



## Mixture and Alligation Questions for SNAP

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# Questions

## Instructions

For the following questions answer them individually

### Question 1

A vessel contains a mixture of milk and water in the respective ratio of 14 : 3. 25.5 litres of the mixture is taken out from the vessel and 2.5 litres of pure water and 5 litres of pure milk is added to the mixture. If the resultant mixture contains 20% water, what was the initial quantity of mixture in the vessel before the replacement? (in litres)

- A 51
- B 102
- C 68
- D 85
- E 34

**Answer: C**

### Explanation:

Let the total quantity of mixture in the vessel initially =  $17x$  litres

$$\Rightarrow \text{Quantity of milk} = \frac{14}{17} \times 17x = 14x \text{ litres}$$

$$\text{Quantity of water} = 17x - 14x = 3x \text{ litres}$$

Acc. to ques,

$$\Rightarrow \frac{14x - (\frac{14}{17} \times 25.5) + 5}{3x - (\frac{3}{17} \times 25.5) + 2.5} = \frac{80}{20}$$

$$\Rightarrow \frac{14x - 21 + 5}{3x - 4.5 + 2.5} = 1$$

$$\Rightarrow \frac{14x - 16}{3x - 2} = 1$$

$$\Rightarrow 14x - 16 = 12x - 8$$

$$\Rightarrow 14x - 12x = 16 - 8$$

$$\Rightarrow x = \frac{8}{2} = 4$$

$\therefore$  Initial quantity of mixture in the vessel before the replacement =  $17 \times 4 = 68$  litres

### Question 2

A vessel contains 100 litres mixture of milk and water in the respective ratio of 22 : 3. 40 litres of the mixture is taken out from the vessel and 4.8 litres of pure milk and pure water each is added to the mixture. By what percent is the quantity of water in the final mixture less than the quantity of milk?

- A  $78\frac{1}{2}$
- B  $79\frac{1}{6}$
- C  $72\frac{5}{6}$
- D 76
- E  $77\frac{1}{2}$

**Answer: B**

### Explanation:

Quantity of milk in vessel =  $\frac{22}{25} \times 100 = 88$  litres

=> Quantity of water =  $100 - 88 = 12$  litres

40 litres of the mixture is taken out, i.e.,  $\frac{40}{100} = \left(\frac{2}{5}\right)^{th}$

=> Milk left =  $88 - \frac{2}{5} \times 88 = 52.8$  litres

Water left =  $12 - \frac{2}{5} \times 12 = 7.2$  litres

Now, 4.8 litres of milk and water are added.

=> Quantity of milk in the vessel =  $52.8 + 4.8 = 57.6$  litres

Quantity of water in the vessel =  $7.2 + 4.8 = 12$  litres

∴ Required % =  $\frac{57.6-12}{57.6} \times 100$

=  $\frac{45.6}{57.6} = 79\frac{1}{6}\%$

### Question 3

Jar A has 60 litres of mixture of milk and water in the respective ratio of 2 : 1. Jar B which had 40 litres of mixture of milk and water was emptied into jar A, as a result in jar A, the respective ratio of milk and water became 13 : 7. What was the quantity of water in jar B?

- A 8 litres
- B 15 litres
- C 22 litres
- D 7 litres
- E 1 litre

**Answer: B**

### Explanation:

Jar A has 60 litres of mixture of milk and water in the respective ratio of 2 : 1

=> Quantity of milk in Jar A =  $\frac{2}{3} \times 60 = 40$  litres

Quantity of water in Jar A =  $60 - 40 = 20$  litres

Let quantity of water in Jar B =  $x$  litres

=> Quantity of milk in Jar B =  $(40 - x)$  litres

Acc. to ques, =>  $\frac{40+(40-x)}{20+x} = \frac{13}{7}$

=>  $560 - 7x = 260 + 13x$

=>  $13x + 7x = 560 - 260$

=>  $20x = 300$

=>  $x = \frac{300}{20} = 15$  litres

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### Question 4

Jar A has 36 litres of mixture of milk and water in the respective ratio of 5 : 4. Jar B which had 20 litres of mixture of milk and water, was emptied into jar A, and as a result in jar A, the respective ratio of milk and water becomes 5: 3. What was the quantity of water in jar B?

