

1. A container contains 40 litres of milk. From this container 4 litres of milk was taken out and replaced by water. This process was repeated further two times. How much milk is now contained by the container?

A. 26 litres

B. 29.16 litres

C. 28 litres

D. 28.2 litres

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Answer : Option B

Explanation :

Assume that a container contains x of liquid from which y units are taken out and replaced

by water. After n operations, the quantity of pure liquid

$$= x\left(1 - \frac{y}{x}\right)^n$$

$$\text{Hence milk now contained by the container} = 40\left(1 - \frac{4}{40}\right)^3 = 40\left(1 - \frac{1}{10}\right)^3$$

$$40 \times \frac{9}{10} \times \frac{9}{10} \times \frac{9}{10} = \frac{4 \times 9 \times 9 \times 9}{100} = 29.16$$

2. Tea worth Rs. 126 per kg and Rs. 135 per kg are mixed with a third variety of tea in the ratio 1 : 1 : 2. If the mixture is worth Rs. 153 per kg, what is the price of the third variety per kg ?

A. Rs.182.50

B. Rs.170.5

C. Rs.175.50

D. Rs.180

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Answer : Option C

Explanation :

Tea worth Rs. 126 per kg and Rs. 135 per kg are mixed in the ratio 1 : 1

$$\text{So their average price} = \frac{(126 + 135)}{2} = 130.5$$

Hence let's consider that the mixture is formed by mixing two varieties of tea.

one at Rs. 130.50 per kg and the other at Rs. x per kg in the ratio 2 : 2, i.e.,

1 : 1. Now let's find out x .

By the rule of alligation, we can write as

Cost of 1 kg of 1st kind of tea	Cost of 1 kg of 2nd kind of tea
130.50	x

Mean Price

153

$(x - 153)$

22.50

$$(x - 153) : 22.5 = 1 : 1$$

$$\Rightarrow x - 153 = 22.50$$

$$\Rightarrow x = 153 + 22.5 = 175.5$$

3. A milk vendor has 2 cans of milk. The first contains 25% water and the rest milk. The second contains 50% water. How much milk should he mix from each of the containers so as to get 12 litres of milk such that the ratio of water to milk is 3 : 5?

A. 5litres, 7 litres

B. 7litres, 4 litres

C. 6litres, 6 litres

D. 4litres, 8 litres

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Answer : Option C

Explanation :

Solution 1

Let x and $(12-x)$ litres of milk be mixed from the first and second container respectively

Amount of milk in x litres of the the first container = $.75x$

Amount of water in x litres of the the first container = $.25x$

Amount of milk in $(12-x)$ litres of the the second container = $.5(12-x)$

Amount of water in $(12-x)$ litres of the the second container = $.5(12-x)$

Ratio of water to milk = $[.25x + .5(12-x)] : [.75x + .5(12-x)] = 3 : 5$

$$\Rightarrow \frac{(.25x + 6 - .5x)}{(.75x + 6 - .5x)} = \frac{3}{5}$$

$$\Rightarrow \frac{(6 - .25x)}{(.25x + 6)} = \frac{3}{5}$$

$$\Rightarrow 30 - 1.25x = .75x + 18$$

$$\Rightarrow 2x = 12$$

$$\Rightarrow x = 6$$

Since $x = 6$, $12 - x = 12 - 6 = 6$

Hence 6 and 6 litres of milk should be mixed from the first and second container respectively

