Pair of Linear Equations in Two varibles Ex 3.10 Q1

Answer :

We have to find the speed of car

Let X and Y be two cars starting from points A and B respectively. Let the speed of car X be x km/hr and that of car Y be y km/hr.

Case I: When two cars move in the same directions:

Suppose two cars meet at point Q, Then,

Distance travelled by car $X = AQ$

Distance travelled by car $Y = BQ$

It is given that two cars meet in 7 hours.

Therefore, Distance travelled by car X in 7 hours = $7x$ km

$AQ = 7x$

Distance traveled by car y in 7 hours = $7y$ km

$BQ = 7Y$

Clearly $AQ - BQ = AB$

$7x - 7y = 70$

Dividing both sides by common factor 7 we get,

$x - y = 10 \cdots (i)$

Case II : When two cars move in opposite direction

Suppose two cars meet at point. Then,

Distance travelled by car $X = AP$,

Distance travelled by car $Y = BP$.

In this case, two cars meet in 1 hour

Therefore Distance travelled by car X in1 hour $= 1x$ km

$AP = 1x$

Distance travelled by car Y in 1 hour $= 1y$ km

$BP = 1y$

From the above clearly,

$AP + BP = AB$

$AP + BP = AB$

$x + y = 70$ ...(ii)

By solving equation (i) and (ii), we get

$$x - y = 10$$

$$\underline{x + y = 70}$$

$$2x = 80$$

$$x = \frac{80}{2}$$

$$x = 40$$

Substituting $x = 40$ in equation (ii) we get

$$x + y = 70$$

$$40 + y = 70$$

$$y = 70 - 40$$

$$y = 30$$

Hence, the speed of car starting from point A is $\boxed{40\ km/hr}$.

The speed of car starting from point B is $\boxed{30\ km/hr}$.

Pair of Linear Equations in Two varibles Ex 3.10 Q2

Answer :

Let the speed of the sailor in still water be *x* km/hr and the speed of the current be *y* km/hr

Speed upstream $=(x-y)\,km/hr$

Speed downstream $=(x+y)\,km/hr$

Now, Time taken to cover 8km down stream $=\frac{8}{x+y}\,hrs$

Time taken to cover 8km upstream$=\frac{8}{x-y}\,hrs$

But, time taken to cover 8 km downstream in 40 minutes or $\frac{40}{60}\,hours$ that is $\frac{2}{3}\,hours$

$$\frac{8}{x+y}=\frac{2}{3}$$

$$8\times 3=2(x+y)$$

$$24=2x+2y$$

Dividing both sides by common factor 2 we get

$$12=x+y\cdots(i)$$

Time taken to cover 8km upstream in1hour

$$\frac{8}{x-y}=1$$

$$8=1(x-y)$$

$$8=x-y \quad ...(ii)$$

By solving these equation (i) and (ii) we get

$$x+y=12$$

$$\underline{x-y=8}$$

$$2x=20$$

$$x=\frac{20}{2}$$

$$x=10$$

Substitute $x=10$ in equation (i) we get

$$x+y=12$$

$$10+y=12$$

$$y=12-10$$

$$y=2$$

Hence, the speed of sailor is $\boxed{10\ km/hr}$

The speed of current is $\boxed{2\ km/hr}$

********** END **********