

Alligation :- To find the ratio in which two ingredients must be mixed to produce a desired mixture.

let average of 'n' no = a & average of 'y' no = b combined average of n and y = m.

$$\text{weighted average} = \frac{an + by}{n + y} = m$$

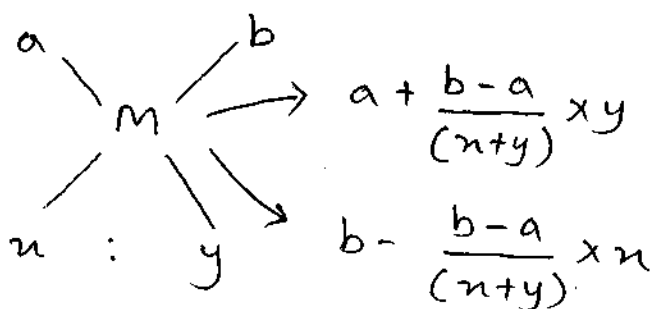
$$mn + my = an + by$$

$$\Rightarrow mn - an = by - my$$

$$\Rightarrow n(m - a) = y(b - m)$$

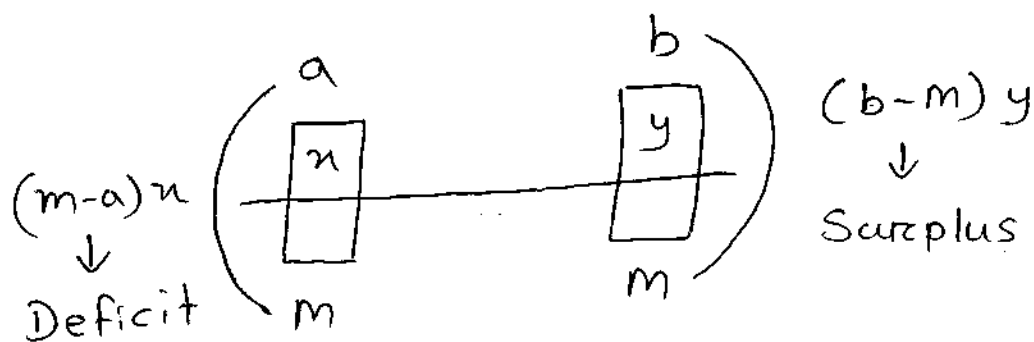
$$\Rightarrow \frac{n}{y} = \frac{b - m}{m - a}$$

$$b > m > a$$



$$(b - m) : (m - a)$$

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$$\therefore mn - na + by - my = 0$$

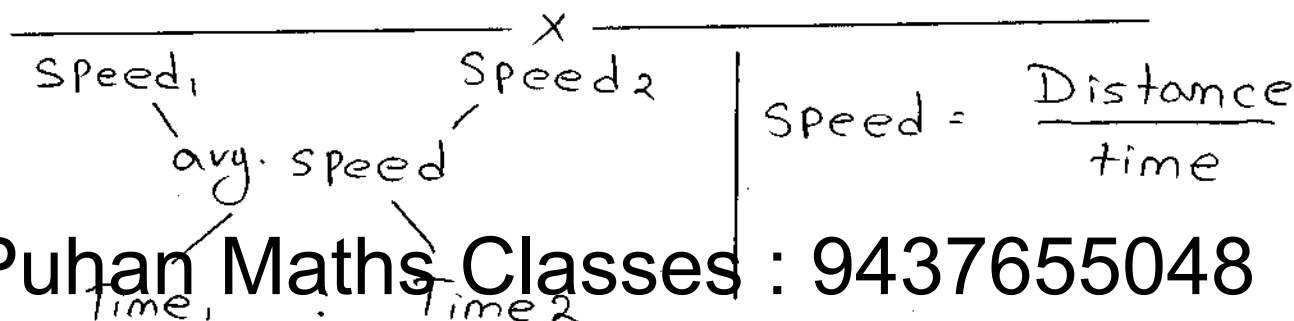
$$\Rightarrow a = \frac{mn + by - my}{n}$$

