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PAIR OF LINEAR EQUATIONS IN TWO VARIABLES

PPT5

SUBJECT : MATHEMATICS
CHAPTER NUMBER: 03
CHAPTER NAME : PAIR OF LINEAR EQUATIONS IN TWO VARIABLES

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PREVIOUS KNOWLEDGE TEST

Substitution method

If we have a pair of Linear Equations with two variables x and y, then we have to follow these steps to solve them with the substitution method-

Step 1: We have to choose any one equation and find the value of one variable in terms of other variable i.e. y in terms of x.

Step 2: Then substitute the calculated value of y in terms of x in the other equation.

Step 3: Now solve this Linear Equation in terms of x as it is in one variable only i.e. x.

Step 4: Substitute the calculate value of x in the given equations and find the value of y.

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Learning outcome

- Students will be able to find solution of a pair of linear equations algebraically by Substitution method.

- Students will be able to apply it to solve real life situations.

(i) The difference between two numbers is 26 and one number is three times the other. Find them.

https://youtu.be/nYE1yx9YIOM

(i) The difference between two numbers is 26 and one number is three times the other. Find them

(*i*) Let Ist number be x and 2nd number be y.

Let $x > y$

1st condition:

$$x - y = 26 \qquad \ldots (i)$$

2nd condition:

$$x = 3y \qquad \ldots (ii)$$

Putting $x = 3y$ in equation (i)

$$3y - y = 26 \Rightarrow 2y = 26$$

$$\Rightarrow \quad y = 13$$

$\therefore$ From (ii)

$$x = 3 \times 13 = 39$$

$\therefore$ One number is 13 and the other number is 39.

Five years hence, the age of Jacob will be three times that of his son. Five years ago, Jacob's age was seven times that of his son. What are their present ages?
https://youtu.be/5R2tkeGiqRY(3.41)

Five years hence, the age of Jacob will be three times that of his son. Five years ago, Jacob's age was seven times that of his son. What are their present ages?

(*vi*) Let present age of Jacob be x years and that of his son be y years.

A.T.Q.

1st Condition:

$$x + 5 = 3(y + 5)$$

$$\Rightarrow \quad x + 5 = 3y + 15$$

$$\Rightarrow \quad x - 3y = 15 - 5$$

$$\Rightarrow \quad x - 3y = 10 \qquad \ldots (i)$$

2nd Condition:

$$x - 5 = 7(y - 5)$$

$$\Rightarrow \quad x - 5 = 7y - 35$$

$$\Rightarrow \quad x = 7y - 35 + 5$$

$$\Rightarrow \quad x = 7y - 30 \qquad \ldots (ii)$$

Putting the value of 'x' in equation (i), we get

$$7y - 30 - 3y = 10$$

$$4y - 30 = 10$$

$$4y = 40 \quad \Rightarrow \quad y = 10$$

Putting the value of y in equation (ii), we have

$$x = 7(10) - 30 = 70 - 30$$

$$\Rightarrow \boxed{x = 40}$$

Hence, the present age of Jacob is 40 years and that of his son is 10 years.

A fraction becomes 9 /11, if 2 is added to both the numerator and the denominator. If, 3 is added to both the numerator and the denominator it becomes 5/ 6. Find the fraction https://youtu.be/e3HMDC2KzSY(4.01)

A fraction becomes 9 /11, if 2 is added to both the numerator and the denominator. If, 3 is added to both the numerator and the denominator it becomes 5/ 6. Find the fraction

Let numerator be x and denominator be y.

$\therefore$ Fraction is $\frac{x}{y}$

A.T.Q.

1st Condition:

$$\frac{x+2}{y+2} = \frac{9}{11}$$

$$\Rightarrow \quad 11x + 22 = 9y + 18$$

$$\Rightarrow \quad 11x - 9y = 18 - 22$$

$$\Rightarrow \quad 11x - 9y = -4 \qquad \ldots (i)$$

2nd Condition:

$$\frac{x+3}{y+3} = \frac{5}{6}$$

$$\Rightarrow \quad 6x + 18 = 5y + 15$$

$$\Rightarrow \quad 6x - 5y = 15 - 18$$

$$\Rightarrow \quad 6x - 5y = -3 \qquad \ldots (ii)$$

From equation (i), we get

$$11x = 9y - 4$$

$$\Rightarrow \quad x = \frac{9y-4}{11}$$

Putting this value in equation (ii), we have

$$6\left[\frac{9y-4}{11}\right] - 5y = -3$$

$$\Rightarrow \quad \frac{54y-24}{11} - 5y = -3$$

$$\Rightarrow \quad 54y - 24 - 55y = -33$$

$$\Rightarrow \quad -y = -33 + 24$$

$$\Rightarrow \quad -y = -9 \Rightarrow \boxed{y=9}$$

Putting the value of y in equation (i), we get

$$\Rightarrow \quad 11x - 9(9) = -4 \Rightarrow 11x - 81 = -4$$

$$\Rightarrow \quad 11x = -4 + 81$$

$$\Rightarrow \quad 11x = 77 \Rightarrow \boxed{x=7}$$

$\therefore$ Fraction is $\frac{x}{y} = \frac{7}{9}$.

Home assignment

- **Ex. 3.3 Q. 3 & AHA**

Solve using Substitution Method

1. The ages of two friends Ani and Biju differ by 3 years. Ani's father Dharam is twice as old as Ani and Biju is twice as old as his sister Cathy. The ages of Cathy and Dharam differ by 30 years. Find the ages of Ani and Biju.
2. A train covered a certain distance at a uniform speed. If the train would have been 10 km/h faster, it would have taken 2 hours less than the scheduled time. And, if the train were slower by 10 km/h; it would have taken 3 hours more than the scheduled time. Find the distance covered by the train

THANKING YOU

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