Solution 2

Let cost of 1 litre milk be Rs. 1

Milk in 1 litre mix in 1st can = $\frac{3}{4}$ litre

Cost Price(CP) of 1 litre mix in 1st can = Rs. $\frac{3}{4}$

Milk in 1 litre mix in 2nd can = $\frac{1}{2}$ litre

Cost Price(CP) of 1 litre mix in 2nd can = Rs. $\frac{1}{2}$

Milk in 1 litre of the final mix = $\frac{5}{8}$

Cost Price(CP) of 1 litre final mix = Rs. $\frac{5}{8}$

\Rightarrow Mean price = $\frac{5}{8}$

By the rule of alligation, we can write as

CP of 1 litre mix in 2nd can
1/2

CP of 1 litre mix in 1st can
3/4

Mean Price
5/8

$$3/4 - 5/8 = 1/8$$

$$5/8 - 1/2 = 1/8$$

=> mix in 2nd can : mix in 1st can = 1/8 : 1/8 = 1:1

ie, from each can, $\frac{1}{2} \times 12 = 6$ litre should be taken

4. Two vessels A and B contain spirit and water in the ratio 5 : 2 and 7 : 6 respectively. Find the ratio in which these mixture be mixed to obtain a new mixture in vessel C containing spirit and water in the ration 8 : 5 ?

A. 3 : 4

B. 4 : 3

C. 9 : 7

D. 7 : 9

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Answer : Option D

Explanation :

Let Cost Price(CP) of 1 litre spirit be Rs.1

Quantity of spirit in 1 litre mixture from vessel A = 5/7

Cost Price(CP) of 1 litre mixture from vessel A = Rs. 5/7

Quantity of spirit in 1 litre mixture from vessel B = 7/13

Cost Price(CP) of 1 litre mixture from vessel B = Rs. 7/13

Quantity of spirit to be obtained in 1 litre mixture from vessel C = 8/13

Cost Price(CP) of 1 litre mixture from vessel C = Rs. 8/13 = Mean Price

By the rule of alligation, we can write as

CP of 1 litre mixture from
vessel A
5/7

CP of 1 litre mixture from
vessel B
7/13

Mean Price
8/13

$$8/13 - 7/13 = 1/13$$

$$5/7 - 8/13 = 9/91$$

=> Mixture from Vessel A : Mixture from Vessel B = $1/13 : 9/91 = 7 : 9 =$ Required Ratio

5. The cost of Type 1 material is Rs. 15 per kg and Type 2 material is Rs.20 per kg. If both Type 1 and Type 2 are mixed in the ratio of 2 : 3, then what is the price per kg of the mixed variety of material?

A. Rs. 19

B. Rs. 16

C. Rs. 18

D. Rs. 17

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Answer : Option C

Explanation :

Solution 1

Cost Price(CP) of Type 1 material is Rs. 15 per kg

Cost Price(CP) of Type 2 material is Rs. 20 per kg

Type 1 and Type 2 are mixed in the ratio of 2 : 3

Hence Cost Price(CP) of the resultant mixture = $\frac{(15 \times 2) + (20 \times 3)}{(2 + 3)}$

$$= \frac{(30 + 60)}{5} = \frac{90}{5} = 18$$

=> rice per kg of the mixed variety of material = Rs.18

Solution 2

Cost Price(CP) of Type 1 material is Rs. 15 per kg

Cost Price(CP) of Type 2 material is Rs. 20 per kg

Let Cost Price(CP) of resultant mixture be Rs.x per kg

By the rule of alligation, we have

CP of Type 1 material

CP of Type 2 material

15

20

Mean Price

x

$$(20-x)$$

$$(x-15)$$

$$\Rightarrow \text{Type 1 material} : \text{Type 2 material} = (20-x) : (x-15)$$

$$\text{Given that Type 1 material} : \text{Type 2 material} = 2 : 3$$

$$\Rightarrow (20-x) : (x-15) = 2 : 3$$

$$\Rightarrow \frac{(20-x)}{(x-15)} = \frac{2}{3}$$

$$\Rightarrow 3(20-x) = 2(x-15)$$

$$\Rightarrow 60 - 3x = 2x - 30$$

$$\Rightarrow 90 = 5x$$

$$\Rightarrow x = \frac{90}{5} = 18$$

$$\Rightarrow \text{price per kg of the mixed variety of material} = \text{Rs.18}$$

6. Find the ratio in which rice at Rs. 7.20 a kg be mixed with rice at Rs. 5.70 a kg to produce a mixture worth Rs. 6.30 a kg.

