UDAAN

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Pair of linear equation in two variable

Mathematics | Lecture - 05

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Topics *to be covered*

1. Word Problems (Part-1)
   - Problems On Costs
   - Problems On Numbers
   - Problems On Fractions

A) CBSE.

B) Other boards.

C) Dhoor...

D) Maha Dhoor.....


WORK HARD
DREAM BIG
NEVER GIVE UP !!

Topic : Condition of Solvability

#Q. Given the linear equation $3x + 4y = 9$. Write another linear equation in these two variables such that the geometrical representation of the pair so formed is:

(i) intersecting lines

(ii) coincident lines.

[Board Term – 1, 2016]

$\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$

$\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$

$3x+4y = 9$

(i) $6x+12y = 8$

$-6x+8y = 7$

(ii) $3x+4y = 9$

$\rightarrow 300x+400y = 900$

$\rightarrow 15x+20y = 45$

Topic : Miscellaneous Question

ALD

#Q. Write an equation of a line passing through the point representing solution of the pair of linear equations $x + y = 2$ and $2x - y = 1$. How many such lines can we find?

$x+y=2$

$2x-y=1$

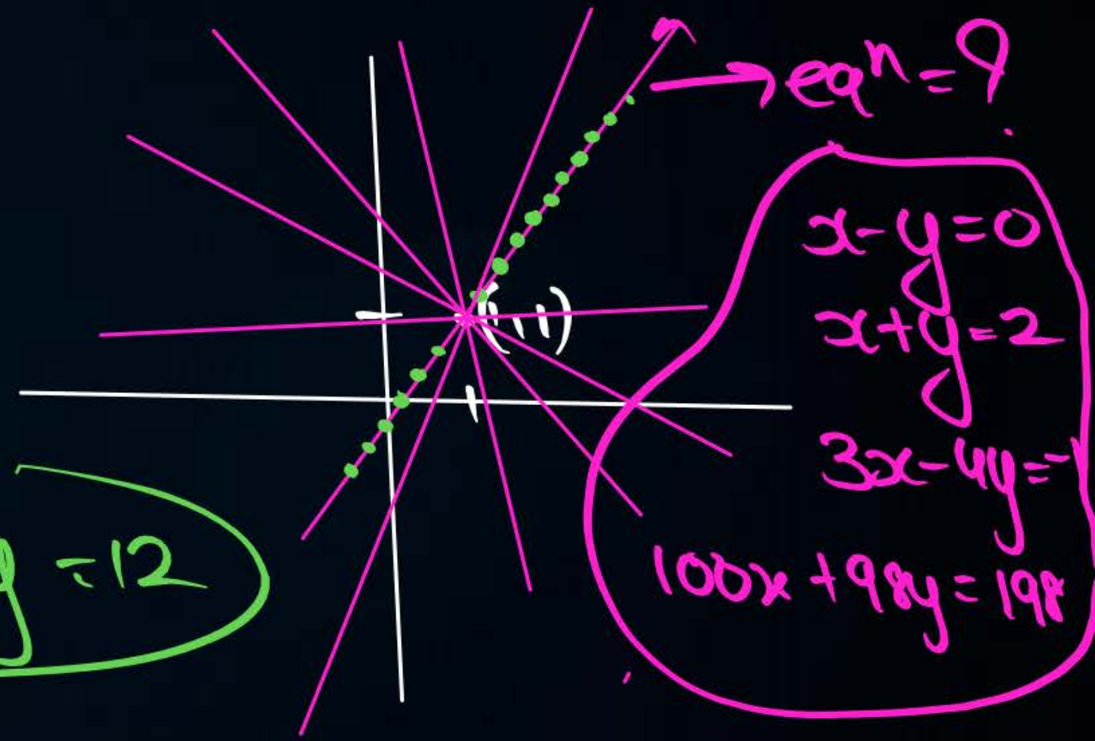
(+)

