

Distance and Time

Given below are the important distance and time based questions formulas:

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

Speed and Time are inversely proportional

If the **ratio of speed** of A and B is **a:b**

Then **ratio of time** taken is **1/a : 1/b**

1. A train travels at 82km/hr, how many meters will it travel in 15 minutes.

- Speed = 82km/hr

$$= \text{Distance} / \text{time} = \text{Distance} / 15/60$$

$$\text{Distance} = \text{speed} \times \text{time} = 82 \times 15/60 = 20.5 \text{ km} = 20500\text{m}$$

2. How many minutes does Adithya take to cover a distance of 400m, if he must at a speed of 20km/hr.

- Time = Distance/speed
- $$= \frac{400}{20 \times \frac{5}{18}} = 4 \times 18 = 72 \text{ seconds} = 1 \frac{12}{60} = 1 \frac{1}{5} \text{ minutes}$$

3. A man walked at a speed of 4 km/hr from A to B and come back from B to A at a speed of 6km/hr. Find ratio of time taken, for walking from A to B to that of from B to A.

- Ratio of speed = $4:6 = 2:3$
- Ratio of time taken = $\frac{1}{2}:\frac{1}{3} = 3:2$

4. A man covers a certain distance between his house and office on a Scooter. Having an average speed of 30 km/hr, he reaches office late by 10 minutes. However, with a speed of 40 km/hr, he reaches his office 5 minutes earlier. Find the distance between his house and office.

Sol:

Let the required distance be x km.

Time taken at 30 km/hr = $x/30$

Time taken at 40 km/hr = $x/40$

Difference between the time taken = $10 - (-5) = 15 \text{ mts} = 15/60 \text{ km/hr}$

$$x/30 - x/40 = 15/60$$

$$X = 30 \text{ km}$$

5. A person reaches his destination 40 minutes late if his speed is 3 km/hr and reaches 30 minutes before time if his speed is 4 km/hr. Find the distance of his destination from his starting point.

Sol:

Let the required distance be x km.

Time taken at 3 km/hr = $x/3$

Time taken at 4 km/hr = $x/4$

Difference between time taken: $40 - (-30) = 70$ mins = $70/60$ hours.

$$x/3 - x/4 = 70/60$$

$$X = 14 \text{ km}$$

7. John travelled from his town to city. John went to city by bicycle at the speed of 25 km/h and came back at the speed of 4 km/h. If John took 5 hours and 48 min to complete his journey, what is the distance between town and city ?

Sol:

Let the required distance be x km.

Time taken at 25 km/hr $=x/25$

Time taken at 4 km/hr $=x/4$

Total time $= x/25+x/4 = 5*48/60$

$29x/100 = 29/5$

$x=20\text{km}$

8. A motor car does a journey in 10 hours, the first half at 21 km per hour, and the rest at 24 km per hour. Find the distance.

Sol:

Let the required distance be x km.

First half distance is $x/2$

$$\text{Time taken at 21 km/hr} = \frac{x/2}{21}$$

Second half distance is $x/2$

$$\text{Time taken at 24 km/hr} = \frac{x/2}{24}$$

$$\text{Time taken for whole journey} = \frac{x/2}{21} + \frac{x/2}{24} = 10$$

$$\mathbf{X=224km}$$

9. If a boy walks from his house at 4 km/hr he reaches school 10 min early, if he walks at 3 km/hr he reaches 10 min late. What is the distance from his house to school ?

Sol:

Let the distance be x km

Difference in timing = 20 min = $\frac{1}{3}$ hr

$$\therefore \frac{x}{3} - \frac{x}{4} = \frac{1}{3}$$

$$\Rightarrow 4x - 3x = 4$$

$$\Rightarrow x = 4 \text{ km}$$

10. A man covered a distance of 180 km in 4 hours on a bike. How much distance will be cover on a bicycle in 8 hours if he rides the bicycle at one-sixth the speed of the bike ?

Speed of the bike :

$$= \left(\frac{180}{4} \right) \text{ km/hr}$$

$$= 45 \text{ km/hr}$$

Speed of the bicycle :

$$= \left(\frac{1}{6} \times 45 \right) \text{ km/hr}$$

$$= 7.5 \text{ km/hr}$$

∴ Required distance :

$$= (7.5 \times 8) \text{ km}$$

$$= 60 \text{ km}$$

Problems for Practice

- A man travels from his home to the station. If he travels at 20 km/h, he reaches 12 minutes late, and if he travels at 30 km/h, he reaches 6 minutes early. Find the distance between his home and the station.
- A man reaches his office 20 minutes late if he travels at 18 km/h and reaches 10 minutes early if he travels at 24 km/h. What is the distance?
- A student cycles to his school. If he goes at 12 km/h, he reaches 20 minutes late. If he cycles at 18 km/h, he reaches 10 minutes early. What is the distance to his school?
- A delivery person goes from a warehouse to a customer's home. At 25 km/h, he is late by 12 minutes. At 35 km/h, he is early by 6 minutes. Find the distance he covers.