$$\Rightarrow b = \frac{my - mn + an}{y}$$

$$\Rightarrow a = m + \frac{(b - m)y}{n}$$

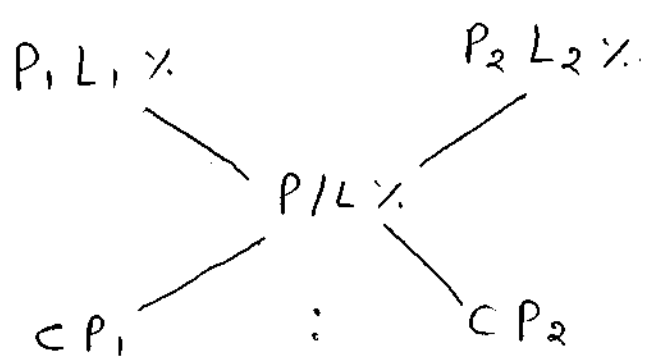
$$\Rightarrow b = m - \frac{(m - a)n}{y}$$

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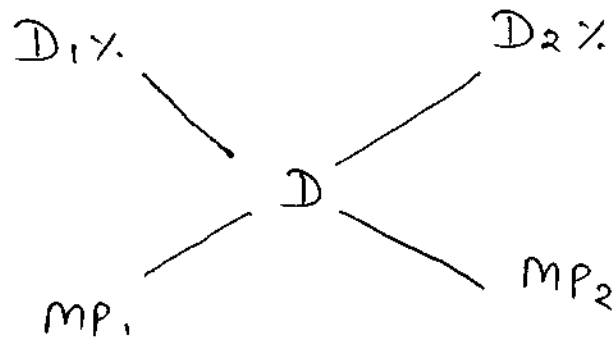
Puham Maths Classes : 9437655048

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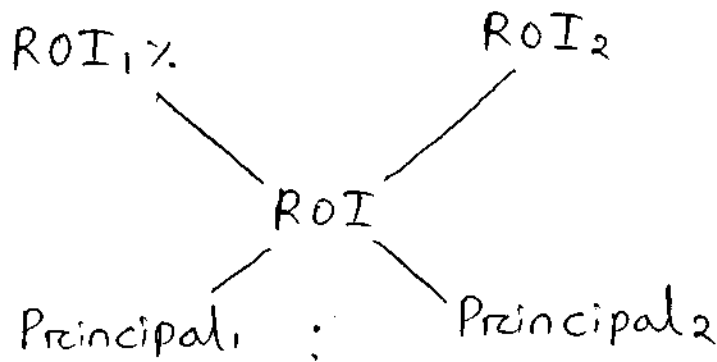
$$P/L\% = \frac{P/L}{CP} \times 100$$

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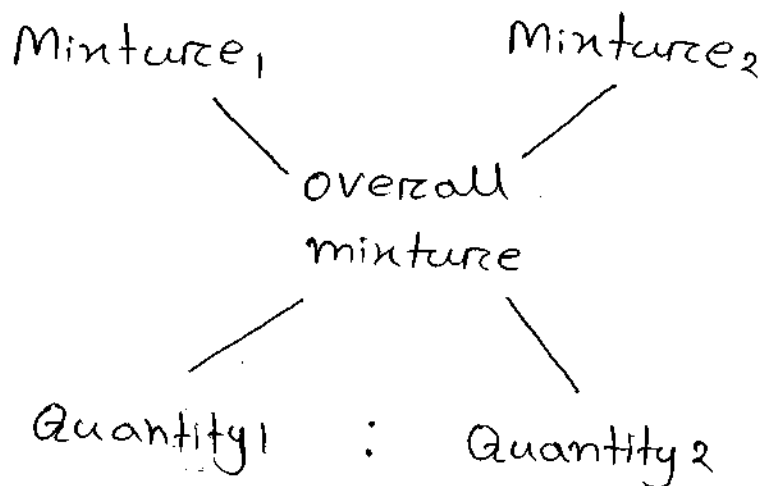
$$D\% = \frac{\text{Discount}}{MP} \times 100$$

