UDAAN

2025

Pair of linear equation in two variable

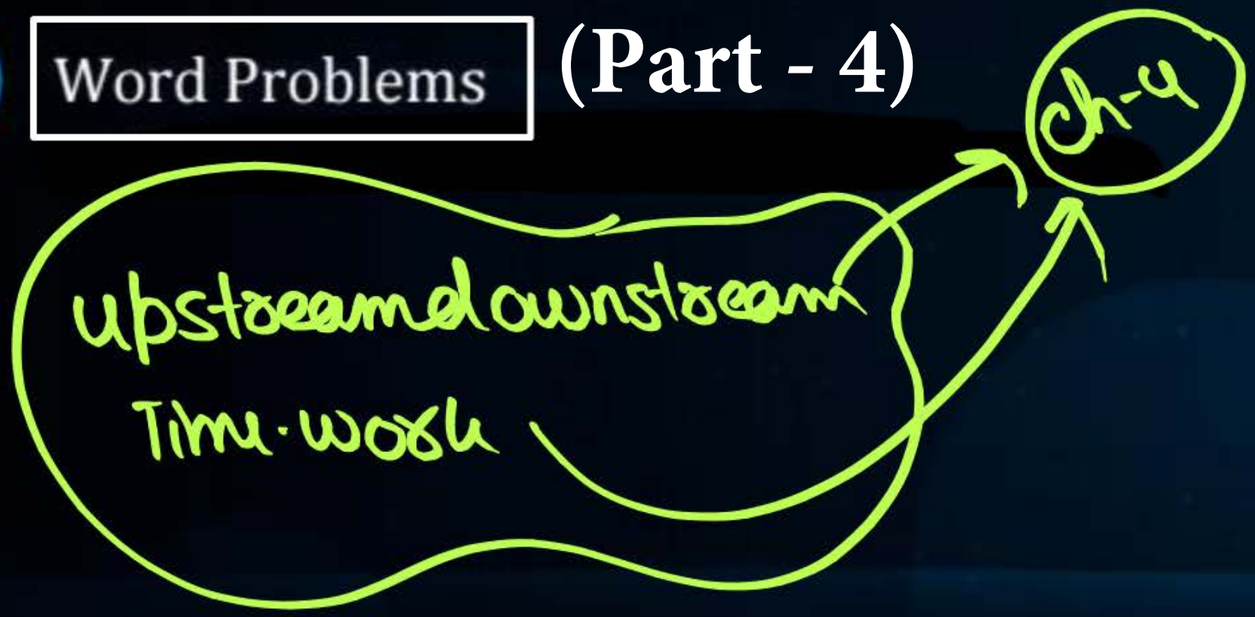
Mathematics | Lecture - 08

Akhiri lecture

By – Ritik Sir

Topics *to be covered*

1. Word Problems **(Part - 4)**




WORK HARD
DREAM BIG
NEVER GIVE UP !!

Topic : Problems Based on Speed, Distance and Time

$D = S \times T$, $T = \frac{D}{S}$, $S = \frac{D}{T}$

#Q. Points A and B are 70 km. a part on a highway. A car starts from A and another car starts from B simultaneously. If they travel in the same direction, they meet in 7 hours, but if they travel towards each other, they meet in one hour. Find the speed of the two cars. [CBSE 2002]

Let speed of car 1 = x km/hr

" " car 2 = y km/hr

$AD = AB + BD$

$7x = 70 + 7y$

$7x - 7y = 70$

$x - y = 10$ (1)

