UDAAN

2026

Pair of Linear Equation in Two Variables

MATHS LECTURE:-6

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Topics *to be covered*

A Word Problems Part-2

#Q. The sum of a two-digit number and the number obtained by reversing the order of its digits is 165. If the digits differ by 3, find the number.

CBSE 2002

Let,
unit's digit = x
ten's digit = y
two digit no. = $10y+x$
Reversed no. = $10x+y$

$10y+x+10x+y = 165$

$11y+11x = 165$

$11(y+x) = 165$

$y+x = \frac{165}{11}$

$y+x = 15$ ... (1)

$x-y = 3$ or $y-x = 3$

$y+x=15$

$y+x=3$

$2x=18$

$x=9$

$y+x=15$

$y+9=15$

$y=6$

$\therefore$ two digit no. $=10y+x$

$=69$

$y+x=15$

$y-x=3$

$2y=18$

$y=9$

$y+x=15$

$9+x=15$

$x=6$

$\therefore$ two digit no. $=10y+x$

$=96$

Ans//

Substitution

#Q. A two-digit number is 4 times the sum of its digits and twice the product of the digits. Find the number.

CBSE 2005

$10y+x = 4(x+y)$

$10y+x = 2(xy)$

$10y+x = 4x+4y$

$10y-4y = 4x-x$

$6y = 3x$