- A 5 litres

- B 3 litres
- C 8 litres
- D 2 litres
- E 1 litre

**Answer: A**

**Explanation:**

Jar A has 36 litres of mixture of milk and water in the respective ratio of 5 : 4

$$\Rightarrow \text{Quantity of milk in Jar A} = \frac{5}{9} \times 36 = 20 \text{ litres}$$

$$\text{Quantity of water in Jar A} = 36 - 20 = 16 \text{ litres}$$

Let quantity of water in Jar B =  $x$  litres

$$\Rightarrow \text{Quantity of milk in Jar B} = (20 - x) \text{ litres}$$

$$\text{Acc. to ques, } \Rightarrow \frac{20 + (20 - x)}{16 + x} = \frac{5}{3}$$

$$\Rightarrow 120 - 3x = 80 + 5x$$

$$\Rightarrow 5x + 3x = 120 - 80$$

$$\Rightarrow 8x = 40$$

$$\Rightarrow x = \frac{40}{8} = 5 \text{ litres}$$

**Question 5**

Jar A contains 78 litres of milk and water in the respective ratio of 6 : 7. 26 litres of the mixture was taken out from Jar A. What quantity of milk should be added to jar A, so that water constitutes 40% of the resultant mixture in jar A?

- A 8 litres
- B 36 litres
- C 12 litres
- D 14 litres
- E 18 litres

**Answer: E**

**Explanation:**

Jar A has 78 litres of mixture of milk and water in the respective ratio of 6 : 7

$$\Rightarrow \text{Quantity of milk in Jar A} = \frac{6}{13} \times 78 = 36 \text{ litres}$$

$$\text{Quantity of water in Jar A} = 78 - 36 = 42 \text{ litres}$$

$$26 \text{ litres of the mixture was taken out from Jar A, i.e., } \frac{26}{78} = \left(\frac{1}{3}\right)^{rd}$$

$$\Rightarrow \text{Milk left} = 36 - \frac{1}{3} \times 36 = 24$$

$$\text{Water left} = 42 - \frac{1}{3} \times 42 = 28$$

Let milk added to jar A =  $x$  litres

$$\text{Acc. to ques, } \Rightarrow \frac{24 + x}{28} = \frac{60}{40}$$

$$\Rightarrow \frac{24 + x}{28} = \frac{3}{2}$$

$$\Rightarrow 48 + 2x = 84$$

$$\Rightarrow 2x = 84 - 48 = 36$$

$$\Rightarrow x = \frac{36}{2} = 18 \text{ litres}$$

#### Question 6

A vessel contains 60 litres of milk. 6 litres of milk is taken out and 6 litres of water is added to the vessel. Again 6 litres of mixture from the vessel is withdrawn and 6 litres of water is added to the vessel. The ratio of milk and water in the resulting mixture in the vessel is

- A 81 : 19
- B 71 : 29
- C 61 : 39
- D 61 : 29
- E None of these

**Answer: A**

#### Explanation:

If we are taking out 6 litres out of a 60 litre solution and replacing it with water,

$\Rightarrow$  We are replacing  $\frac{1}{10}$ th of the solution with water

$\Rightarrow$  Fraction of milk will become  $\frac{9}{10}$ th of original.

If the process is repeated 'n' times, fraction of milk will become  $(\frac{9}{10})^n$  of the original.

Here, the process is done twice.

$\Rightarrow$  Final quantity of milk =  $(\frac{9}{10})^2 \times 60 = 48.6$  litres

and Final quantity of water =  $60 - 48.6 = 11.4$  litres

$\therefore$  Required ratio =  $\frac{48.6}{11.4} = 81 : 19$

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#### Question 7

The milk and water in two vessels A and B are in the ratio 4 : 3 and 2 : 3 respectively. In what ratio the liquids in both the vessels be mixed to obtain a new mixture in vessel C consisting half milk and half water?

- A 8 : 3
- B 7 : 5
- C 4 : 3
- D 2 : 3
- E None of these

**Answer: B**

#### Explanation:

Let mixture in vessel A =  $x$  ml

and mixture in vessel B =  $y$  ml

$\Rightarrow$  Milk in vessel A =  $\frac{4x}{7}$

Milk in vessel B =  $\frac{2y}{5}$

Acc to ques,

$$\Rightarrow \frac{4x}{7} + \frac{2y}{5} = \frac{1}{2}(x + y)$$

$$\Rightarrow \frac{4x}{7} - \frac{x}{2} = \frac{y}{2} - \frac{2y}{5}$$

$$\Rightarrow \frac{x}{14} = \frac{y}{10}$$

$$\Rightarrow \frac{x}{y} = \frac{14}{10} = \frac{7}{5}$$

#### Question 8

Jar A contains 'X' litre of pure milk only. A 27 litre mixture of milk and water in the respective ratio of 4 : 5, is added to jar A. The new mixture thus formed in jar A contains 70% milk, what is the value of X ?