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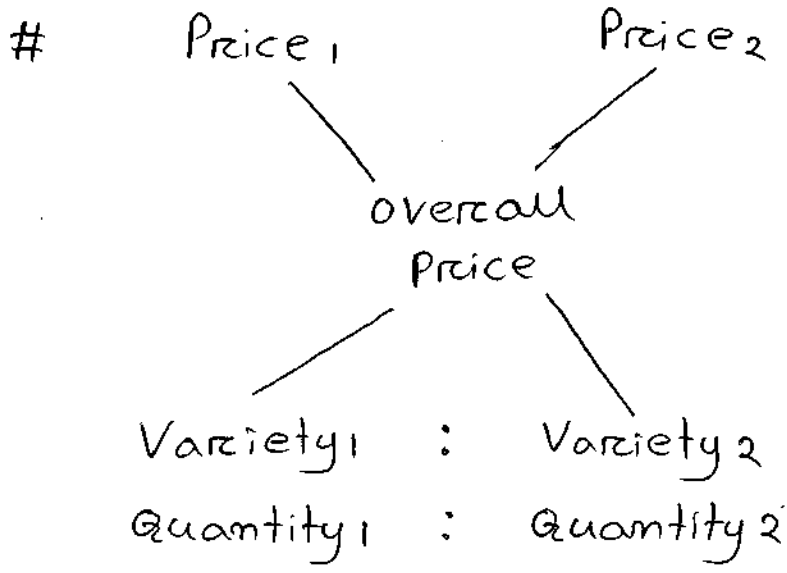


$$ROI\% = \frac{\text{SI for 1 year}}{\text{Principal}} \times 100$$

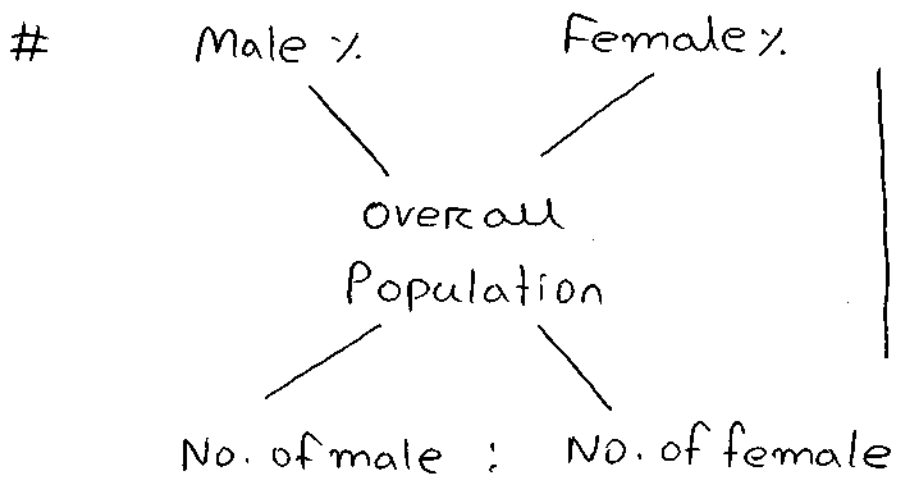
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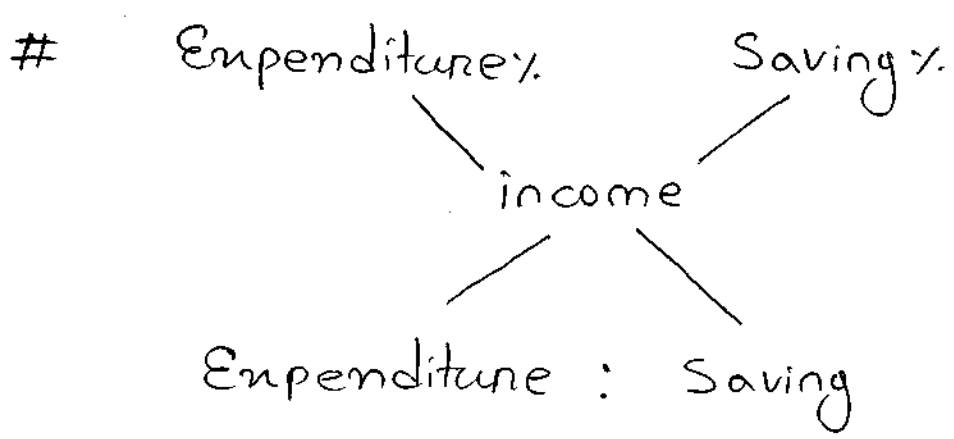
$$\text{Part of minture} = \frac{\text{Part Present}}{\text{Quantity}}$$



$$\text{Price} = \frac{\text{Rs.}}{\text{kg}}$$



$$\begin{aligned} \text{Male / female} \\ = \frac{\text{No of male / female}}{\text{Total population}} \end{aligned}$$



$$\text{Income} = \text{Expenditure} + \text{Saving}$$

_____ x _____

- ① Kalyan spends 80% of his income. His income increase by 15% and his expenditure also increases by 5%. The percentage of increase in his saving is :