$D = S \times T$

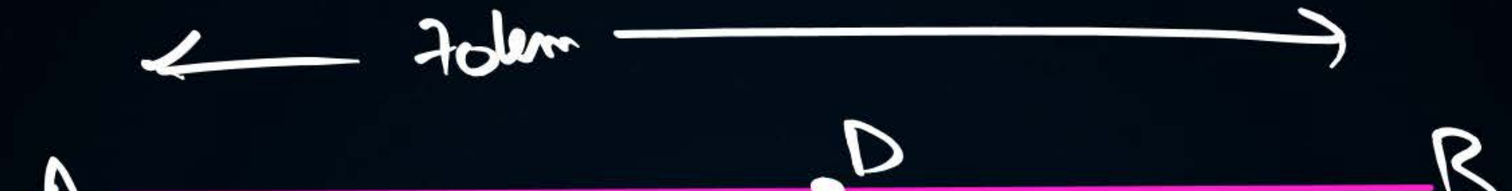
$AD = x \times 7$

$AD = 7x$

$D = S \times T$

$BD = y \times 7$

$BD = 7y$



D = SXT

AD = xx1

AD = x

AB = AD + BD

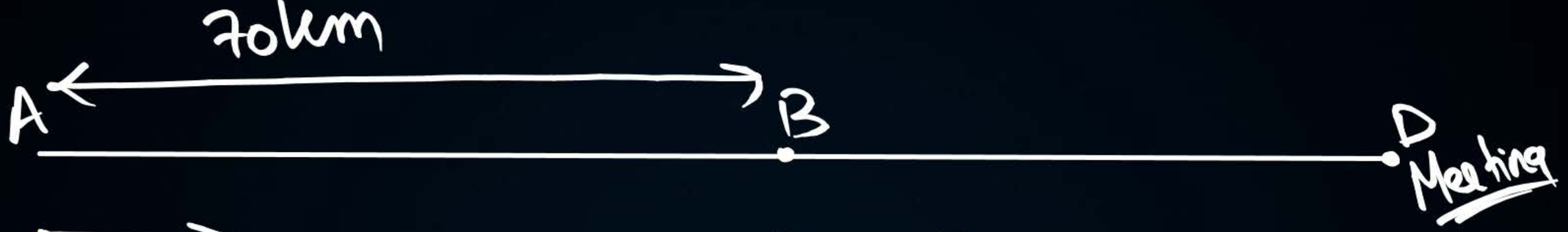
70 = x + y (1)

D = SXT

BD = yx1

BD = y

Case I



$D = S \times T$

$AD = x \times 7$

$AD = 7x$

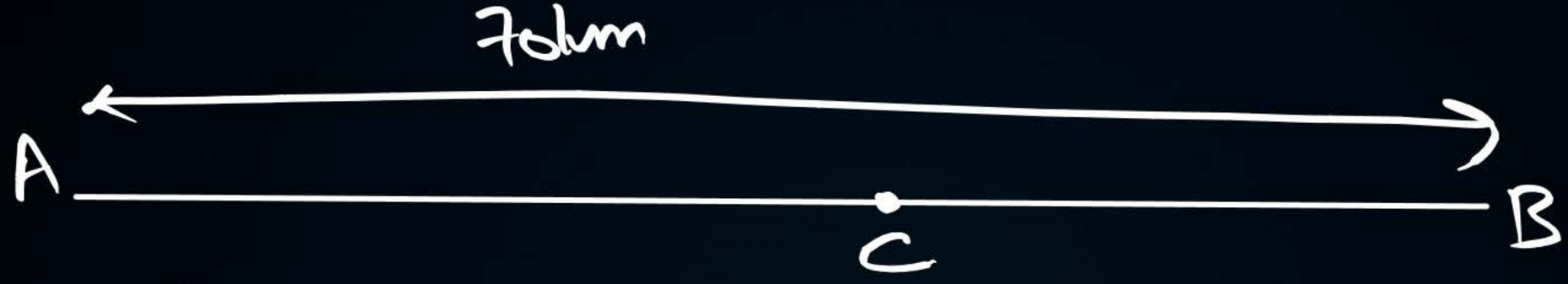
$D = S \times T$

$BD = y \times 7$

$BD = 7y$

$AD = AB + BD$

$7x = 70 + 7y$ (1)



