



Pair of Linear Equations in Two variables Ex 3.9 Q11

Answer :

Let the present ages of Ani, Biju, Dharam and Cathy be x , y , z and t years respectively.

The ages of Ani and Biju differ by 3 years. Thus, we have

$$x - y = \pm 3$$

$$\Rightarrow x = y \pm 3$$

Dharam is twice as old as Ani. Thus, we have $z = 2x$

Biju is twice as old as Cathy. Thus, we have $y = 2t$

The ages of Cathy and Dharam differ by 30 years. Clearly, Dharam is older than Cathy. Thus, we have $z - t = 30$

So, we have two systems of simultaneous equations

$$(i) \quad x = y + 3,$$

$$z = 2x,$$

$$y = 2t,$$

$$z - t = 30$$

$$(ii) \quad x = y - 3,$$

$$z = 2x,$$

$$y = 2t,$$

$$z - t = 30$$

Here x , y , z and t are unknowns. We have to find the value of x and y .

(i) By using the third equation, the first equation becomes $x = 2t + 3$

From the fourth equation, we have

$$t = z - 30$$

Hence, we have

$$x = 2(z - 30) + 3$$

$$= 2z - 60 + 3$$

$$= 2z - 57$$

Using the second equation, we have

$$x = 2 \times 2x - 57$$

$$\Rightarrow x = 4x - 57$$

$$\Rightarrow 4x - x = 57$$

$$\Rightarrow 3x = 57$$

$$\Rightarrow x = \frac{57}{3}$$

$$\Rightarrow x = 19$$

From the first equation, we have

$$x = y + 3$$

$$\Rightarrow y = x - 3$$

$$\Rightarrow y = 19 - 3$$

$$\Rightarrow y = 16$$

Hence, the age of Ani is **19** years and the age of Biju is **16** years.

(ii) By using the third equation, the first equation becomes $x = 2t - 3$

From the fourth equation, we have

$$t = z - 30$$

Hence, we have

$$x = 2(z - 30) - 3$$

$$= 2z - 60 - 3$$

$$= 2z - 63$$

Using the second equation, we have

$$x = 2 \times 2z - 63$$

$$\Rightarrow x = 4z - 63$$

$$\Rightarrow 4z - x = 63$$

$$\Rightarrow 3x = 63$$

$$\Rightarrow x = \frac{63}{3}$$

$$\Rightarrow x = 21$$

From the first equation, we have

$$x = y - 3$$

$$\Rightarrow y = x + 3$$

$$\Rightarrow y = 21 + 3$$

$$\Rightarrow y = 24$$

Hence, the age of Ani is 21 years and the age of Biju is 24 years.

Note that there are two possibilities.

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