- ④ Piku answers 20 out of 25 questions correctly in the first section. In the second section he answers 60% questions correct and his total score is 66.66% in the test given that all the questions carry equal marks, without negative marking. The total number of question in the test is :

Soln:-

<u>1st</u>		<u>2nd</u>	
80%		60%	
$\swarrow$ $\searrow$ $\frac{200}{3}\%$ $\swarrow$ $\searrow$			
20	:	40	
1	:	2	

1 unit	_____	25
3 units	_____	$3 \times 25 = 75$

_____ x _____

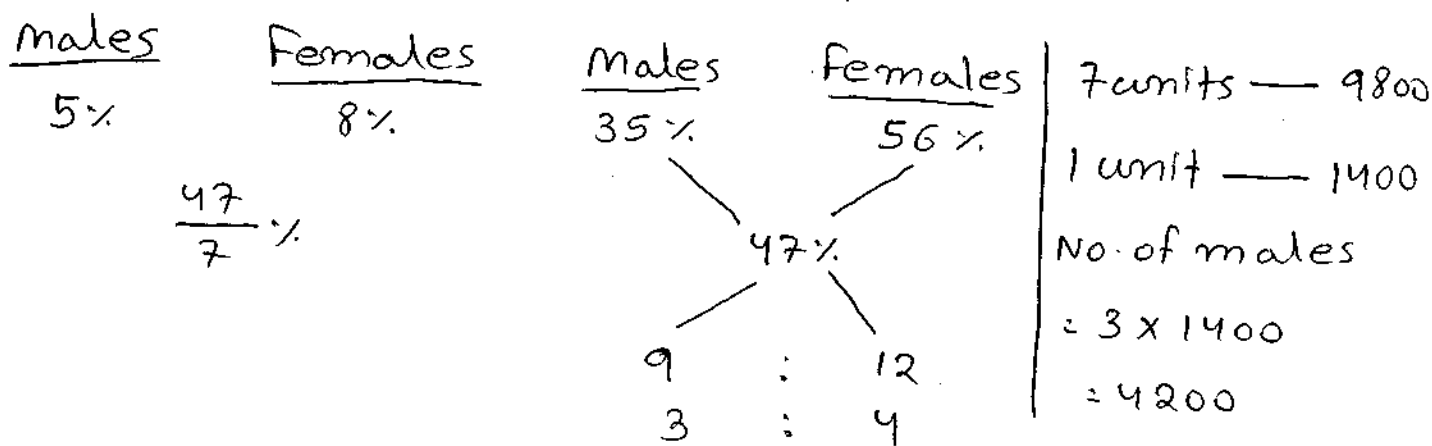
- ⑤ If $\frac{2}{5}$ of to total population are male and number of male decreases by 12%, then population of town decreases by 3%. Find the percentage change in number of females.

Soln:-

<u>Male</u>		<u>Female</u>
12%		x%
$\swarrow$ $\searrow$ -3 $\swarrow$ $\searrow$		
2	:	3
$\times 3 \rightarrow 6$		$\times 3 \rightarrow 9$

- Soln:- Population increase = $10458 - 9800 = 658$

$$\text{overall \%} = \frac{658}{9,800} \times 100 = \frac{47}{7} \%$$



- Soln:-
- | <u>Correct</u> | | <u>Wrong</u> |
|----------------|-----|--------------|
| 6 | | -3 |
| | 4.8 | |
| 7.8 | | 1.2 |
| 13 | : | 2 |