$D = S \times T$

$AC = x \times 1$

$AC = x$

$AB = AC + BC$

$70 = x + y$ ... (1)

$D = S \times T$

$BC = y \times 1$

$BC = y$

$7x = 70 + 7y$

$7x - 7y = 70$

$7(x-y) = 70$

$x - y = 10$

$70 = x + y$

$x + y = 70$

$x - y = 10$

$2x = 80$

$x = 40$

$\Rightarrow x + y = 70$

$y = 30$

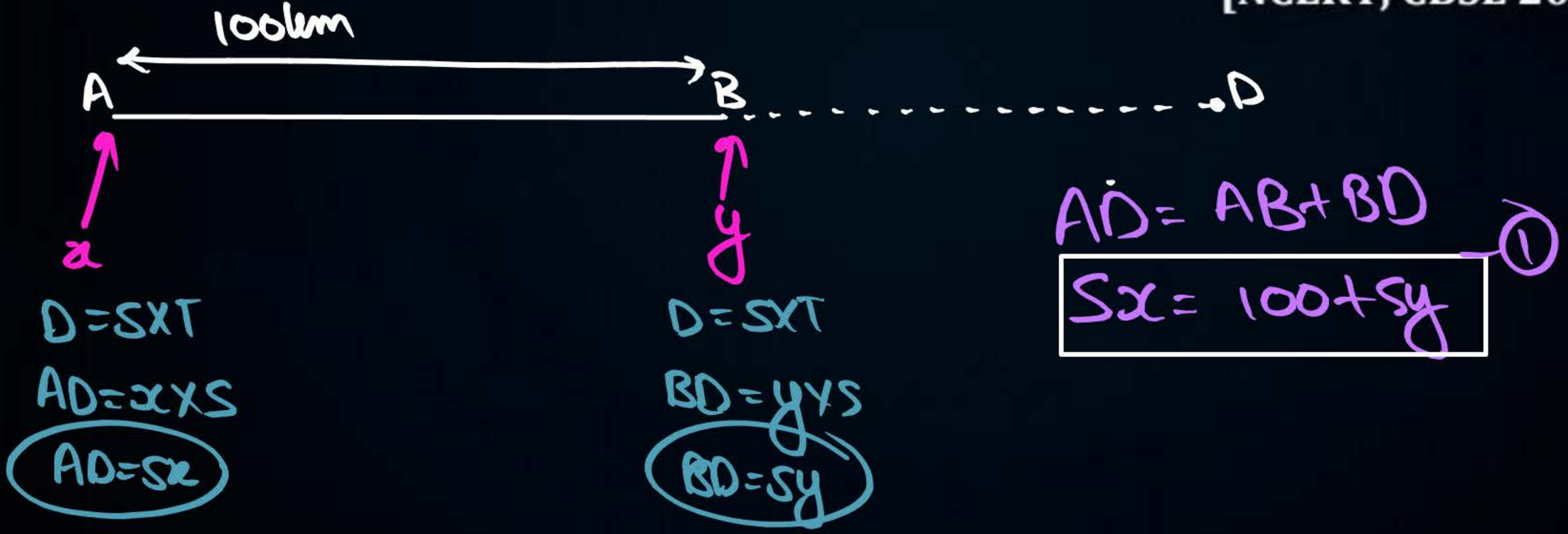
Car $_1$ = 40km/hr

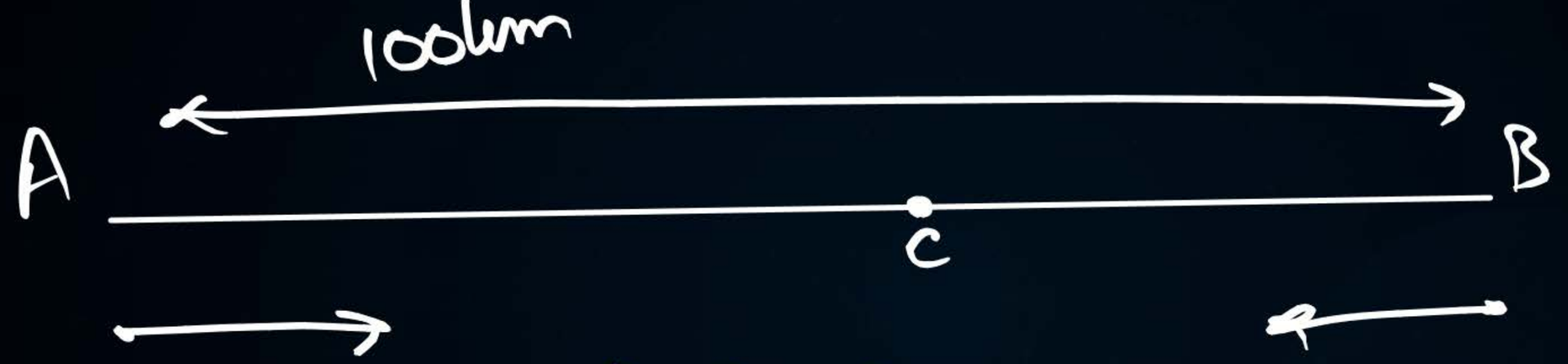
Car $_2$ = 30km/hr

Topic : Problems Based on Speed, Distance and Time

#Q. Places A and B are 100 km apart on a highway. One car starts from A and another from B at the same time. If the cars travel in the same direction at different speeds, they meet in 5 hours. If they travel towards each other, they meet in 1 hour. What are the speeds of two cars?

[NCERT, CBSE 2009]