A. 4 : 3

B. 3 : 4

C. 2 : 3

D. 3 : 2

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Answer : Option C

Explanation :

CP of 1Kg 1st kind rice = Rs.7.20

CP of 1Kg 2nd kind rice = Rs.5.70

CP of 1Kg mixed rice = Rs.6.30

By the rule of alligation, we have

CP of 1Kg 1st kind rice
7.2

CP of 1Kg 2nd kind rice
5.7

Mean Price
6.3

$$6.3 - 5.7 = .6$$

$$7.2 - 6.3 = .9$$

$$\text{Required Ratio} = .6 : .9 = 6:9 = 2:3$$

7. 8 litres are drawn from a cask full of wine and is then filled with water. This operation is performed three more times. The ratio of the quantity of wine now left in cask to that of the water is 16 : 65. How much wine did the cask originally hold?

A. 30 litres

B. 26 litres

C. 24 litres

D. 32 litres

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Answer : Option C

Explanation :

Let initial quantity of wine = x litre

After a total of 4 operations, quantity of wine = $x(1 - \frac{8}{x})^4 = x(1 - \frac{8}{x})^4$

Given that after a total of 4 operations, the ratio of the quantity of wine left in cask

to that of water = 16 : 65

Hence we can write as $\frac{x(1 - \frac{8}{x})^4}{x} = \frac{16}{81}$

$$\Rightarrow (1 - \frac{8}{x})^4 = (\frac{2}{3})^4$$

$$\Rightarrow (1 - \frac{8}{x}) = \frac{2}{3}$$

$$\Rightarrow (\frac{x - 8}{x}) = \frac{2}{3}$$

$$\Rightarrow 3x - 24 = 2x$$

$$\Rightarrow x = 24$$

8. A jar full of whiskey contains 40% alcohol. A part of this whisky is replaced by another containing 19% alcohols and now the percentage of alcohol was found to be 26%. The quantity of whisky replaced is

A. $\frac{4}{3}$
C. $\frac{3}{2}$

B. $\frac{3}{4}$
D. $\frac{2}{3}$

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Here is the answer and explanation

Answer : Option D

Explanation :

Concentration of alcohol in 1st Jar = 40%

Concentration of alcohol in 2nd Jar = 19%

After the mixing, Concentration of alcohol in the mixture = 26%

By the rule of alligation,

Concentration of alcohol in 1st Jar	Concentration of alcohol in 2nd Jar
40%	19%
Mean 26%	
7	14

Hence ratio of 1st and 2nd quantities = 7 : 14 = 1 : 2

9. How many kilograms of sugar costing Rs. 9 per kg must be mixed with 27 kg of sugar costing Rs. 7 per Kg so that there may be a gain of 10 % by selling the mixture at Rs. 9.24 per Kg ?

A. 60 Kg

B. 63 kg

C. 58 Kg

D. 56 Kg

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Answer : Option B

Explanation :

Selling Price(SP) of 1 Kg mixture= Rs. 9.24

Profit = 10%

$$\begin{aligned}\text{Cost Price(CP) of 1 Kg mixture} &= \frac{100}{(100 + \text{Profit}\%)} \times \text{SP} = \frac{100}{(100 + 10)} \times 9.24 \\ &= \frac{100}{110} \times 9.24 = \frac{92.4}{11} = \text{Rs. } 8.4\end{aligned}$$

By the rule of alligation, we have

CP of 1 kg sugar of 1st kind	CP of 1 kg sugar of 2nd kind
Rs. 9	Rs. 7

Mean Price
Rs.8.4

$$8.4 - 7 = 1.4$$

$$9 - 8.4 = .6$$

ie, to get a cost price of 8.4, the sugars of kind1 and kind2 should be mixed in the

ratio $1.4 : .6 = 14 : 6 = 7 : 3$

Let x Kg of kind1 sugar is mixed with 27 kg of kind2 sugar

then $x : 27 = 7 : 3$

$$\Rightarrow \frac{x}{27} = \frac{7}{3}$$

$$\Rightarrow x = 27 \times \frac{7}{3} = 63$$

10. In what ratio should rice at Rs.9.30 per Kg be mixed with rice at Rs. 10.80 per Kg so that the mixture be worth Rs.10 per Kg ?

