

Time, Speed & Distance

Suppose, Delhi to Agra is 120 km. And my motorcycle covers 40 km in one hour. So, how much time I will take to reach Agra?

Simple! 3 hrs. time.

But my friend's car covers 60 km in an hour. He will take how much time?

Simple! 2 hrs. time.

Means to say, my friend will reach Agra 1 hour before me.

So, keeping the distance constant, we got two times for two speeds. The time taken is inversely proportional to speed.

Basic formula we used here for calculation of time taken is:

Time taken = Distance/Speed

And using this formula, we can calculate speed, or, distance, if two other things are known

Speed = Distance/Time

Distance = Speed * Time

(1).Relation between distance ,time and speed:

Distance = speed x Time

(2).To convert speed of any object from KMPH to MPS multiply the speed by = $1000 / 3600 = 5 / 18$

(3).To convert speed of any object from MPS to KMPH multiply the speed by = $3600 / 1000 = 18 / 5$

(4).If the speed ratio of A and B is a:b then ratio of time to cover certain distance is = $1/a : 1/b = b : a$

(5).If a person covers certain distance with speed x KMPH and return back with speed y KMPH then his average speed throughout the journey is

Average speed = $2xy/(x+y)$ KMPH

(6).If a certain distance is covered with 3 different speed x KMPH, y KMPH and z KMPH then average speed throughout the journey is

$$\text{Average speed} = \frac{3xyz}{(xy+yz+zx)} \text{KMPH}$$

(7).If 2 different distances covered with speed x KMPH and y KMPH respectively but required same time then average speed throughout the journey is

$$\text{Average speed} = \frac{(x+y)}{2} \text{KMPH}$$

(8).If 2 trains start at the same time from different points suppose A and B respectively toward each other and after crossing if they take a and b seconds time resp to reach at B and A point then

$$(A's \text{ speed}) : (B's \text{ speed}) = \frac{b}{a} : \frac{a}{b}$$

Formulae based on Train Problems

Relative Speed (Train Problems):

(9)If two trains are moving in the same direction with speed x KMPH and y KMPH where $x > y$ in that case their relative speed is given as: $(x-y)$ KMPH

(10)If two trains are moving in the opposite direction with speed x KMPH and y KMPH in that case their relative speed is given as: $(x+y)$ KMPH