A 23

B 30

C 27

D 48

E 28

**Answer: A**

**Explanation:**

Quantity of milk in 27 litre mixture =  $\frac{4}{4+5} \times 27 = 12$  litre

Quantity of water =  $27 - 12 = 15$  litre

Ratio of milk and water in the new mixture =  $70 : 30 = 7 : 3$

Acc to ques,

$$\Rightarrow \frac{X+12}{15} = \frac{7}{3}$$

$$\Rightarrow 3X + 36 = 15 \times 7 = 105$$

$$\Rightarrow 3X = 105 - 36 = 69$$

$$\Rightarrow X = \frac{69}{3} = 23 \text{ litre}$$

#### Question 9

In a vessel there is 40 litres mixture of milk and water. There is 15% water in the mixture. The milkman sells 10 litres of mixture to a customer and thereafter adds 12.5 litres of water to the remaining mixture. What is the respective ratio of milk and water in the new mixture ?

A 2 : 3

B 3 : 2

C 3 : 4

D 4 : 3

E None of these

**Answer: B**

**Explanation:**

Mixture remaining after selling 10 litres =  $40 - 10 = 30$  litres

Now, quantity of water in 30 litres of mixture =  $\frac{15}{100} \times 30 = 4.5$  litres

Milk =  $30 - 4.5 = 25.5$  litres

After adding 12.5 litres of water, total quantity of water =  $12.5 + 4.5 = 17$  litres

$\therefore$  Required ratio of milk and water =  $25.5 : 17$

=  $1.5 : 1 = 3 : 2$

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### Question 10

18 litres of pure water was added to a vessel containing 80 litres of pure milk. 49 litres of the resultant mixture was then sold and some more quantity of pure milk and pure water was added to the vessel in the respective ratio of 2 : 1. If the resultant respective ratio of milk and water in the vessel was 4 : 1, what was the quantity of pure milk added in the vessel ? (in litres)

- A 4
- B 8
- C 10
- D 12
- E 2

**Answer:** A

#### Explanation:

18 litres of pure water was added to a vessel containing 80 litres of pure milk.

Total mixture =  $80 + 18 = 98$  litres

Now, 49 litres i.e.,  $\frac{1}{2}$  is removed,  $\Rightarrow$  Milk left =  $\frac{80}{2} = 40$  litres

Water left =  $\frac{18}{2} = 9$  litres

Let milk added be  $2x$  litres and water added is  $x$  litres

$$\Rightarrow \frac{40+2x}{9+x} = \frac{4}{1}$$

$$\Rightarrow 40 + 2x = 36 + 4x$$

$$\Rightarrow 2x = 40 - 36 = 4$$

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

$\therefore$  Quantity of milk added =  $2 \times 2 = 4$  litres

### Question 11

A vessel contains a mixture of milk and water in the respective ratio of 10 : 3. Twenty-six litre of this mixture was taken out and replaced with 8 litre of water. If the resultant respective ratio of milk and water in the mixture was 5 : 2, what was the initial quantity of mixture in the vessel ? (in litre)

- A 143
- B 182
- C 169
- D 156
- E 130

**Answer:** E

**Explanation:**

Let quantity of Milk and water be M and W respectively.

$$M : W = 10 : 3$$

$$3M = 10W$$

In 26 litre of mixture

$$M = 26(10/13) = 20 \text{ litre and}$$

$$W = 26(3/13) = 6 \text{ litre}$$

8 litre of water is added.

Resulting ratio of M and W is

$$M - 20 : W - 6 + 8 = 5 : 2$$

$$2(M - 20) = 5(W + 2)$$

$$2M - 40 = 5W + 10$$

Multiplying all the terms by 2.

$$4M - 80 = 10W + 20$$

Replacing 10W with 3M.

$$4M - 80 = 3M + 20$$

$$M = 100$$

Hence W would be 30.

$$\text{Total quantity} = 100 + 30 = 130.$$

Option E is the correct answer.

**Question 12**

In a 90 litres mixture of milk and water, percentage of water is only 30%. The milkman gave 18 litres of this mixture to a customer and then added 18 litres of water to the remaining mixture. What is the percentage of milk in the final mixture ?