$D = S \times T$

$AC = x \times 1$

$AC = x$

$AB = AC + CB$

$100 = x + y$ — (1)

$D = S \times T$

$BC = y \times 1$

$BC = y$

Income, Expenditure, Savings.

$I - E = S$

$I = 10000$

$E = 7000$

$S = 3000$

#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 Rs 200 per month, find their monthly incomes.

Let the income of two persons be $9x, 7x$.

" " E " " " " $4y, 3y$.

Savings = 200.

I

$9x - 4y = 200$ — (1)

II

$7x - 3y = 200$ — (2)

Topic : [redacted]

#Q. The larger of two supplementary angles exceeds the smallest by 18 degrees. Find them.

Let the angles be x and y. (Let x, y)

$x + y = 180^\circ$ ①

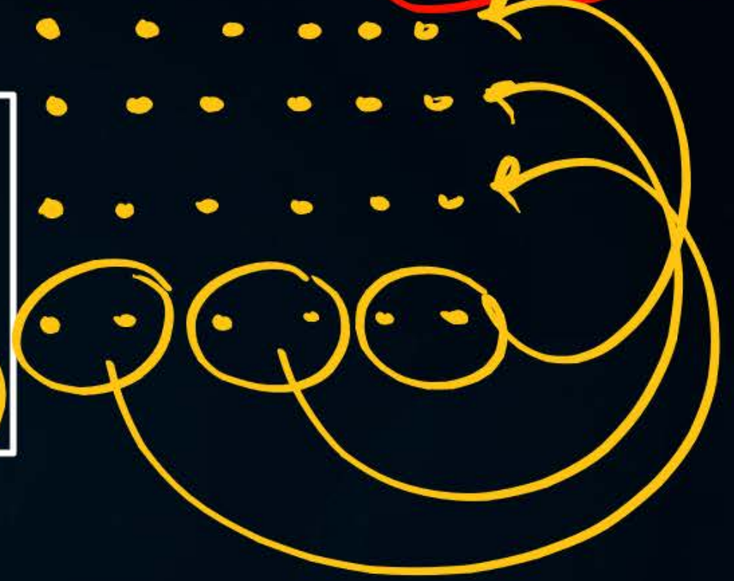
$x = y + 18$ ②

$x - y = 18^\circ$

Two angles → Sum → 180° → Supplementary angles.