15 units $\times 4 = 60$

13 units $\times 4$ 52

If he attempt all questions correctly

$$60 \times 6 = 360$$

$$\begin{array}{r} 360 \\ - 288 \\ \hline \end{array}$$

72 marks less due to wrong answer
of one wrong answer is correct he gets $6 - (-3)$

$$\text{No. of wrong answer} = \frac{72}{9} = 8 = 9 \text{ marks}$$

$$\text{Correct answers} = 60 - 8 = 52$$

_____ X _____

- ⑧ A labour was hired on the condition that he would be paid Rs. 320 per day for his working but he would be fined at the rate of Rs. 48 per day for his absent. If the labour was paid Rs. 7120, after 4 weeks, the number of days the labour absent from work was:

Soln:-

<u>Present</u>	<u>absent</u>
320	-48
	$\frac{1780}{7}$
2240	-336
1780	
$\frac{529}{246}$	$\frac{115}{460}$
23	5

$$28 \text{ units} \text{ --- } 28$$

$$5 \text{ units} \text{ --- } 5$$

If he works all day, he gets
 $= 8960 - 7120 = 1840 \text{ less}$

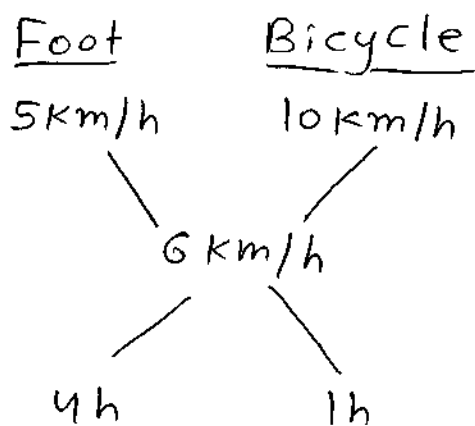
If he work on each absent day he would get $= 320 - (-48)$
 $= 368$

$$\text{No. of absent day} = \frac{1840}{368} = 5 \text{ days}$$

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- ⑨ A man travelled a distance of 72 km. in 12 hours. He travelled partly on foot at 5 km/h and partly on bicycle at 10 km/h. The distance travelled on foot is :

Soln:- overall speed = $\frac{72}{12} = 6 \text{ km/h}$



5 hours ——— 12 h

1 unit ——— $\frac{12}{5} \text{ h}$

4 units ——— $\frac{48}{5} \text{ h}$

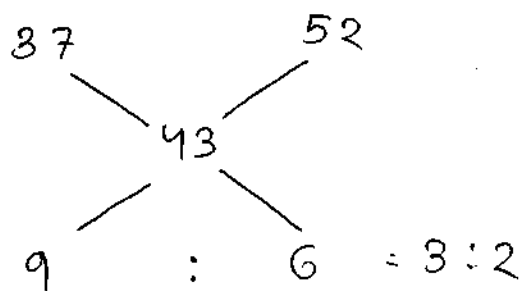
Distance travelled on foot

$$5 \text{ km/h} \times \frac{48}{5} \text{ h} = 48 \text{ km.}$$

————— x —————

- ⑩ A person standing on the platform saw that a train crossed him in 37 seconds. Another train coming from opposite direction crossed him in 52 seconds. If the two train takes 43 seconds to cross each other find the ratio of their speed.

Soln:-



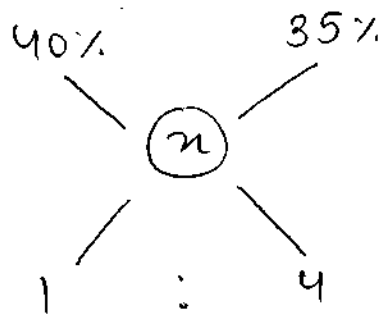
————— x —————

- ⑪ Aman invested a sum of money in Scheme A at the rate of 8% p.a. for a period of 5 years on simple interest. He invested four times and the sum of

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Scheme A in Scheme B at the rate of 5% p.a. for 7 years on Simple Interest He received a total interest amount of Rs. 1620. How much did he invest in Scheme B?