**A** 64

**B** 48

**C** 52

**D** 68

**E** 56

**Answer:** E

**Explanation:**

In 90 liters of mixture,

$$\text{Amount of water} = \frac{90 \times 30}{100} \\ = 27 \text{ liters.}$$

$$\text{Amount of milk} = \frac{90 \times 70}{100} \\ = 63 \text{ liters.}$$

Similarly, in 18 liters of mixture,

$$\text{Amount of water} = \frac{18 \times 30}{100} \\ = 5.4 \text{ liters.}$$

$$\text{Amount of milk} = \frac{18 \times 70}{100} \\ = 12.6 \text{ liters.}$$

After removing 18 liters of solution,

$$\text{Amount of water} = 27 - 5.4 = 21.6 \text{ liters.}$$

$$\text{Amount of milk} = 63 - 12.6 = 50.4 \text{ liters.}$$

After adding 18 liters of water,

$$\text{Amount of water in the solution} = 21.6 + 18 = 39.6 \text{ liters.}$$

$$\text{Hence, Percentage of milk in solution} = \frac{50.4}{50.4 + 39.6} \times 100 \\ = 56\%.$$

Hence, Option E is correct.



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### Question 13

Pure milk costs Rs. 16 per litre. After adding water the milkman sells the mixture at the rate of Rs. 15 per litre and thereby makes a profit. of 25%. In what respective ratio does he mix milk with water ?

- A 3 : 1
- B 4 : 3
- C 3 : 2
- D 5 : 3
- E 4 : 1

**Answer:** A

### Explanation:

Profit = 25% hence effective Cost Price = Selling Price \*  $\frac{8}{10}$  or Selling Price - 20%  
Thus Effective Cost Price = Rs 12 per litre

(It can be said that the farmer is adding the Milk equivalent of Effective Cost Price and Water equivalent of Initial - Effective Cost Price)

Ratio =  $\frac{\text{Effective Cost Price}}{\text{Initial} - \text{Effective Cost Price}}$

Ratio =  $\frac{12}{4} = 3:1$

### Question 14

In Jar A, 140 litre milk was mixed with 40 litre water. Some of this mixture was taken out from Jar A and put in Jar B. If before the operation, there was 17 litres of milk in Jar B, and afterwards the resultant ratio between milk and water in jar B was 19 : 3 respectively, what was the amount of mixture that was taken out from Jar A ? ( in litre)

- A 21
- B 36
- C 46
- D 18
- E 27

**Answer:** E

### Explanation:

Milk to water ratio in Jar A is 140:40 = 7:2. Let the quantity of taken out mixture from jar A = 9x litre.

Hence, milk will be 7x and water will be 2x litres.

Therefore,  $(7x + 17) / 2x = 19/3$

=>x = 3

Hence, amount taken out is 9\*3 = 27 litres.

### Question 15

In Jar A, 180 litre milk was mix with 36 litre water. Some of this mixture was taken out from Jar A and put it in Jar B. If after adding 6 litres of water in the mixture, the respective ratio between milk and water in Jar B was 5 : 2 respectively, what was the amount of mixture that was taken out from Jar A ? (in litres)

- A 24
- B 54
- C 30
- D 36
- E 42

**Answer: D**

**Explanation:**

The ratio of milk to water in Jar X

$$= 180 : 36 = 5:1$$

Now, let 6x litres of mixture be taken out from Jar X and put in Jar Y.

Then, milk in Jar Y = 5x

Water in Jar Y = x

$$\text{So, } 5x/(x+6) = 5/2$$

$$\text{or, } 10x = (5x + 30)$$

$$\text{or, } 5x = 30,$$

$$\therefore x = 6$$

Hence the mixture that was taken out from Jar X =  $6x = 6 \times 6 = 36$  litres

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**Question 16**

There are 81 litre pure milk in a container. One third of milk is replaced by water in the container. Again one third of mixture is extracted and equal amount of water is added. What is the ratio of milk to water in the new mixture ?

- A 1 : 2
- B 1 : 1
- C 2 : 1
- D 4 : 5
- E None of these

**Answer: D**

**Explanation:**

$$\text{using } \frac{QNR_{final}}{Total} = \frac{QNR_{initial}}{Total} \left(1 - \frac{\text{quantity replaced}}{total}\right)^n$$

here QNR is the quantity which is only removed in whole process and hence here it is milk and 'n' is the number of times the replacement process is repeated

So using the formula

$$\frac{QNR_{final}}{Total} = \frac{81}{81} \times \left(1 - \frac{27}{81}\right)^2$$

$$\frac{QNR_{final}}{Total} = 4/9$$

So after two replacement cycles the ratio of Milk : Water = 4:5

### Question 17

A vessel contains 64 litres of mixture of milk and water in the ratio 7 : 3 respectively. 8 litres of mixture is replaced by 8 litres of milk. What is the ratio of milk and water in the resulting mixture ?