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

$2y = x$

$10y+x = 2xy$

$10y+2y = 2(2y)y$

$12y = 4y^2$

$12y-4y^2 = 0$

$(4y)(3-y) = 0$

$4y = 0, \quad 3-y = 0$

$y = 0, \quad 3 = y$

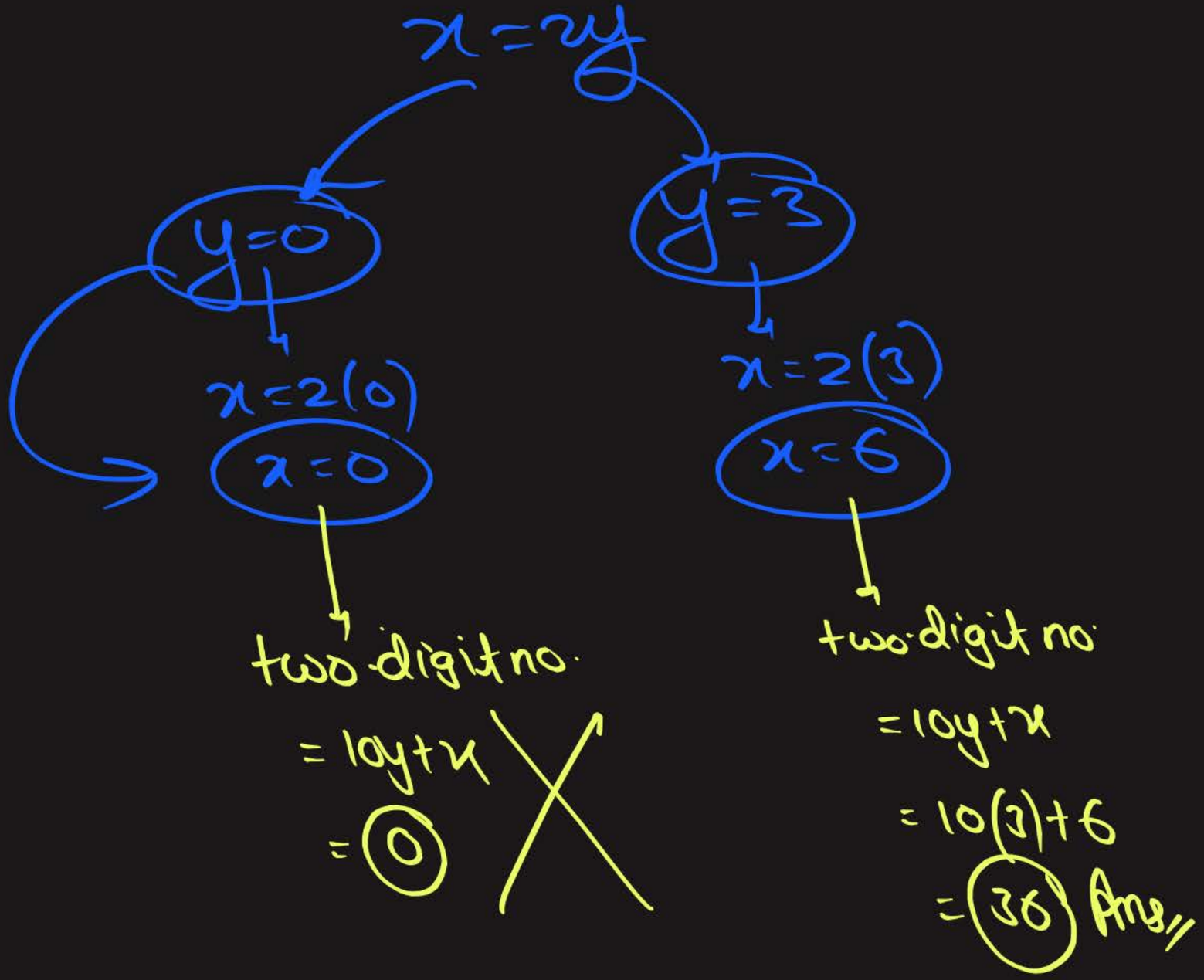
Let

unit's digit $= x$

ten's digit $= y$

two-digit no. $= 10y+x$

Reversed no. $= 10x+y$


x = 2y
y = 0
y = 3
x = 2(0)
x = 0
x = 2(3)
x = 6
two digit no.
= 10y + x
= 0
two digit no.
= 10y + x
= 10(3) + 6
= 36 Ans//

#Q. Half of the difference of two numbers is 2. The sum of the greater number and twice the smaller number is 13. Find the numbers.

CBSE 2023

Let the two nos be x and y. $(x > y)$

$$\frac{1}{2}(x-y) = 2$$

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

$$x - y = 4 \quad \text{①}$$

$$x + 2y = 13 \quad \text{②}$$

$$\begin{array}{r} x+2y=13 \\ x-y=4 \\ \hline (-)\ (-)\ \ (-) \end{array}$$

$$3y = 9$$

$$y = 3$$

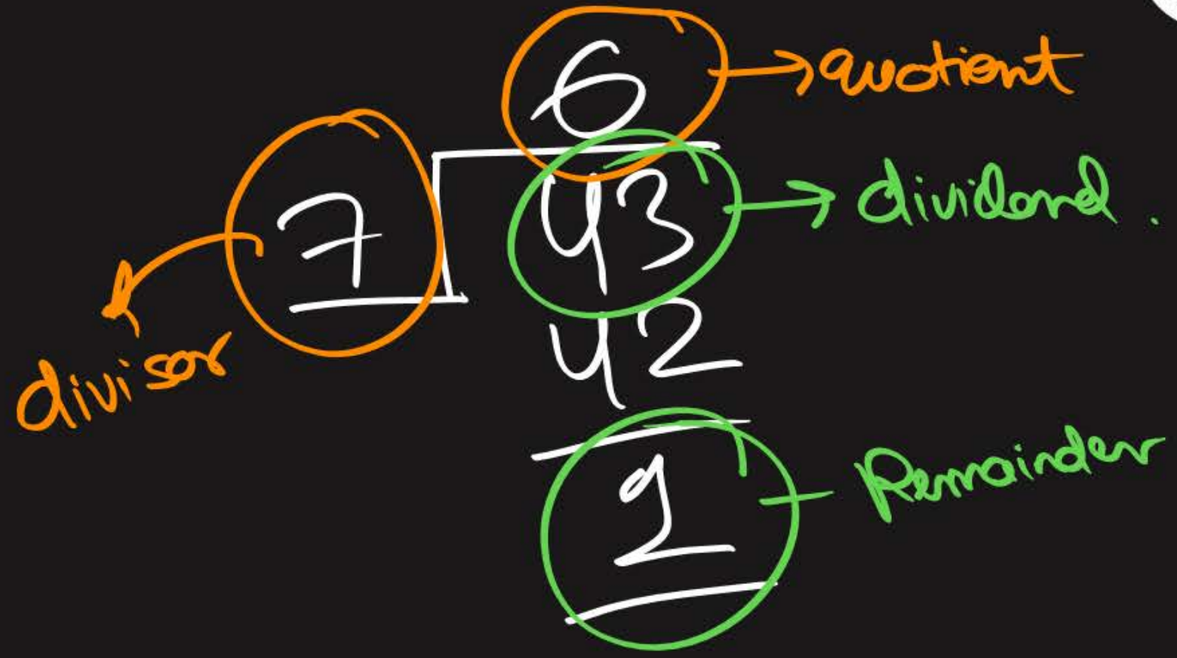
$$x - y = 4$$

$$x - 3 = 4$$

$$x = 7$$

Ans: the nos are 7 and 3.