•(dot) = Student

Logic



Total no. of students = (no. of rows) (no. of students in each row)

no. of rows = x

no. of students in each row = y

Total = xy

Topic : [redacted]

#Q. The students of a class are made to stand in rows. If 3 students are extra in a row, there would be 1 row less. If 3 students are less in a row, there would be 2 rows more. Find the number of students in the class.

Let the no. of rows = x

Let the no. of students in each = y.

Total students = xy.

$R = x+2$	$R = x-1$	$R = x$
$S = y-3$	$S = y+3$	$S = y$
$T = (x+2)(y-3)$	$T = (x-1)(y+3)$	$T = xy$

$xy = xy - 3x + 2y - 6$

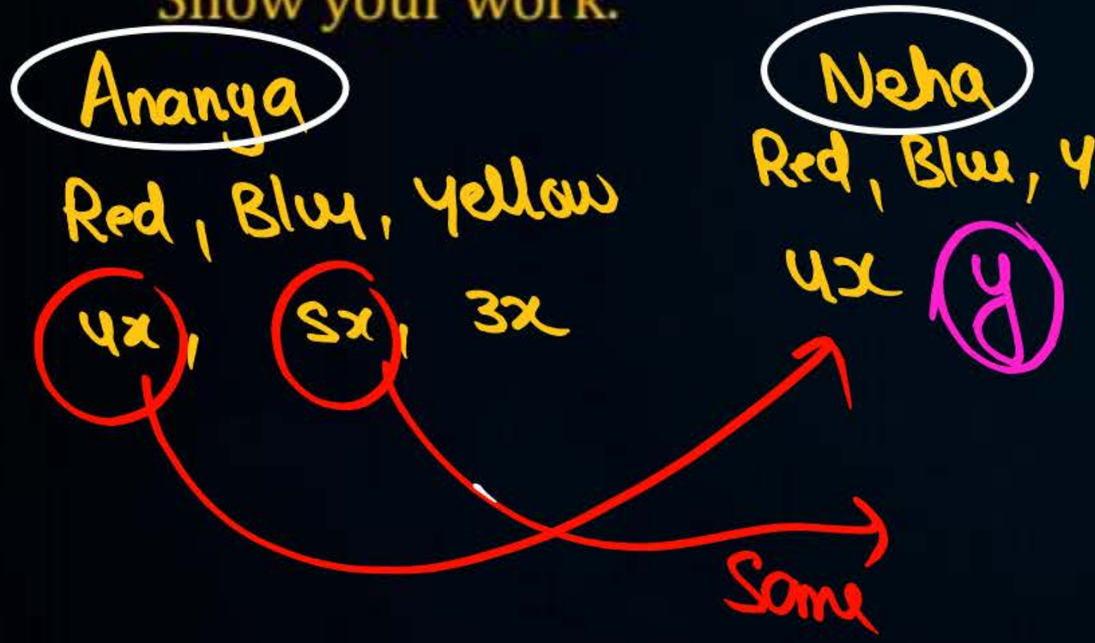
$6 = -3x + 2y$ — ①

$xy = xy + 3x - y - 3$

$3 = 3x - y$ — ②

Topic :

#Q. Ananya had red, blue and yellow marble in the ratio 4 : 5 : 3. She gave all her red marbles and some blue marble to Neha. The ratio of the number of blue marbles an yellow marbles left with Ananya was 7 : 9.
If Ananya gave 20 marbles to Neha, how many of them are red marbles? Show your work.