- A 59 : 21
- B 35 : 22
- C 64 : 23
- D 65 : 21
- E None of these

**Answer:** A

#### Explanation:

Solution of milk and water in vessel = 64 litres

ration of Milk:Water = 7:3

using

$$\frac{\text{waterconcentrationfinal}}{\text{total}} = \frac{\text{initialwaterconc.}}{\text{total}} \left(1 - \frac{\text{removedvolume}}{\text{total}}\right)^n$$

$$\frac{\text{waterconcentrationfinal}}{\text{total}} = \frac{3}{10} \left(1 - \frac{8}{64}\right)^1$$

$$\frac{\text{waterconcentrationfinal}}{\text{total}} = \frac{3}{10} \left(1 - \frac{1}{8}\right)^1$$

$$\frac{\text{waterconcentrationfinal}}{\text{total}} = \frac{21}{80}$$

water : milk in new solution after replacement = 21: 59

### Question 18

A vessel contains a mixture of Grape, Pineapple and Banana juices in the respective ratio of 4 : 6 : 5. 15 litres of this mixture is taken out and 8 litres of grape juice and 2 litres of pineapple juice is added to the vessel. If the resultant quantity of grape juice is 10 litres less than the resultant quantity of pineapple juice. what was the initial quantity of mixture in the vessel ? (in litres)

- A 120
- B 150
- C 105
- D 135
- E 90

**Answer:** D

#### Explanation:

let the amount of grape juice ,pineapple juice and banana juice in vessel be 4y ,6y,5y respectively

Now when we removed 15 ltr from vessel the juice will be removed in their given ratio i.e 4 ltr of grape juice will be removed and 6 ltrs of pineapple will be removed and 5 ltrs of banana juice will be removed and hence new quantities are

Grape juice = 4y-4

Pineapple juuce = 6y- 6

Banana juice = 5y- 5

Niw 8 ltrs of grape juuce is added and 2 ltrs of pineapple juice is added so new quantities of Juices in vessel are

Grape juice = 4y+4

Pineapple juuce = 6y-4

It is given that grape juice amount is 10 ltrs less than pineapple juice quantity .

So

$$6y - 4 - 4y - 4 = 10$$

$$2y = 18$$

$$y = 9$$

$$\text{Initial quantity in vessel} = 15y = 15 \times 9 = 135 \text{ ltrs}$$

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### Question 19

18 litres of pure water was added to a vessel containing 80 litres of pure milk. 49 litres of the resultant mixture was then sold and some more quantity of pure milk and pure water was added to the vessel in the respective ratio of 2:1. If the resultant respective ratio of milk and water in the vessel was 4:1, what was the quantity of pure milk added in the vessel ? (in litres)

A 4

B 8

C 10

D 12

E 2

**Answer: A**

### Explanation:

18 litres of pure water was added to 80 litres of pure milk.

This we get a mixture where

quantity of water = 18 litre

quantity of milk = 80 litre

Total quantity of the mixture =  $18 + 80 = 98$  litre

49 litres of the resultant mixture was then sold. Since half of the mixture is removed and only the other half is remaining,

quantity of water remaining =  $18/2 = 9$  litre

Quantity of milk remaining =  $80/2 = 40$  litre

Total quantity remaining = 49 litre

some more quantity of pure milk and pure water was added to the vessel in the ratio 2:1

Let quantity of milk added =  $2x$

quantity of water added =  $x$

Now,

quantity of water =  $9 + x$

quantity of milk =  $40 + 2x$

Given that ratio of milk and water in the vessel is now 4:1

$$\Rightarrow (40 + 2x) : (9 + x) = 4 : 1$$

$$\Rightarrow 40 + 2x = 4(9 + x)$$

$$\Rightarrow 40 + 2x = 36 + 4x$$

$$\Rightarrow 2x = 4$$

$$\Rightarrow x = 2$$

quantity of pure milk added in the vessel =  $2x = 4$  litre

#### Question 20

Two types of rice (type 1 and type 2) were mixed in the respective ratio of 1 : 3. The mixture was then sold @ 75.60 per kg to gain a profit of 20%. If the price of type 1 rice is Rs. 75 per kg, what is the price of type 2 price per kg?

- A Rs. 55
- B Rs. 53
- C Rs. 59
- D Rs. 57
- E Rs. 62

**Answer:** C

**Explanation:**

Profit = 0.2 CP

Profit = SP - CP

1.2CP = SP

Hence, CP = (SP/1.2) = 75.6/1.2 = 63

Now, let the cost of type 1 rice is T1 and cost of type 2 be T2.

$$63 = \frac{T1 + 3T2}{4}$$
$$= (75 + 3x)/4$$

x = 59

Therefore, cost of type 2 price is 59.

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