$$D = d \times q + r$$



#Q. If three times the larger of the two numbers is divided by the smaller one, we get 4 as quotient and 3 as the remainder. Also, if seven times the smaller number is divided by the larger one, we get 5 as quotient and 1 as remainder. Find the numbers.

Let the nos be x and y. $(x>y)$

	Case-I	Case II
Dividend	$3x$	$7y$
divisor	y	x
quotient	4	5
Remainder	3	1

$$3x = y(4) + 3$$

$$7y = x(5) + 1$$

Fraction Vale questions.

Numerator = x

Denominator = y

Fraction = $\frac{x}{y}$

$N' = x+2$

$D' = y-3$

$F' = \frac{x+2}{y-3}$

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

Let, $N = x$

$D = y$

$\Rightarrow \boxed{F = x/y}$

Case-I

$N' = x+2$

$D' = y+2$

$F' = \dfrac{x+2}{y+2}$

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

$11x + 22 = 9y + 18$

$\boxed{11x - 9y = -4}$ — (1)

Case-II

$N'' = x+3$

$D'' = y+3$

$F'' = \dfrac{x+3}{y+3}$

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

$6x + 18 = 5y + 15$

$\boxed{6x - 5y = -3}$ — (2)

Ans: $\frac{7}{9}$

#HS²BD

#Q. A fraction becomes 1/3 when 2 is subtracted from the numerator and it becomes 1/2 when 1 is subtracted from the denominator. Find the fraction.

CBSE 2019

$N = x$

$D = y$

$F = x/y$

I

$N' = x-2$

$D' = y$

$F' = \frac{x-2}{y}$

II

$N'' = x$

$D'' = y-1$

$F'' = \frac{x}{y-1}$

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

$3x - 6 = y$ ①

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

$2x = y - 1$ ②

Ans: 7/15

#S²DD

#Q. The sum of the numerator and denominator of a fraction is 3 less than twice the denominator. If the numerator and denominator are decreased by 1, the numerator becomes half the denominator. Determine the fraction.

CBSE 2001,10

Let, N = x
D = y
F = x/y

$x + y = 2y - 3$

$x - y = -3$ ①

$N' = x - 1$
$D' = y - 1$

$x - 1 = \frac{1}{2}(y - 1)$

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

$2x - 2 = y - 1$

$2x - y = 1$ ②

Ans = 4/7

#Q. Six years hence a man's age will be three times the age of his son and three years ago he was nine times as old as his son. Find their present ages.

$$x+6 = 3(y+6)$$

$$x+6 = 3y+18$$

$$x-3y = 12 \quad (1)$$

$$x-3 = 9(y-3)$$

$$x-3 = 9y-27$$

$$x-9y = -24 \quad (2)$$

	Past	Present	Future
Man	$x-3$	x	$x+6$
Son	$y-3$	y	$y+6$

Ans: Man's age = 30 years

Son's age = 6 years.

#Q. Two years ago, a father was five times as old as his son. Two years later, his age will be 8 more than three times the age of the son. Find the present ages of father and son.