Ananya

$$\frac{\text{no. of Blue Marbles}}{\text{no. of yellow marbles}} = \frac{7}{9}$$

$$\frac{5x-y}{3x} = \frac{7}{9}$$

$$9(5x-y) = 21x$$

$$45x - 9y = 21x$$

$$24x - 9y = 0 \quad \text{--- (1)}$$

$6(4x+y=20)$ — ②

$2x+3y=60$ — ①

$24x-9y=0$ — ②

$\ominus \quad \oplus \quad \ominus$

$15y=120$

$y=\frac{120}{15}$

$y=8$

$\Rightarrow 4x+y=20$

$4x+8=20$

$4x=12$

$x=3$

0
60 Red marbles

$4x=4\times3=12$

CASE BASED

Two schools 'P' and 'Q' decided to award prizes to their students for two games of Hockey Rs. x per student and Cricket Rs. y per student. School 'P' decided to award a total of Rs. 9, 500 for the two games to 5 and 4 students respectively; while school 'Q' decided to award Rs. 7,370 for the two games to 4 and 3 students respectively.
Based on the above information, answer the following questions: **(CBSE DL, 2023)**

H.W

Topic : Case Based

#Q. (i) Represent the following information algebraically (in terms of x and y).

Topic : Case Based

#Q. (ii) What is the prize amount for hockey?

OR

Prize amount on which game is more and by how much?

Topic : Case Based

#Q. (iii) What will be the total prize amount if there are 2 students each from two games?

CASE BASED

Dhoni is a former Indian cricketer and captain of the Indian national cricket team. He is known for his powerful and innovative batting, and he has scored many boundaries throughout his career. He has a particular penchant for hitting sixes, and he is one of the most successful finishers in limited- overs cricket. Dhoni has hit a total of 359 fours and 209 sixes in One Day Internationals (ODIs), and 78 fours and 16 sixes in Twenty20 Internationals (T20Is). Some of his most memorable boundary shots include the helicopter shot, which he invented himself, and his signature flick shot over the leg side.

In on of the matches he scored 98 runs only in boundaries.
Some of the boundaries were fours (4 runs each) and
some of the boundaries were sixes (6 runs each).
If the number of sixes made was two less than that of fours
answer the following questions.

let the no. of fours = x

" " " " sixes = y

Topic : Case Based

#Q. (i) What is the algebraic representation of the above problem?

$4x + 6y = 98$

If the no. of sixes is two less than the no. of fours..

$y = x - 2$

1 Six = 6 Runs
2 Six = (2 × 6) Runs
⋮
11 Sixes = (11 × 6) Runs
⋮
y Six = (y × 6) Runs
= 6y

1 Four = 4 Runs
2 Four = (2 × 4) Runs
⋮
10 Four = (10 × 4) Runs
⋮
x Four = (x × 4) Runs
= 4x

Topic : Case Based

#Q. (ii) How many fours did he make?

OR

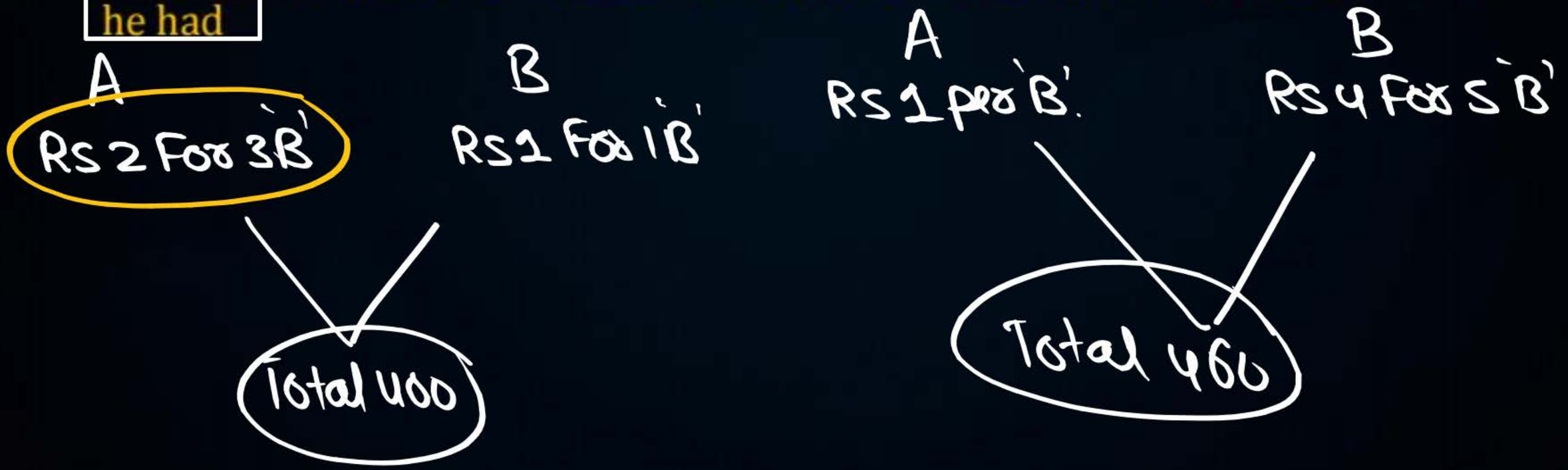
How many sixes did he make?