Soln:-



$$n = 35 + \frac{40-35}{5} \times 1 = 36\%$$

ATQ,

$$36\% \text{ ————— } 1620$$

$$1\% \text{ ————— } 45$$

$$P: 100\% \text{ ————— } 4500$$

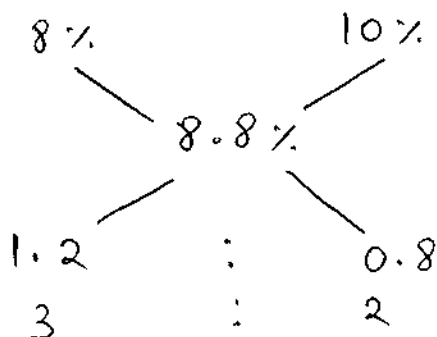
$$5 \text{ units } \frac{\times 900}{\text{—————}} 4500$$

$$4 \text{ units } \frac{\times 900}{\text{—————}} 3600$$

————— x —————

- ⑫ Kiran lent Rs. 4000 to two persons such that one part of it at the rate of 8% per annum and the remaining part at the rate of 10% per annum. He got an annual Simple interest of Rs. 352. Then the sum lent at 10% is :

Soln:- overall rate of interest = $\frac{352}{4000} \times 100 = 8.8\%$



$$5 \text{ units } \text{—————} 4000$$

$$1 \text{ unit } \text{—————} 800$$

$$2 \text{ units } \text{—————} 1600$$

————— x —————

- ⑬ A person purchased a table and a sofa for Rs. 28,000. He sold the sofa at a profit of 10% and the table at

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a profit of 12.25%. If his total profit was 13%, then the difference between the Cost Price of the Sofa and table is :

Soln:-

<u>Sofa</u>		<u>Table</u>
10%		15.25%
13%		
2.25%	:	3
3	:	4
1 unit		

7 units	_____	28,000
1 unit	_____	4,000

_____ x _____

- (14) A seller sells a table at 24% and a chair 15% discount. Marked price of both the items are Rs. 8400. Find the difference between marked price of both items if total discount is $20\frac{1}{7}\%$.

Soln:-

<u>Table</u>		<u>Chair</u>
24%		15%
$\frac{141}{7}\%$		
36	:	27
4	:	3

7 units	_____	Rs. 8400
1 unit	_____	Rs. 1200

_____ x _____

- (15) Sudha bought 80 articles at the same price. She sold some of them at 8% profit and remaining at 12% loss resulting in an overall profit of 6%.

The number of items sold at 8% profit is :

Soln:-

+8%		-12%
+6%		
18		2
9	:	1

10 units	_____	80
1 unit	_____	8
9 units	<u> x8 </u>	72

_____ x _____

- ⑩ A shopkeeper bought 80kg of Sugar at the rate of Rs. 13.50 per kg. He mixed it with 120kg of Sugar costing Rs. 16 per kg. In order to make a profit of 20%, he must sell the mixture at:

Soln:- Quantity = 80 : 120 = 2 : 3

13.50		16
n		
2	:	3

$$= 13.50 + \left(\frac{16 - 13.50}{5} \right) \times 3$$

$$= 15$$

CP = 15
SP = 15 × $\frac{120}{100}$
= Rs. 18

_____ x _____

- ⑪ How many kg of Salt costing Rs. 28 per kg must be mixed with 39.6 kg. of Salt costing Rs. 16 per kg. So that selling the mixture at Rs. 29.90, there is a gain of 15%.

Soln:- 15% = $\frac{3}{20}$ $\left\{ \begin{array}{l} \text{SP} = 23 \\ \text{CP} \end{array} \right.$

23 units _____ 29.90

28		16
26		
10		2
5		1

_____ x _____

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- ⑮ In what ratio should tea costing Rs. 300/kg be mixed with tea costing Rs. 200/kg so that the cost of the mixture is Rs. 225/kg.

Soln:-

$$\begin{array}{ccc}
 300 & & 200 \\
 & \searrow & \swarrow \\
 & 225 & \\
 & \swarrow & \searrow \\
 25 & & 75 \\
 1 & : & 3
 \end{array}$$

- ⑯ A 120 liters mixture of milk and water contains 40% milk. How much milk must be added so that milk becomes 50%?

Soln:-

<u>mixture₁</u>		<u>mixture₂</u>	
40%		100%	
	$\searrow$	$\swarrow$	
	50%		
	$\swarrow$	$\searrow$	
50	:	10	
5	:	1	

5 units	_____	120
1 unit	_____	24

_____ x _____

- ⑰ A dishonest milkman buys milk at Rs. 24 per liter and adds $\frac{1}{3}$ of water to it and sells the mixture at Rs. 32 per liter. What is his gain?