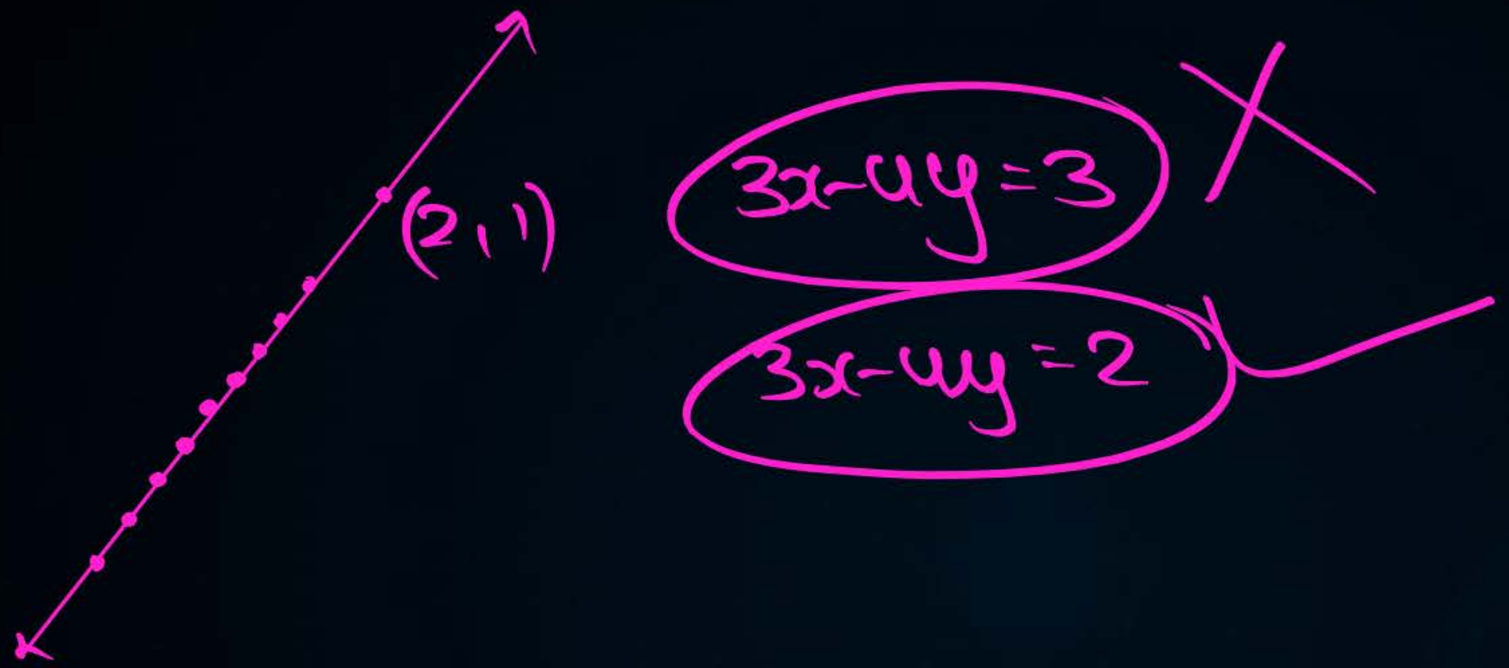
$3x = 3$

$x = 1$

$x+y=2$

$y=1$




(2,1)
3x-4y=3
3x-4y=2

Topic : Miscellaneous Question

Extra Knowledge

#Q. Solve :

$2x - y = 4$

$y - z = 6$

$x - z = 10$

$-y = 4 - 2x$

$y = -4 + 2x$

$y = -4$

$-z = 10 - x$

$z = -10 + x$

$z = -10$

$y - z = 6$

$-4 + 2x - (-10 + x) = 6$

$-4 + 2x + 10 - x = 6$

$x + 6 = 6$

$x = 0$

$x+y=3 \rightarrow y=3-x \rightarrow y=0$

$2x-z=4 \rightarrow -z=y-2x \rightarrow z=-y+2x \rightarrow z=2$

$z-y=2$

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

$-y+2x-3+x=2$

$3x-7=2$

$3x=9$

$x=3$

Topic : Problems Based On Articles & Their Costs

Chaddha

1 → 200

5 → (5x200)

100 → (100x200)

1 chaddha = x

2 'C' = 2xx = 2x

7 'C' = 7x

100 'C' = 100x

Macchli--

1 M = y

5M = 5y

100x + 8y

Topic : Problems Based On Articles & Their Costs

#Q. 4 Chairs and 3 tables cost Rs. 2100 and 5 chairs and 2 tables cost Rs. 1750. Find the cost of a chair and a table separately.

Let the cost of a chair = x Rs.

" " " " table = y Rs.

According to the qu

$4x + 3y = 2100$ ①

$5x + 2y = 1750$ ②

$8x + 6y = 4200$

$-15x - 6y = -5250$

$-7x = -1050$

$x = \frac{-1050}{-7}$

$x = 150$

Put 'x' in eqn ①

$4x + 3y = 2100$

$4(150) + 3y = 2100$

$600 + 3y = 2100$

$3y = 1500$

$y = 500$

Hence, cost of a chair = 150 Rs.

and, " " " table = 500 Rs.

Topic : Problems Based On Articles & Their Costs

#Q. 7 audio cassettes and 3 video cassettes cost Rs. 1110, while 5 audio cassettes and 4 video cassettes cost Rs. 1350. Find the cost of an audio cassette and a video cassette.

Let the cost of 1 audio cassette = x Rs.

" " " " " Video " = y Rs.

$7x + 3y = 1110$ — ①

$5x + 4y = 1350$ — ②

Bado Badi

x 30 Mangoes y

x-30 y+30

Topic : Problems Based On Articles & Their Costs

#Q. A and B each have a certain number of mangoes. A says to B, "if you give 30 of your mangoes, I will have twice as many as left with you." B replies, "if you give me 10, I will have thrice as many as left with you." How many mangoes does each have?