A. 7 : 8

B. 8 : 7

C. 6 : 7

D. 7 ; 6

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Answer : Option B

Explanation :

By the rule of alligation, we have

Cost of 1 kg rice of 1st kind	Cost of 1 kg rice of 2nd kind
9.3	10.80

Mean Price
10

$$10.8 - 10 = .8$$

$$10 - 9.3 = .7$$

Required ratio = $.8 : .7 = 8 : 7$.

11. In what ratio must tea worth Rs. 60 per kg be mixed with tea worth Rs. 65 a Kg such that by selling the mixture at Rs. 68.20 a Kg ,there can be a gain 10%?

A. 3 : 2

B. 2 : 3

C. 4 : 3

D. 3 : 4

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Answer : Option A

Explanation :

Cost Price(CP) of 1 Kg mixture = Rs. 68.20

Profit = 10%

$$\begin{aligned}\text{Cost Price(CP) of 1 Kg mixture} &= \frac{100}{(100 + \text{Profit}\%)} \times \text{SP} = \frac{100}{(100 + 10)} \times 68.20 \\ &= \frac{100}{110} \times 68.20 = \frac{682}{11} = \text{Rs. } 62\end{aligned}$$

By the rule of alligation:

CP of 1 kg tea of 1st kind

CP of 1 kg tea of 2nd kind

60

65

Mean Price

62

65 - 62 = 3

62 - 60 = 2

Hence required ratio = 3 : 2

12. A container contains a mixture of two liquids P and Q in the ratio 7 : 5. When 9 litres of mixture are drawn off and the container is filled with Q, the ratio of P and Q becomes 7 : 9. How many litres of liquid P was contained in the container initially?

A. 23

B. 21

C. 19

D. 17

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Answer : Option B

Explanation :

Let's initial quantity of P in the container be 7x

and initial quantity of Q in the container be 5x

and initial quantity of Q in the container be $5x$

Now 9 litres of mixture are drawn off from the container

$$\text{Quantity of P in 9 litres of the mixtures drawn off} = 9 \times \frac{7}{12} = \frac{63}{12} = \frac{21}{4}$$

$$\text{Quantity of Q in 9 litres of the mixtures drawn off} = 9 \times \frac{5}{12} = \frac{45}{12} = \frac{15}{4}$$

Hence

$$\text{Quantity of P remains in the mixtures after 9 litres is drawn off} = 7x - \frac{21}{4}$$

$$\text{Quantity of Q remains in the mixtures after 9 litres is drawn off} = 5x - \frac{15}{4}$$

Since the container is filled with Q after 9 litres of mixture is drawn off,

$$\text{Quantity of Q in the mixtures} = 5x - \frac{15}{4} + 9 = 5x + \frac{21}{4}$$

Given that the ratio of P and Q becomes 7 : 9

$$\Rightarrow \left(7x - \frac{21}{4}\right) : \left(5x + \frac{21}{4}\right) = 7 : 9$$

$$\Rightarrow \frac{\left(7x - \frac{21}{4}\right)}{\left(5x + \frac{21}{4}\right)} = \frac{7}{9}$$

$$63x - \left(\frac{9 \times 21}{4}\right) = 35x + \left(\frac{7 \times 21}{4}\right)$$

$$28x = \left(\frac{16 \times 21}{4}\right)$$

$$x = \left(\frac{16 \times 21}{4 \times 28} \right)$$

$$\text{litres of P contained in the container initially} = 7x = \left(\frac{7 \times 16 \times 21}{4 \times 28} \right) = \frac{16 \times 21}{4 \times 4} = 21$$

13. A vessel is filled with liquid, 3 parts of which are water and 5 parts of syrup. How much of the mixture must be drawn off and replaced with water so that the mixture may be half water and half syrup?

