

$$\rightarrow t = \frac{15}{2} \text{ hrs}$$

$$/ \text{ Distance} = 30 \times \frac{15}{2} = 225 \text{ km}$$

12. (a) Let the distance be x km and speed of

train be y km/h. Then by question, we have

$$\frac{x}{y+4} = \frac{x}{y} - \frac{30}{60} \dots\dots\dots (i)$$

$$\text{and } \frac{x}{y-2} = \frac{x}{y} + \frac{20}{60} \dots\dots\dots (ii)$$

On solving (i) and (ii), we get x = 3y

Put x = 3y in (i) we get

$$\frac{3y}{y+4} = 3 - \frac{1}{2} \rightarrow y = 20$$

Hence, distance = 20 × 3 = 60 km.

13. (a) Let the speed of the goods train be x

kmph. Distance covered by goods train in 10 hours

= Distance covered by express train in 4 hours.

$$/ 10x = 4 \times 90 \text{ or } x = 36.$$

So, speed of goods train = 36 kmph.

14. (a) Due to stoppages, it covers 20 km less

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$$\begin{aligned}\text{Time taken to cover 20km} &= \frac{20}{80}h = \frac{1}{4}h \\ &= \frac{1}{4} \times 60 \text{ min} = 15 \text{ min}\end{aligned}$$

15. (b) If new speed is $\frac{a}{b}$ of original speed.

Then,
usual time $\times \left(\frac{b}{a} - 1\right) = \text{change in time}$
/usual time $\times \left(\frac{4}{3} - 1\right) = \frac{1}{3}$
 $\Rightarrow \text{usual time} = \frac{1}{3} \times 3 = 1 \text{ hr}$

16. (b) Let the distance between the two

stations be x km.
Then, $\frac{x}{50} - \frac{10}{6} = \frac{x}{30} - \frac{50}{6}$
 $\Rightarrow \frac{x}{50} - \frac{1}{6} = \frac{x}{30} - \frac{5}{6}$
or $\frac{x}{30} - \frac{x}{50} = \frac{2}{3}$ or $x = 50 \text{ km}$

Thus distance between the station A and B = 50 km

17. (a) Distance to be covered by the thief and

by the owner is same. Let after time 't', owner catches the thief.

$$\begin{aligned}40 \times t &= 50 \left(t - \frac{1}{2}\right) \\ \Rightarrow 10t &= 25 \Rightarrow t = \frac{5}{2} \text{ hr} =\end{aligned}$$

$$2 \frac{1}{2} \text{ hr}$$

18. (a) A covers 3.5 km before he meets B in

$$\begin{aligned}(18 \times 3.5 + 3) &= 66 \text{ min} = \frac{66}{60} \\ &= \frac{11}{10} \text{ h}\end{aligned}$$

Now, B covers a distance of 5.5 km in $\frac{11}{10}$ hours

$$\begin{aligned}\Rightarrow \text{B's speed} &= \frac{11}{2} \times \frac{10}{11} = \\ &= 5 \text{ km/h}\end{aligned}$$

19. (a) Average speed =

$$\begin{aligned}\frac{\text{Total distance}}{\text{Total time}} &= \frac{400 \times 4 \times 9}{88 + 96 + 89 + 87} = \frac{400 \times 4 \times 9}{360} \\ &= 40 \text{ metres / minute}\end{aligned}$$

20. (b) Let the speed of the train and the car

be x km/h and y km/h, respectively.

$$\text{Now, } \frac{120}{x} + \frac{480}{y} = 8 \text{----- (i)}$$

$$\text{and } \frac{200}{x} + \frac{400}{y} = \frac{25}{3} \text{---}$$

----(ii)

$$\text{From (i), } 120y + 480x = 8xy$$

and--(iii)

$$\text{From (ii), } 200y + 400x = \frac{25}{3}xy \text{ -}$$

---(iv)

From (iii) and (iv),

$$\begin{aligned}\frac{120y + 480x}{8} &= \frac{3(200y + 400x)}{25} \\ \text{or } 15y + 60x &= 24y + 48x \\ \text{or } 12x &= 9y \text{ or } \frac{x}{7} = \frac{3}{4}\end{aligned}$$

21. (a) Let the duration of the flight be x

hours. Then,

$$\begin{aligned}\frac{600}{x} - \frac{600}{x + \frac{1}{2}} &= 200 \Rightarrow \frac{600}{x} \\ &- \frac{1200}{2x + 1} = 200\end{aligned}$$

$$\begin{aligned}\Rightarrow x(2x + 1) &= 3 \Rightarrow 2x^2 + x - 3 \\ &= 0 \Rightarrow (2x + 3)(x - 1) = 0 \Rightarrow x = 1 \\ \text{hr [neglecting the -ve value of } x]\end{aligned}$$

22. (c) Let the speed of the cars be x km/h

and y km/h respectively.