$x+30 = 2x(y-30)$

$x+30 = 2y-60$

$x-2y = -90$ -①

$y+10 = 3x(x-10)$

$y+10 = 3x-30$

$y-3x = -40$ -②

A	B
x	y
$x+30$	$y-30$
$x-10$	$y+10$

$3(x-2y=-90)$ ⟶ $x-2y=-90$

$-3x+y=-40$

$x-2(62)=-90$

$3x-6y=-270$

$x-124=-90$

$-3x+y=-40$

$x=34$

$-5y=-310$

$y=\frac{310}{5}$

$y=62$

A	B
34	62
64	32
24	72

30 ↔ 10

Topic : Problems Based On Articles & Their Costs

#Q. A and B each have certain number of oranges. A says to B, "if you give me 10 of your oranges, I will have twice the number of oranges left with you." B replies, if you give me 10 of your oranges, I will have the same number of oranges as left with you." Find the number of oranges with A and B separately.

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

$x+10=2y-20$

$x-2y=-30$ — (1)

$x-10=y+10$

$x-y=20$ — (2)

A	B
x	y
$x+10$	$y-10$
$x-10$	$y+10$

Topic : Problems Based On Articles & Their Costs

#Q. One says, "Give me a hundred, friend! I shall then become twice as rich as you." The other replies, "If you give me ten, I shall be six times as rich as you." Tell me what is the amount of their respective capital? [NCERT]

$x+100=2(y-100)$

$x+100=2y-200$

$x-2y=-300$ ①

$y+10=6(x-10)$

$y+10=6x-60$

$-6x+y=-70$ ②

One	Other
x	y
$x+100$	$y-100$
$x-10$	$y+10$

Topic : Problems Based on Numbers

Two digit numbers

$82 = 8 \times 10 + 2 \times 1$

ten's digit, unit's digit

$98 = 9 \times 10 + 8 \times 1$

$32 = 3 \times 10 + 2 \times 1$

$23 = 2 \times 10 + 3 \times 1$

$xy = x \times 10 + y \times 1 = 10x + y$

$yx = 10y + x$

Find the two digit no?

Let unit's digit = x

" ten's digit = y

(Number)(original no) (Two digit no) $= 10y + x$

Reversed (Interchange) $= 10x + y$

Topic : Problems Based on Numbers

#Q. Sum of two numbers is 35 and their difference is 13. Find the numbers.

Topic : Problems Based on Numbers

#Q. In a two digit number, the unit's digit is twice the ten's digit. If 27 is added to the number, the digits interchange their places. Find the number.

$x = 2y$ — (1)

$27 + 10y + x = 10x + y$

$-9x + 9y = -27$

$9(-x + y) = -27$

$-x + y = -3$ — (2)

$-(2y) + y = -3$

$-y = -3$

$y = 3$

$x = 2(3)$

$x = 6$

∴ Two digit no. $= 10y + x$

$= 10(3) + 6$

$= 36$

★

unit's digit $= x$

ten's digit $= y$

number $= 10y + x$

Reversed no. $= 10x + y$

Topic : Problems Based on Numbers

#Q. In a two digit number, the ten's digit is three times the unit's digit. When the number is decreased by 54, the digits are reversed. Find the number.

Ten's digit = 3(unit's digit)

$y = 3(x)$ — ①

$10y + x - 54 = 10x + y$

$9y - 9x = 54$

$y - x = 6$ — ②

unit's digit = x

ten's digit = y

Number = $10y + x$

Reversed no. = $10x + y$

Topic : Problems Based on Numbers

#Q. The sum of the digits of a two digit number is 8 and the difference between the number and that formed by reversing the digits is 18. Find the number.

$x+y=8$ — (1)

(Number) − (Reversed no.) = 18

$(10y+x)-(10x+y)=18$

$10y+x-10x-y=18$

$9y-9x=18$

$y-x=2$ — (2)

$x+y=8$

$-x+y=2$ (Add)

$2y=10$

$y=5$

$x=3$

Ans

No. $=10y+x$

53

$U=x$

$T=y$

Number $=10y+x$

Reversed no. $=10x+y$.

Topic : Problems Based on Numbers

#Q. A two-digit number is 3 more than 4 times the sum of its digits. If 18 is added to the number, the digits are reversed. Find the number.

[CBSE 2001 C]

$10y+x = 3+4(x+y)$

$10y+x = 3+4x+4y$

$-3x+6y=3$ — (1)

$18+10y+x = 10x+y$

$-9x+9y=-18$ — (2)

$U = x$

$T = y$

$No. = 10y+x$

$R.No. = 10x+y$

Homework

Question Bank

Page 100 → (3)

" 101 → (6)

" 103 → (3)

" 115 → Very short (1,5,6)

" 115 → long answer (4,5)

Module :

Page 99 → Very short (2,3,6,8,9)

→ long answer (3,4,5,6)

THANK YOU