A. $\frac{1}{3}$

B. $\frac{1}{4}$

C. $\frac{1}{5}$

D. $\frac{1}{6}$

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Answer : Option C

Explanation :

Let the quantity of the initial liquid in the vessel = 8 litre and

quantity of water in the initial liquid = 3 litre and

quantity of syrup in the initial liquid = 5 litre

Let x litre of the mixture is drawn off and replaced with water

Quantity of water in the new mixture = $3 - \frac{3x}{8} + x$

Quantity of syrup in the new mixture = $5 - \frac{5x}{8}$

Given that in the new mixture, quantity of water = quantity of syrup

$$\Rightarrow 3 - \frac{3x}{8} + x = 5 - \frac{5x}{8}$$

$$\Rightarrow \frac{10x}{8} = 2$$

$$\Rightarrow \frac{5x}{4} = 2$$

$$\Rightarrow x = \frac{8}{5}$$

$$\Rightarrow \frac{8}{5} \text{ litre}$$

Initially we assumed that the quantity of the initial liquid in the vessel = 8 litre for the ease of calculations. For that $\frac{8}{5}$ litre of the mixture to be drawn off and replaced with water so that the mixture may be half water and half syrup

Now, if the initial liquid in the vessel = 1 litre, quantity of the mixture to be drawn off

and replaced with water so that the mixture may be half water and half syrup

$$= \frac{8}{5} \times \frac{1}{8} = \frac{1}{5}$$

It means $\frac{1}{5}$ of the mixture has to be drawn off and replaced with water so that the

mixture

may be half water and half syrup

14. In what ratio must water be mixed with milk costing Rs.12 per litre in order to get a mixture worth of Rs.8 per litre?

A. 1 : 3

B. 2 : 2

C. 1 : 2

D. 3 : 1

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Answer : Option C

Explanation :

By the rule of alligation, we have

Cost Price of 1 litre of water	Cost Price of 1 litre of milk
0	12

Mean Price
8

$12-8=4$

$8-0=8$

Required Ratio = 4 : 8 = 1 : 2

15. In what ratio must tea at Rs.62 per Kg be mixed with tea at Rs. 72 per Kg so that the mixture must be worth Rs. 64.50 per Kg?

A. 1 : 2

B. 2 : 1

C. 3 : 1

D. 1 : 3

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Answer : Option C

Explanation :

By the rule of alligation, we have

Cost of 1 kg of 1st kind tea	Cost of 1 kg tea of 2nd kind tea
62	72

Mean Price
64.5

$$72 - 64.5 = 7.5$$

$$64.5 - 62 = 2.5$$

$$\text{Required Ratio} = 7.5 : 2.5 = 3 : 1$$

16. In what ratio must a grocer mix two varieties of pulses costing Rs.15 and Rs. 20 per kg respectively to obtain a mixture worth Rs.16.50 per Kg?

A. 1 : 2

B. 2 : 1

C. 3 : 7

D. 7 : 3

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Answer : Option D

Explanation :

By the rule of alligation, we have

CP of 1 kg of 1st variety pulse	CP of 1 kg of 2nd variety pulse
15	20

Mean Price
16.5

$$20 - 16.5 = 3.5$$

$$16.5 - 15 = 1.5$$

$$\text{Required Ratio} = 3.5 : 1.5 = 35 : 15 = 7 : 3$$

17. A merchant has 1000 kg of sugar part of which he sells at 8% profit and the rest at 18% profit. He gains 14% on the whole. The Quantity sold at 18% profit is

A. 300

B. 400

C. 600

D. 500

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Answer : Option C

Explanation :

By the rule of alligation, we have

Profit% by selling 1st part	Profit% by selling 2nd part
8	18

Net % profit

$$\text{percentage of water in the mixture} = \frac{x}{T} \times 100 = \frac{x}{5x} \times 100 = \frac{1}{5} \times 100 = 20\%$$

 Solution 2 - Using the concepts learned in Mixtures and Alligations

Let CP of 1 litre milk = Rs.1

Given that SP of 1 litre mixture = CP of 1 Litre milk = Rs.1

Given than Gain = 25%

$$\text{Hence CP of 1 litre mixture} = \frac{100}{(100 + \text{Gain}\%)} \times \text{SP}$$

$$= \frac{100}{(100 + 25)} \times 1 = \frac{100}{125} = \frac{4}{5}$$

By the rule of alligation, we have

CP of 1 litre milk

1

CP of 1 litre water

0

CP of 1 litre mixture

4/5

$$4/5 - 0 = 4/5$$

$$1 - 4/5 = 1/5$$

$$\Rightarrow \text{Quantity of milk} : \text{Quantity of water} = 4/5 : 1/5 = 4 : 1$$

$$\text{Hence percentage of water in the mixture} = \frac{1}{5} \times 100 = 20\%$$