Their relative speed when they are moving in same direction = $(x - y)$ km/h.

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- Their relative speed when they are in opposite directions = $(x + y)$ km/h.
Now, $\frac{70}{(x+y)} = 1$ or $x + y = 70$
- ...(i) and $\frac{70}{(x-y)} = 7$ or $x - y = 10$
-(ii)
- Solving (i) and (ii), we get
 $x = 40$ km/h and $y = 30$ km/h
23. (b) $D = S \times T$
 $60 = S \times \left(\frac{45}{60}\right) \text{ hr}$
 $S = \frac{60 \times 60}{45} \rightarrow 80 \text{ km/hr}$
Now, new speed = $80 - 15 = 65$ km/hr.
 $\text{Time} = \frac{\text{Distance}}{\text{Speed}} = \frac{60}{65} \text{ hr.}$
or $\frac{60}{65} \times 60 \text{ min} = 55.38 \text{ min.}$
Hence, Time to taken by car to travel same distance is 55.38 min
24. (c) Let the husband and the wife meet after x minutes. 4500 metres are covered by Pradeep in 60 minutes.
In x minutes, he will cover $\frac{4500}{60} x$ metres.
Similarly,
In x minutes, his wife will cover $\frac{3750}{60} x$ m.
Now, $\frac{4500}{60} x + \frac{3750}{60} x = 726$
 $\rightarrow x = \frac{726 \times 60}{8250} = 5.28 \text{ min}$
25. (b) Volume of water flowed in an hour
 $= 2000 \times 40 \times 3 \text{ cubic metre} = 240000 \text{ cubic metre}$
/ Volume of water flowed in 1 minute

- $= \frac{240000}{60} = 4000 \text{ cubic metre} = 40,00,000 \text{ litre}$
26. (b) Downstream speed = $15 + 5 = 20$ km/h.
/ Required distance = $20 \times \frac{24}{60} = 8 \text{ km.}$
27. (a) Man's speed in upstream = $4 - 2 = 2$ km/h.
/ Required time = $\frac{6}{2} = 3 \text{ km/h}$
28. (b) Rate downstream = $\frac{16}{2} \text{ kmph} = 8$ kmph
Rate upstream = $\frac{16}{4} \text{ kmph} = 4$ kmph.
/ Speed in still water = $\frac{1}{2}(8 + 4) = 6 \text{ km/h.}$
29. (a) Let speed of the boat in still water be x km/h and speed of the current be y km/h. / Then, upstream speed = $(x - y)$ km/h and downstream speed = $(x + y)$ km/h
Now, $\frac{24}{(x-y)} + \frac{28}{(x+y)} = 6 \dots (1)$
and $\frac{30}{(x-7)} + \frac{21}{(x+y)} = \frac{13}{2} \dots (2)$
Solving (1) and (2), we get
 $x = 10 \text{ km/h}$ and $y = 4 \text{ km/h}$
30. (d) Let V_m = Velocity of man = 48 m/min
Let V_c = Velocity of current
then t_1 = time taken to travel 200m against the current.
i.e., $t_1 = \frac{200}{V_m - V_c} \dots \dots \dots$
(1)
and t_2 = time to travel 200m with the current

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$$\text{i.e., } t_2 = \frac{200}{V_m + V_c} \dots\dots\dots$$

(2)

Given : $t_1 - t_2 = 10 \text{ min}$

$$\frac{200}{V_m - V_c} - \frac{200}{V_m + V_c} = 10$$

$$\Rightarrow V_m^2 - V_c^2 = 40V_c \Rightarrow V_c^2 + 40V_c - (48)^2 = 0 \Rightarrow V_c = 32, -72$$

Hence, speed of the current = 32
($V_c \neq -72$).

31. (c) Their relative speeds = $4.5 + 3.75 =$

8.25 km/h

$$\text{Distance} = 726 \text{ metres} = \frac{726}{1000} =$$

0.726 km

$$\text{Required time} = \frac{0.726}{8.25} \times 60 =$$

5.28 min

32. (c) Let the total distance to be travelled =

x km

Speed of train = V km/h

and time taken = 1 hr

$$\frac{150}{v} + \frac{x-150}{\frac{3v}{5}} = (t+8)$$

..... (1)

$$\frac{510}{v} + \frac{x-510}{\frac{3}{5}v} = (t+4)$$

..... (2)