Soln:-

<u>Milk</u>		<u>water</u>	
Rs 24		Rs 0	
	$\searrow$	$\swarrow$	
3	:	1	

$n = 0 + \frac{(24-0) \times 3}{4} = 18$

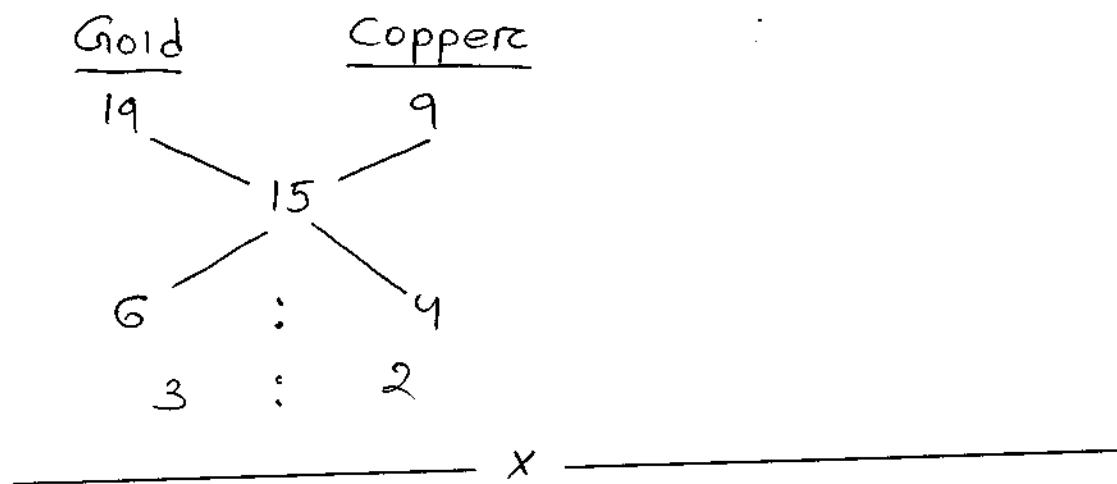
Profit = $32 - 18 = 14$

Profit % = $\frac{14}{18} \times 100$

$= \frac{7}{9} \times 100$

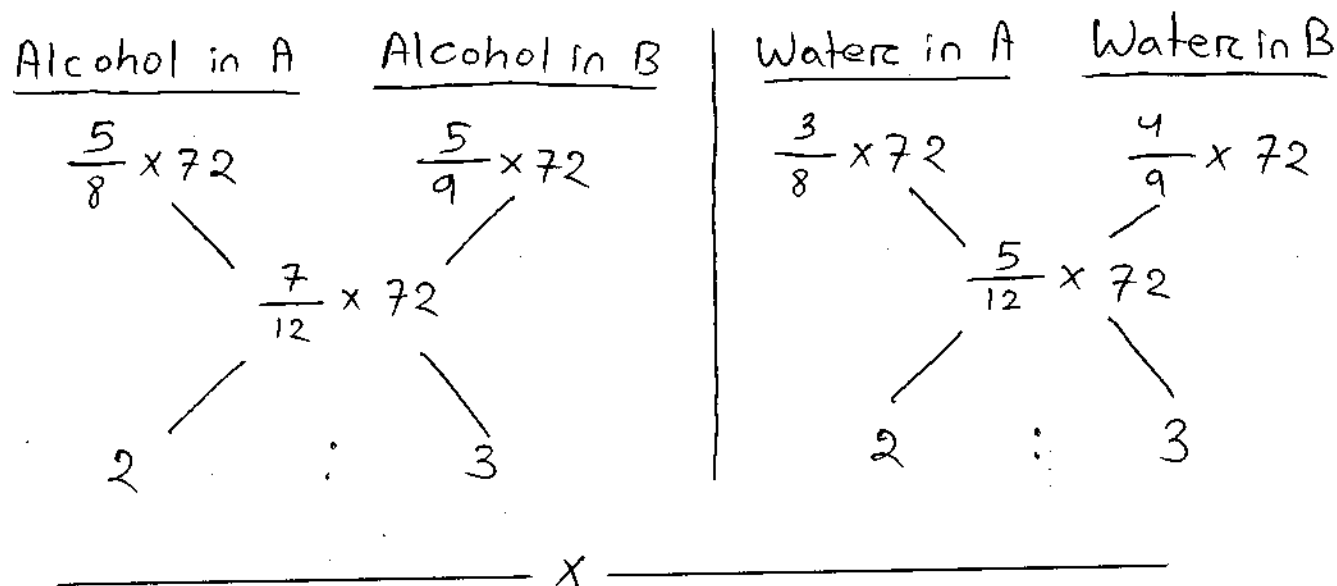
②① Gold is 19 times as heavy as water and copper is 9 times as heavy as water. In what ratio should these be mixed to get an alloy 15 times as heavy as water?