19. In what ratio must water be mixed with milk to gain $16\frac{2}{3}\%$ on selling the mixture at cost price?

A. 6 : 1

B. 1 : 6

C. 1 : 4

D. 4 : 1

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Answer : Option B

Explanation :

Let CP of 1 litre milk = Rs.1

SP of 1 litre mixture = CP of 1 litre milk = Rs.1

$$\text{Gain} = 16 \frac{2}{3} \% = \frac{50}{3} \%$$

$$\text{CP of 1 litre mixture} = \frac{100}{(100 + \text{Gain}\%)} \times \text{SP}$$

$$= \frac{100}{(100 + \frac{50}{3})} \times 1 = \frac{100}{(\frac{350}{3})} = \frac{300}{350} = \frac{6}{7}$$

By the rule of alligation, we have

CP of 1 litre water
0

CP of 1 litre milk
1

CP of 1 litre mixture
 $\frac{6}{7}$

$$1 - \frac{6}{7} = \frac{1}{7}$$

$$\frac{6}{7} - 0 = \frac{6}{7}$$

Quantity of water : Quantity of milk = $\frac{1}{7} : \frac{6}{7} = 1 : 6$

20. In what ratio must rice at Rs.7.10 be mixed with rice at Rs.9.20 so that the mixture may be worth Rs.8 per Kg?

A. 5 : 4

B. 2 : 1

C. 3 : 2

D. 4 : 3

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Answer : Option D

Explanation :

By the rule of alligation, we have

CP of 1 kg Rice of 1st kind
7.1

CP of 1 kg Rice of 2nd kind
9.2

Mean Price

8

$$9.2 - 8 = 1.2$$

$$8 - 7.1 = .9$$

$$\text{Required ratio} = 1.2 : .9 = 12 : 9 = 4 : 3$$

21. How many Kg of rice at Rs.6.60 per Kg. be mixed with 56Kg of rice at Rs.9.60 per Kg to get a mixture worth Rs.8.20 per Kg

A. 56 Kg

B. 52 Kg

C. 44 Kg

D. 49 Kg

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Answer : Option D

Explanation :

By the rule of alligation, we have

Cost of 1 kg of 1st kind rice	Cost of 1 kg of 2nd kind rice
6.6	9.6

Price of 1Kg of the mixture
8.2

$$9.6 - 8.2 = 1.4$$

$$8.2 - 6.6 = 1.6$$

Quantity of 1st kind rice : Quantity of 2nd kind rice = 1.4 : 1.6 = 7 : 8

Quantity of 1st kind rice : 56 = 7 : 8

$$\Rightarrow \text{Quantity of 1st kind rice} = 56 \times \frac{7}{8} = 49$$

22. How many litres of water must be added to 16 liters of milk and water contains 10% water to make it 20% water in it

A. 4 litre

B. 2 litre

C. 1 litre

D. 3 litre

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Answer : Option B

Explanation :

By the rule of alligation, we have

% Concentration of water
in pure water : 100

% Concentration of water
in the given mixture : 10

Mean % concentration
20

$$20 - 10 = 10$$

$$100 - 20 = 80$$

$$\Rightarrow \text{Quantity of water} : \text{Quantity of the mixture} = 10 : 80 = 1 : 8$$

Here Quantity of the mixture = 16 litres

$$\Rightarrow \text{Quantity of water} : 16 = 1 : 8$$

$$\text{Quantity of water} = 16 \times \frac{1}{8} = 2 \text{ litre}$$

23. We have a 630 ml of mixture of milk and water in the ratio 7:2. How much water must be added to make the ratio 7:3?

A. 70 ml

B. 60 ml

C. 80 ml

D. 50 ml

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Answer : Option A

Explanation :

concentration of water in mixture1 = $\frac{2}{9}$ (Since the ratio of milk and water = 7:2) --
-item(1)

concentration of water in pure water = 1 ---item(2)

