



Pair of Linear Equations in Two variables 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,

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

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 in 1 hour = $1x$ km

$$AP = 1x$$

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

$$BP = 1y$$

From the above clearly,

$$AP + BP = AB$$

$$AP + BP = AB$$

$$x + y = 70 \dots (ii)$$

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

$$\cancel{x} - \cancel{y} = 10$$

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

$$2x = 80$$

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

$$x = 40$$

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 40 km/hr .

The speed of car starting from point B is 30 km/hr .

Pair of Linear Equations in Two variables 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

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

Time taken to cover 8km upstream in 1 hour

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

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

$$8 = x - y \dots (ii)$$

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

$$x + y = 12$$

$$x - y = 8$$

$$2x = 20$$

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

$$x = 10$$

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 10 km/hr

The speed of current is 2 km/hr

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