Soln:-



②② Alcohol and water in two vessels A and B are in the ratio 5:3 and 5:4 respectively. In what ratio the liquid of both the vessels be mixed to obtain a new mixture in vessel in the ratio 7:5?

Soln:-



②③ A cricketer whose bowling average is 12.4 runs per wicket takes 5 wickets for 26 runs in the next innings and thereby decreases his average by 0.4.

The number of wickets taken by him till the last match was:

Soln:- $\frac{26 \text{ runs}}{5 \text{ wickets}} = 5.2 \text{ runs per wicket}$

$$\begin{array}{ccc} 12.4 & & 5.2 \\ & \diagdown & / \\ & 12 & \\ & / & \diagdown \\ 6.8 & : & 0.4 \\ 17 & : & 1 \end{array}$$

1 unit ——— 5 wickets
No. of wicket taken till the last match = $17 + 1 = 18$
 $= 18 \times 5 = 90 \text{ wickets}$

————— X —————

(24) Brass is an alloy of copper and zinc, Bronze is an alloy of 79% copper, 3% zinc and 18% Tin, Brass and Bronze is mixed to form a fused and this resultant alloy contains 70% copper, 18% zinc and rest is tin. Find the percentage of copper in Brass.

Soln:-

Brass	Brass	Brass	Brass	Brass	Brass
0%	18%	12%	6	:	12
1	:	2	1	:	2

Brass	Brass	Brass	Brass	Brass	Brass
n	79%	70	18	:	2
x9	1	:	2	:	2

$$n = 70 - 18 = 52$$

②5 A shopkeeper sells Table, Chair and Sofa at a profit 12.5%, 20% and 10% respectively. The overall profit % is $13\frac{1}{3}\%$. Find the Overall profit percentage on selling the 3 items.

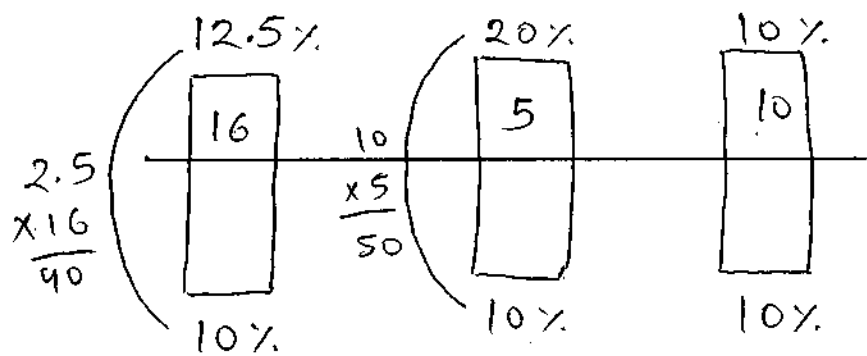
Soln:-

	Table	Chair	Chair	Sofa
	$\frac{1}{8}$	$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{10}$
	$\frac{1}{7}$		$\frac{2}{15}$	
CP $\rightarrow$	$\frac{2}{35}$	$\frac{1}{56}$	$\frac{1}{30}$	$\frac{1}{15}$
	16	5	10	2x5

$\times 5$

$12.5\% = \frac{1}{8}$
 $20\% = \frac{1}{5}$
 $10\% = \frac{1}{10}$
 $14\frac{2}{7}\% = \frac{1}{7}$
 $13\frac{1}{3}\% = \frac{2}{15}$

CP $\rightarrow$ T : C : S
 $16 : 5 : 10$



overall profit % = $10 + \frac{40 + 50}{31}$

= $10 + \frac{90}{31} = 11\frac{7}{31}\%$