Now the above mentioned items are mixed to form a mixture2 where milk and water
ratio = 7: 3

$$\Rightarrow \text{concentration of water in mixture2} = \frac{3}{10}$$

By the rule of alligation, we have

concentration of water
in mixture1 : $\frac{2}{9}$

concentration of water
in pure water : 1

Mean concentration

$$1 - \frac{3}{10} = \frac{7}{10}$$

$$\frac{3}{10} - \frac{2}{9} = \frac{7}{90}$$

$$\Rightarrow \text{Quantity of mixture1} : \text{Quantity of water} = \frac{7}{10} : \frac{7}{90} = \frac{1}{10} : \frac{1}{90} = 1 : \frac{1}{9}$$

Given that Quantity of mixture1 = 630 ml

$$\Rightarrow 630 : \text{Quantity of water} = 1 : \frac{1}{9}$$

$$\Rightarrow \text{Quantity of water} = 630 \times \frac{1}{9} = 70 \text{ ml}$$

24. 3 litre of water is added to 11 litre of a solution containing 42% of alcohol in the water. The percentage of alcohol in the new mixture is

A. 25%

B. 20%

C. 30%

D. 33%

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Answer : Option D

Explanation :

$$42 - x$$

$$x - 0 = x$$

But $(42 - x) : x = 3 : 11$

$$\Rightarrow \frac{42 - x}{x} = \frac{3}{11}$$

$$\Rightarrow \frac{42 - x}{x} = \frac{3}{11}$$

$$\Rightarrow 42 \times 11 - 11x = 3x$$

$$\Rightarrow 14x = 42 \times 11$$

$$\Rightarrow x = 3 \times 11 = 33$$

=> The percentage of alcohol in the new mixture is 33%

25. Rs.460 was divided among 41 boys and girls such that each boy Rs.12 and each girl got Rs.8. What is the number of boys?

A. 33

B. 30

C. 36

D. 28

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Answer : Option A

Explanation :

Solution 1

Assume that the number of boys = b and number of girls is g

number of boys + number of girls = 41

=> $b + g = 41$ ----- (Equation 1)

Given that each boy got Rs.12 and each girl got Rs.8 and Total amount = Rs.460

=> $12b + 8g = 460$ ----- (Equation 2)

Now we need solve Equation 1 and Equation 2 to get b and g

(Equation1) $\times 8$ => $8b + 8g = 8 \times 41 = 328$ -----(Equation3)

(Equation 2) - (Equation 3) = $4b = 460 - 328 = 132$

$$\Rightarrow b = \frac{132}{4} = 33$$

Solution 2

Given that Amount received by a boy = Rs.12 and

Amount received by a girl =Rs.8

Total amount = 460

Given that number of boys + Number of girls = 41

Hence mean amount = $460/41$

By the rule of alligation, we have

Amount received by a boy	Amount received by a girl
12	8

Mean amount
 $460/41$

$$460/41 - 8 = 132/41$$

$$12 - 460/41 = 32/41$$

Number of boys : Number of girls = $132/41 : 32/41 = 132 : 32 = 66 : 16 = 33 : 8$

Given that number of boys + Number of girls = 41

$$\text{Hence number of boys} = 41 \times \frac{33}{41} = 33$$

26. A trader has 1600Kg of sugar. He sells a part at 8% profit and the rest at 12% profit. If he gains 11% on the whole , find the quantity sold at 12%.