CBSE 2004

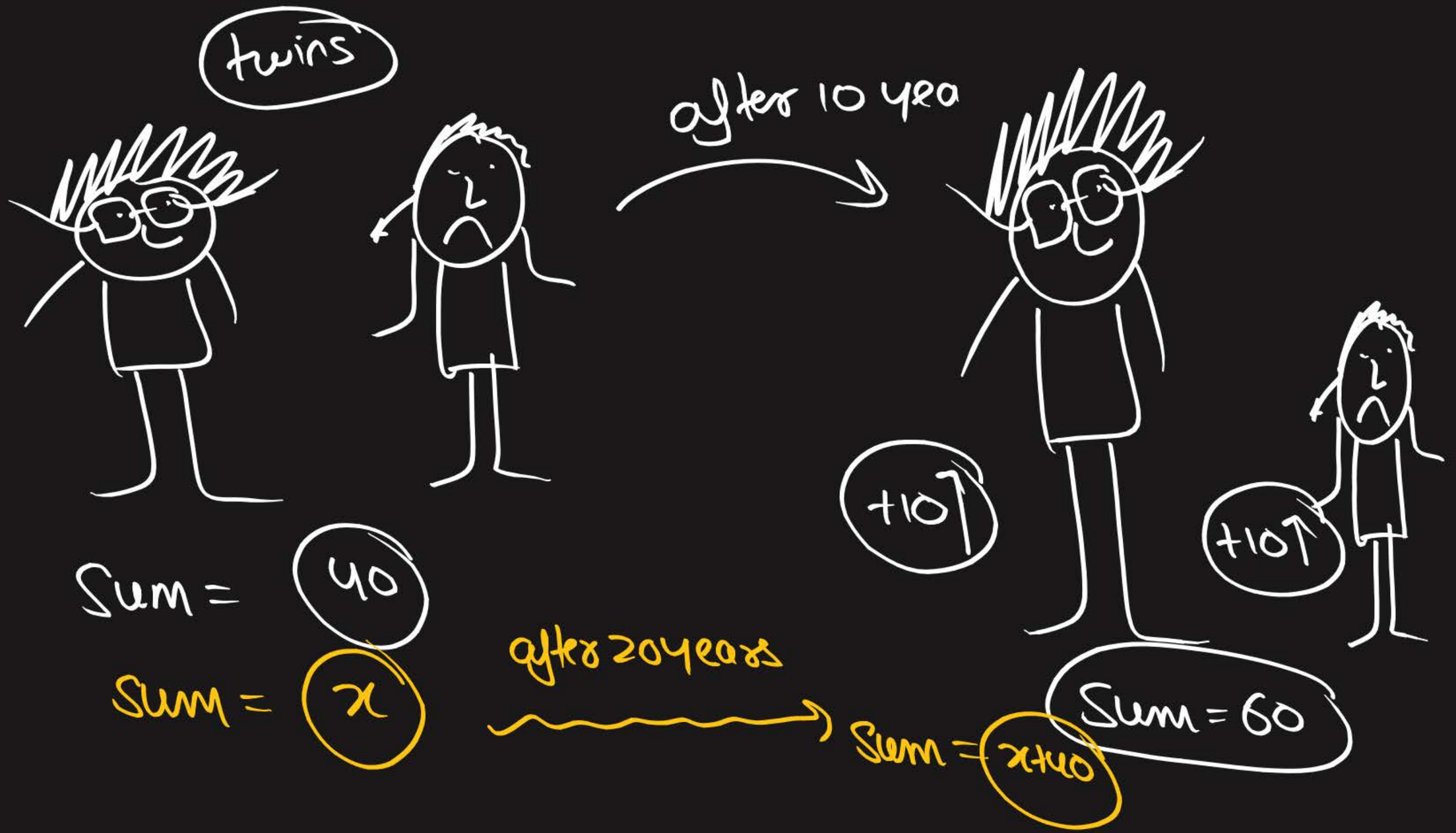
$$x-2 = 5(y-2)$$

$$x+2 = 8+3(y+2)$$

	Pa.	P.	Fu.
Father	$x-2$	x	$x+2$
Son	$y-2$	y	$y+2$

Ans: Father's age = 42 years.

Son's age = 10 years.


twins
after 10 yea
+10
+10
Sum = 60
Sum = 40
Sum = x
after 20 years
Sum = x+40

#Q. Father's age is three times the sum of ages of his two children. After 5 years his age will be twice the sum of ages of two children. Find the age of father.

CBSE 2003,19

$x = 3(y)$ ... (1)

$x + 5 = 2(y + 10)$ ... (2)

Ans: Father's age = 45 years

	Pa.	Pt.	Fu.
Father	X	x	x+5
Sum of ages of two children.	X	y	y+10

#Q. The age of the father is twice the sum of the ages of his two children. After 20 years, his age will be equal to the sum of the ages of his children. Find the age of the father.