Eq(2) – Eq(1)

$$\begin{aligned} \frac{510}{v} - \frac{150}{v} + \frac{x-510}{\frac{3}{5}v} \\ - \frac{x-150}{\frac{3v}{5}} \\ = -4 \end{aligned}$$

$$\frac{360}{v} - \frac{360 \times 5}{3v} = -4 \Rightarrow V = 60 \text{ km/hr.}$$

$$t = \frac{x}{60}$$

Put in eqn (1)

$$\frac{150}{60} + \frac{x-150}{\frac{3 \times 60}{5}} = \frac{x}{60} + 8$$

$$\frac{5}{2} + \frac{x-150}{36} = \frac{x}{60} + 8$$

$$\frac{x-150}{36} - \frac{x}{60} = 8 - \frac{5}{2} = \frac{11}{2}$$

$$\frac{10x-1500-6x}{360} = \frac{11}{2}$$

$$\Rightarrow 4x - 1500 = \frac{360 \times 11}{2} = 1980$$

$$\Rightarrow 4x = 3480$$

$$x = \frac{3480}{4} \text{ km} = 870 \text{ km}$$

33. (b) Let the speed of swimmer be x
km/hr

When he swim with the flow

then speed = $(x + \frac{3}{2})$ km/h.

$$/ S_1 = \left(x + \frac{3}{2}\right) t$$

When he swim against the flow
of stream

$$\text{then speed} = \left(x - \frac{3}{2}\right) t$$

$$/ S_2 = \left(x - \frac{3}{2}\right) t$$

According to the ques

$$S_1 = 2S_2$$

$$\left(x + \frac{3}{2}\right) t = 2 \left(x - \frac{3}{2}\right) t$$

$$\left(x + \frac{3}{2}\right) t = 2t \frac{2x-3}{2}$$

$$\Rightarrow \frac{2x+3}{2} = 2x-3$$

$$\Rightarrow 2x+3 = 4x-6 \Rightarrow 9 = 2x$$

$$\Rightarrow x = \frac{9}{2} =$$

$$4\frac{1}{2} \text{ km/hr}$$

34. (c) The speeds of two persons is
108 km/h

and 75 km/h. The first person covers 1080 km in 10 hours and thus he makes 12 rounds. Thus, he will pass over another person 12 times in any one of the direction.

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$$35. (b) \quad \frac{1st\ man's\ speed}{2nd\ man's\ speed} = \frac{\sqrt{b}}{\sqrt{a}} = \frac{\sqrt{b}}{\sqrt{a}} =$$

$$\frac{4\frac{4}{5}}{3\frac{1}{3}} = \frac{24}{5} \times \frac{3}{10} = \frac{36}{25} = \frac{6}{5}$$

$$/ \frac{12}{2nd\ man's\ speed} = \frac{6}{5}$$

$$/ 2^{nd}\ man's\ speed = \frac{60}{6} =$$

10 km/hr

$$36. (b) \quad \text{Let speed of the second train} = x \text{ km/hr.}$$

$$\text{Relative speed of trains} = (50+x) \text{ km/hr.}$$

$$\text{Distance travelled by trains} = (100 + 120) = 220 \text{ metres}$$

$$\text{Distance} = \text{Speed} \times \text{Time}$$

$$\frac{220}{1000} \Big) km$$

$$= (50 + x) \frac{km}{hr} \cdot$$

$$\times \frac{6}{3600} \Big) hr$$

$$50 + x = \frac{220 \times 3600}{1000 \times 6}$$

$$50 + x = 132$$

$$x = 132 - 50 = 82 \text{ km/hr}$$

37. (c) Note here the length of the train in

which passenger is travelling is not considered since we are concerned with the passenger instead of train. So, the length of the bridge will be directly proportional to the time taken by the passenger respectively.

$t \rightarrow$ Time

$l \rightarrow$ Length of bridge

$$\text{Therefore, } \frac{t_1}{t_2} = \frac{l_1}{l_2}$$

$$\frac{7}{4} = \frac{280}{2}$$

$$\rightarrow x = 160 \text{ m.}$$

38. (a) If the rowing speed in still water be x

kmph, and the distance by y km, then

$$\frac{y}{x-2} = 6$$

$$\rightarrow y = 6(x-2) \dots\dots (1)$$

$$\text{and, } \frac{y}{x+2} = 4$$

$$\rightarrow y = 4(x+2) \dots\dots (2)$$

$$\rightarrow 6(x-2) = 4(x+2)$$

$$\rightarrow x = 10 \text{ kmph}$$

$$39. (b) \quad \text{Time taken by the boat during downstream journey} = \frac{50}{60} = \frac{5}{6} h$$

$$\text{Time taken by the boat in upstream journey} = \frac{5}{4} h$$

$$\text{Average speed} = \frac{2 \times 50}{\frac{5}{6} + \frac{5}{4}} = \frac{100 \times 24}{50}$$

$$= 48 \text{ mph}$$

40. (b) Let the Speed of faster train be x and
in
speed of slower train be y.
Now, when both the train move

same direction their relative speed = $x - y \dots\dots (1)$

Now, total distance covered = $130 + 110 = 240$

Now, distance = speed \times time
 $\therefore 240 = (x - y) \times 60$ ($\because 1 \text{ min} = 60 \text{ sec}$) when the trains move in opposite direction then their relative speed = $x + y$

$$/ 240 = (x + y) \times 3$$

$$\rightarrow 80 = x + y \dots\dots (2)$$

on solving eqs (1) and (2), we get $x = 42 \text{ m/sec}$ and $y = 38 \text{ m/sec}$