A. 1200 Kg

B. 1400 Kg

C. 1600 Kg

D. 800 Kg

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Answer : Option A

Explanation :

By the rule of alligation, we have

% Profit by selling part1

% Profit by selling part2

8

12

Net % Profit

11

$$12 - 11 = 1$$

$$11 - 8 = 3$$

=>Quantity of part1 : Quantity of part2 = 1 : 3

Given that total quantity = 1600 Kg

Hence quantity of part2 (quantity sold at 12%) = $1600 \times \frac{3}{4} = 1200$

27. In 40 litres of a mixture the ratio of milk to water is 7:1. In order to make the ratio of milk to water as 3:1, the quantity of water that should be added to the mixture will be

A. $5 \frac{2}{3}$ litre

B. $4 \frac{1}{3}$ litre

C. $6 \frac{2}{3}$ litre

D. 6 litre

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Answer : Option C

Explanation :

By the rule of alligation, we have

Concentration of water
in pure water : 1

Concentration of water
in mixture : 1/8

Concentration of water in the final mixture

1/4

$$1/4 - 1/8 = 1/8$$

$$1 - 1/4 = 3/4$$

Quantity of water : Quantity of mixture = 1/8 : 3/4 = 1 : 6

Given that quantity of mixture = 40 litre

=>Quantity of water : 40 = 1 : 6

$$\Rightarrow \text{Quantity of water} = 40 \times \frac{1}{6} = 6 \frac{2}{3} \text{ litre}$$

28. Some amount out Rs.7000 was lent at 6% per annum and the remaining was lent at 4% per annum. If the total simple interest from both the fractions in 5 years was Rs.1600, the sum lent of 6% per annum was

- A. Rs. 2400
C. Rs. 2000

- B. Rs. 2200
D. Rs. 1800

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Answer : Option C

Explanation :

Total simple interest received , I = Rs.1600

Principal , p = 7000

period, n = 5 years

Rate of interest, r = ?

$$\text{Simple Interest, } I = \frac{pnr}{100} \Rightarrow 1600 = \frac{7000 \times 5 \times r}{100}$$
$$\Rightarrow r = \frac{1600 \times 100}{7000 \times 5} = \frac{160}{35} = \frac{32}{7} \%$$

By the rule of alligation, we have

Rate of interest % from
part1
6

Rate of interest % from
part2
4

Net rate of interest %
 $\frac{32}{7}$

$$\frac{32}{7} - 4 = \frac{4}{7}$$

$$6 - \frac{32}{7} = \frac{10}{7}$$

$$\Rightarrow \text{Part1} : \text{part2} = \frac{4}{7} : \frac{10}{7} = 4 : 10 = 2 : 5$$

Given that total amount = Rs.7000

$$\text{The amount lent of 6% per annum (part1 amount)} = 7000 \times \frac{2}{7} = \text{Rs. 2000}$$

29. In 1 kg mixture of iron and manganese 20% of manganese. How much iron should be added so that the proportion of manganese becomes 10%

A. 1.5 Kg

B. 2 Kg

C. .5 Kg

D. 1 Kg

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Answer : Option D

Explanation :

By the rule of alligation, we have

Percentage concentration of manganese in the mixture : 20	Percentage concentration of manganese in pure iron : 0
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Percentage concentration of manganese in the final mixture
10

$$10 - 0 = 10$$

$$20 - 10 = 10$$

=> Quantity of the mixture : Quantity of iron = 10 : 10 = 1 : 1

Given that Quantity of the mixture = 1 Kg

Hence Quantity of iron to be added = 1 Kg

30. John bought 20 kg of wheat at the rate of Rs.8.50 per kg and 35 kg at the rate of Rs.8.75 per kg. He mixed the two. Approximately at what price per kg should he sell the mixture to make 40% profit as the cost price?

A. Rs.12

B. Rs.8

C. Rs.16

D. Rs.20

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Answer : Option A

Explanation :

$$CP = 20 \times 8.5 + 35 \times 8.75 = 170 + 306.25 = 476.25$$

$$\text{Profit} = 40\%$$

$$SP = \frac{(100 + \text{Profit}\%)}{100} \times CP = \frac{(100 + 40)}{100} \times 476.25 = \frac{140}{100} \times 476.25$$

$$= \frac{140}{4} \times 19.05 = 35 \times 19.05$$

$$\text{Total quantity} = 20 + 35 = 55 \text{ Kg}$$

$$SP \text{ per Kg} = \frac{35 \times 19.05}{55} = \frac{7 \times 19.05}{11}$$

$$\approx \frac{7 \times 19}{11} \approx \frac{133}{11} \approx 12$$