#GaPk

Income → 10000

Expenditure → 6000

Savings → 10000 - 6000 = 4000

$I - E = S$

Q. 7:5

R = 7x

Aapki = 5x

#Q. The ratio of incomes of two persons is 9:7 and the ratio of their expenditures is 4: 3. If each of them saves 200 per month, find their monthly incomes.

Let the incomes be $9x$ and $7x$

" " expenditure " $4y$ and $3y$

Savings of both of them = 200

Ans in Rs

Income - Expenditure = Saving

$9x - 4y = 200$ ... (1)

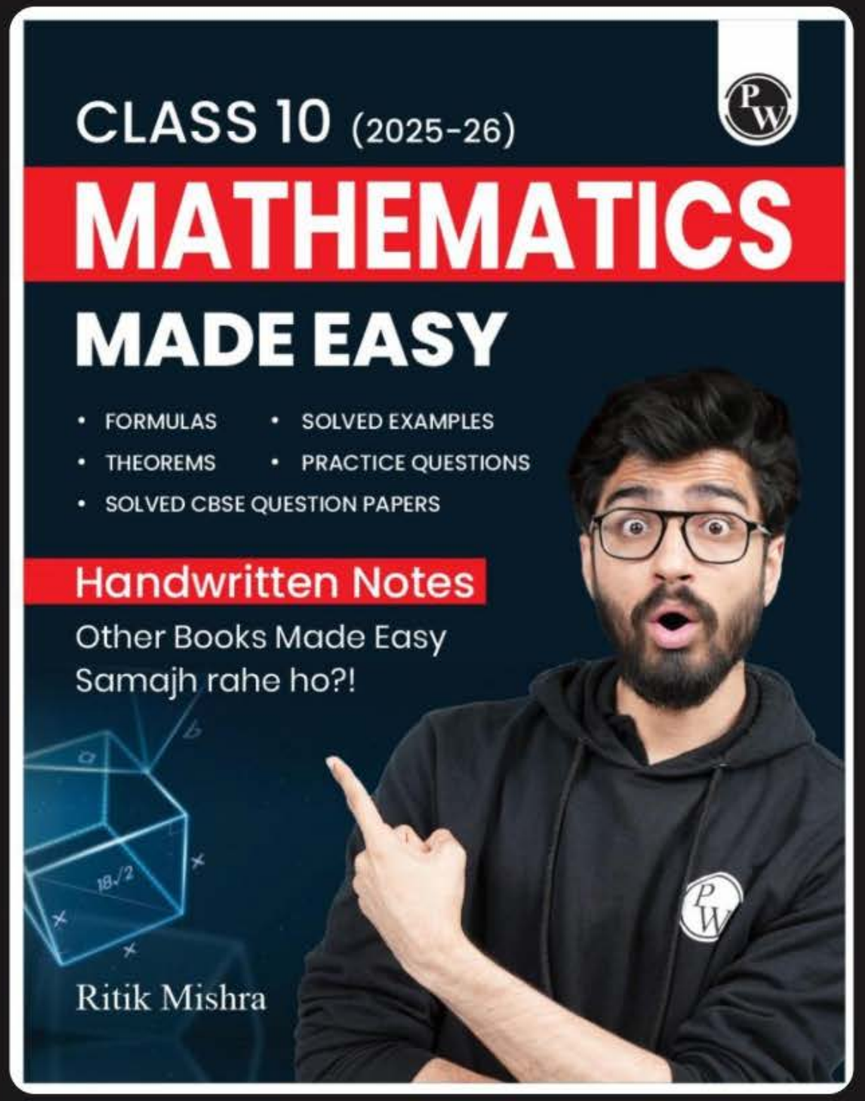
$7x - 3y = 200$ ... (2)

#Gap #HOT

#Q. The ages of two friends Ani and Biju differ by 3 years. Ani's father Dharam is twice as old as Ani and Biju as twice as old as his sister Cathy. The ages of Cathy and Dharam differ by 30 years. Find the ages of Ani and Biju.

#Q. A man starts his job with a certain monthly salary and earns a fixed increment every year. If his salary was ₹1500 after 4 year of service and ₹1800 after 10 years of service, what was his starting salary and what is the annual increment?

#GSPW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