



Pair of Linear Equations in Two variables Ex 3.10 Q5

Answer :

Let the speed of Ajeet and Amit be x Km/hr respectively. Then,

$$\text{Time taken by Ajeet to cover } 30\text{Km} = \frac{30}{x} \text{ hrs}$$

$$\text{Time taken by Amit to cover } 30\text{Km} = \frac{30}{y} \text{ hrs}$$

By the given conditions, we have

$$\frac{30}{x} - \frac{30}{y} = 2 \dots (i)$$

If Ajeet doubles his speed, then speed of Ajeet is $2x$ Km / hr

$$\text{Time taken by Ajeet to cover } 30\text{Km} = \frac{30}{2x} \text{ hrs}$$

$$\text{Time taken by Amit to cover } 30\text{Km} = \frac{30}{y} \text{ hrs}$$

According to the given condition, we have

$$-15x + \frac{30}{y} = 1 \dots (ii)$$

Putting $\frac{1}{x} = u$ and $\frac{1}{y} = v$, in equation (i) and (ii), we get

$$30u - 30v = 2 \dots (iii)$$

$$-15u + 30v = 1 \dots (iv)$$

Adding equations (iii) and (iv), we get

$$30u - \cancel{30v} = 2$$

$$\frac{-15u + \cancel{30v} = 1}{15u = 3}$$

$$u = \frac{15}{3}$$

$$u = \frac{1}{5}$$

Putting $u = \frac{1}{5}$ in equation (iii), we get

$$30u - 30v = 2$$

$$30 \times \frac{1}{5} - 30v = 2$$

$$6 - 30v = 2$$

$$-30v = 2 - 6$$

$$-30v = -4$$

$$v = \frac{\cancel{-4}}{\cancel{-30}}$$

$$v = \frac{2}{15}$$

$$\text{Now, } u = \frac{1}{5}$$

$$\frac{1}{x} = \frac{1}{5}$$

$$x = 5$$

$$\text{and } y = \frac{2}{15}$$

$$\frac{1}{y} = \frac{2}{15}$$

$$y = \frac{15}{2}$$

$$y = 7.5$$

Hence, the speed of Ajeet is 5 km / hr

The speed of Amit is 7.5 km / hr

Pair of Linear Equations in Two variables Ex 3.10 Q6

Answer :

Let the actual speed of the train be $x \text{ Km/hr}$ and the actual time taken by y hours. Then,

Distance covered = *speed* \times *dis tance*

$$= x \times y$$

$$= xy \dots (i)$$

If the speed is increased by $\frac{1}{2} \text{ Km / hr}$, then time of journey is reduced by 1 hour i.e., when speed is

$\left(x + \frac{1}{2}\right) \text{ km / hr}$, time of journey is $(y - 1) \text{ hours}$

$$\therefore \text{Distance covered} = xy \text{ km}$$

$$-2x + y - 1 = 0 \dots (ii)$$

When the speed is reduced by 1 Km / hr , then the time of journey is increased by 3 hours i.e., when speed is $(x - 1) \text{ Km / hr}$, time of journey is $(y + 3) \text{ hours}$

$$\therefore \text{Distance covered} = xy$$

$$xy = (x - 1)(y + 3)$$

$$xy = (x - 1)(y + 3)$$

$$xy = xy - 1y + 3x - 3$$

$$\cancel{xy} = \cancel{xy} + 3x - 1y - 3$$

$$3x - 1y - 3 = 0 \dots (iii)$$

Thus we obtain the following equations

$$-2x + 1y - 1 = 0$$

$$3x - 1y - 3 = 0$$

By using elimination method, we have

$$-2x - \cancel{1y} - 1 = 0$$

$$3x - \cancel{1y} - 3 = 0$$

$$\hline 1x - 4 = 0$$

$$x = 4$$

Putting the value $x = 4$ in equation (iii) we get

$$3x - 1y - 3 = 0$$

$$3 \times 4 - 1y - 3 = 0$$

$$12 - 1y - 3 = 0$$

$$12 - 3 - 1y = 0$$

$$9 - 1y = 0$$

$$-1y = -9$$

$$\cancel{-1}y = \cancel{-}9$$

$$y = 9$$

Putting the value of x and y in equations (i) we get

$$\text{Distance covered} = xy$$

$$= 4 \times 9$$

$$= 36km$$

Hence, the distance is $\boxed{36 \text{ km}}$.

The speed of walking is $\boxed{4 \text{ km / hr}}$.

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