



Pair of Linear Equations in Two variables Ex 3.10 Q12

**Answer :**

Let the speed of rowing 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 20 km down stream =  $\frac{20}{x + y}$  hrs

Time taken to cover 4 km upstream =  $\frac{4}{x - y}$  hrs

But, time taken to cover 20 km downstream in 2 hours

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

$$20 = 2(x + y)$$

$$20 = 2x + 2y \dots (i)$$

Time taken to cover 4 km upstream in 2 hours

$$\frac{4}{x - y} = 2$$

$$4 = 2(x - y)$$

$$4 = 2x - 2y \dots (ii)$$

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

$$2x + 2y = 20$$

$$\begin{array}{r} 2x - 2y = 4 \\ \hline 4x = 24 \end{array}$$

$$x = \frac{24}{4}$$

$$x = 6$$

Substitute  $x = 6$  in equation (i) we get

$$2x + 2y = 20$$

$$12 + 2y = 20$$

$$2y = 20 - 12$$

$$2y = 8$$

$$y = \frac{8}{2}$$

$$y = 4$$

Hence, the speed of rowing in still water is  $\boxed{6 \text{ km/hr}}$ .

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

Pair of Linear Equations in Two variables Ex 3.10 Q13

**Answer :**

Let the speed of A and B be  $x$  Km/hr and  $y$  Km/hr respectively. Then,

Time taken by A to cover  $30\text{km} = \frac{30}{x} \text{ hrs}$ ,

And, Time taken by B to cover  $30\text{km} = \frac{30}{y} \text{ hrs}$ .

By the given conditions, we have

$$\frac{30}{x} - \frac{30}{y} = 3$$

$$\frac{10}{x} - \frac{10}{y} = 1 \dots (i)$$

If A doubles his pace, then speed of A is  $2x \text{ km / hr}$

Time taken by A to cover  $30\text{km} = \frac{30}{2x} \text{ hrs}$ ,

Time taken by B to cover  $30\text{km} = \frac{30}{y} \text{ hrs}$ .

According to the given condition, we have

$$\frac{30}{y} - \frac{30}{2x} = 1\frac{1}{2}$$

$$\frac{30}{y} - \frac{30}{2x} = \frac{3}{2}$$

$$\frac{30}{y} \times \frac{1}{3} - \frac{30}{2x} \times \frac{1}{3} = \frac{3}{2} \times \frac{1}{3}$$

$$\frac{10}{y} \times \frac{1}{x} - \frac{10}{2x} \times \frac{1}{x} = \frac{1}{2} \times \frac{1}{x}$$

$$\frac{10}{x} - \frac{5}{y} = \frac{1}{2}$$

$$-\frac{10}{x} + \frac{20}{y} = 1$$

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

$$10u - 10v = 1$$

$$10u - 10v - 1 = 0 \dots (iii)$$

$$-10u + 20v = 1$$

$$-10u + 20v - 1 = 0 \dots (iv)$$

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

$$10v - 2 = 0$$

$$10v = 2$$

$$v = \frac{2}{10}$$

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

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

$$10u - 10v - 1 = 0$$

$$10u - 10 \times \frac{1}{5} - 1 = 0$$

$$10u - 2 - 1 = 0$$

$$10u - 3 = 0$$

$$10u = 3$$

$$u = \frac{3}{10}$$

$$\text{Now, } u = \frac{3}{10}$$

$$\frac{1}{x} = \frac{3}{10}$$

$$x = \frac{10}{3}$$

$$\text{and, } v = \frac{1}{5}$$

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

$$y = 5$$

Hence, the A's speed is  $\boxed{\frac{10}{3} \text{ km / hr}}$  .

The B's speed is  $\boxed{5 \text{ km / hr}}$  .

\*\*\*\*\* END \*\*\*\*\*