Topic : Case Based

#Q. (iii) What are total number of boundaries scored by Dhoni?

Topic :

#Q. Rana had some bananas and he divided them into two lots A and B. He sold first lot at the rate of Rs 2 for 3 bananas and the second lot at the rate of Re. 1 per banana and got a total of Rs 400. If he had sold the first lot at the rate of Rs. 1 per banana and the second lot at the rate of Rs. 4 for 5 bananas, his total collection would have been Rs. 460. Find the total number of bananas he had



Let no. of Bananas in A = x

" " " " " B = y

A

3 Bananas = 2 Rs.

1 Banana = $\frac{2}{3}$ Rs.

x Banana = $\frac{2}{3}x$ Rs.

B

1 Banana = 1 Rs.

y Bananas = y Rs.

$$\frac{2}{3}x + y = 400 \quad (1)$$

A	B
1 B = 1 Rs.	5 B = 4 Rs
x B = x Rs.	1 B = $\frac{4}{5}$ Rs
	y B = $\frac{4y}{5}$ Rs

$$x + \frac{4y}{5} = 460 \quad (2)$$

Topic :

#Q. A is elder to B by 2 years, A's father F is twice as old as A and B is twice as old as his sister S. If the ages of the father and sister differ by 40 years, find the age of A.

$A = B + 2$ ①

$F = 2A$

$B = 2S$

$F - S = 40$

$2A - \frac{B}{2} = 40$ ②

$A = B + 2$, $2A - \frac{B}{2} = 40$

$\rightarrow 4A - B = 80$

$4(B+2) - B = 80$

$4B + 8 - B = 80$

$3B = 72$

$B = 24$

$\Rightarrow A = B + 2$

$A = 26$


Limit hamesha likhna
hai

Topic :

#Q. Susan invested certain amount of money in two schemes A and B, which offer interest at the rate of 8% per annum and 9% per annum, respectively. She received Rs. 1860 as annual interest. However, had she interchanged the amount of investments in the two schemes, she would have received Rs. 20 more as annual interest. How much money did she invest in each scheme?

let A → x Rs

let B → y Rs.

8%.of x + 9%.of y = 1860

$\frac{8x}{100} + \frac{9y}{100} = 1860$

$8x + 9y = 186000$ ①

100 → 8%.of 100 = 1

200 → 8%.of 200 = 1

400 → 8%.of 400 = 1

x → 8%.of x = 1

Case-II

A → y Rs

B → x Rs.

20 more interest

$8\% \text{ of } y + 9\% \text{ of } x = 1860 + 20$

$\frac{8y}{100} + \frac{9x}{100} = 1880$

$8y + 9x = 188000$ (2)

$8x + 9y = 186000$

$9x + 8y = 188000$

Add

Subtract

Solve..

THANK YOU