41. (c) Note here the length of the train in

which passenger is travelling is not considered since we are concerned with the passenger

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instead of train. So, the length of the bridge will be directly proportional to the time taken by the passenger respectively,

$t \rightarrow$ Time

$l \rightarrow$ Length of bridge

Therefore, $\frac{t_1}{t_2} = \frac{l_1}{l_2}$

$$\frac{7}{4} = \frac{280}{2}$$

$$\rightarrow x = 160 \text{ m}$$

42. (c) Let correct time to cover journey be t hours.

$$70 \left(t + \frac{12}{60} \right) = 80 \left(t + \frac{3}{60} \right)$$

$$70t + 14 = 80t + 4$$

$$10t = 10$$

$$t = 1 \text{ hour}$$

43. (b) Average Speed =

$\frac{\text{Total Distance Covered}}{\text{Total Time Taken}}$

$$= \frac{6+6+6+6}{\frac{6}{25} + \frac{6}{50} + \frac{6}{75} + \frac{6}{150}} \rightarrow \frac{24}{6 \left(\frac{1}{25} + \frac{1}{50} + \frac{1}{75} + \frac{1}{150} \right)}$$

$$\frac{24 \times 300}{6 \times 24} \rightarrow 50 \text{ km/hr}$$

44. (a) Let speed of A and B are S_1 and S_2

respectively.

$$S_1 + S_2 = 7 \quad \dots\dots (1)$$

$$\frac{24}{S_1} + \frac{24}{S_2} = 14$$

$$\text{or } \frac{1}{S_1} + \frac{1}{S_2} = \frac{14}{24} \quad \dots\dots\dots (2)$$

$$\frac{S_1 + S_2}{S_1 S_2} = \frac{14}{24} \rightarrow \frac{7}{S_1 S_2} = \frac{14}{24}$$

$$S_1 S_2 = 12$$

$$S_1(7 - S_1) = 12$$

$$S_1^2 - 7S_1 + 12 = 0$$

$$(S_1 - 4)(S_1 - 3) = 0$$

$$S_1 = 4, 3$$

Corresponding values of $S_2 = 3, 4$

$$\Rightarrow 80 = (x + y) \dots \text{As, } S_1 > S_2$$

A's speed is 4 km/h

45. (d) B covers 40 m in 7 seconds

$$\text{Speed of B} = \frac{40}{7} \text{ m/s}$$

Time taken by B to cover 1km =

$$\frac{1000 \times 7}{40} = 175 \text{ S}$$

$$\text{A's time over the course} = (175 - 7) = 168 \text{ S}$$

46. (c) Let at time 't' dog overtook hare
distance travelled by dog = $16t$
distance between dog and hare =

$$12 \left(t + \frac{1}{60} + 0.1 \right) m$$

$$12 \left(t + \frac{1}{60} + 0.1 \right) = 16t$$

$$12t + \frac{1}{5} + \frac{1}{10} = 16t$$

$$\frac{3}{10} = 4t$$

$$t = \frac{3}{40} h$$

$$t = \frac{3}{40} \times 3600 = 270 \text{ seconds}$$

47. (a)

48. (a) The monkey 1 meter in 4 min.

This

pattern will go on till he reaches 11 meters. i.e., $11 \times 4 = 44$ mins. After that he would have climb 1 meter and he will reach the pole. So, the total time taken = $44 + 1 = 45$ min.

49. (c) Let T be the speed of train and C be

the speed of car.

$$\frac{120}{T} + \frac{480}{C} = 8 \rightarrow \frac{1}{T} + \frac{4}{C} = \frac{1}{15} \dots\dots$$

(1)

$$\frac{200}{T} + \frac{400}{C} = 8 + \frac{20}{60} \rightarrow \frac{1}{T} + \frac{2}{C} =$$

$$\frac{1}{24} \dots\dots (2)$$

Subtracting (2) from (1)

$$\frac{2}{C} (2 - 1) = \frac{1}{15} - \frac{1}{24}$$

$$\frac{2}{C} = \frac{1}{40} \rightarrow C = 80$$

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$$\frac{1}{T} = \frac{1}{15} - \frac{4}{80}$$

$$\frac{1}{T} = \frac{1}{60} \rightarrow T = 60$$

Required ratio = 60 : 80 = 3 : 4