

**Q1) A mixture of 20 kg of spirits and water contains 10% water. How much water must be added to this mixture to raise the percentage of water to 25%?**

**Solution:**

In 20 litres, 2 litres is water and 18 litres is spirit. Now, as water is added so spirit is still 18 litres.

On adding water, 75% is spirit and 25% is water.

75% of mixture = 18 litres (Spirit)

So, 25% of mixture = 6 litres (water)

Water added =  $6 - 2 = 4$  litres.

**Q2) A mixture of 40 litres of milk and water contains 10% water. How much water should be added so that the water is 20% in the new mixture?**

**Solution:**

In 40 litres, 4 litres is water and 36 litres is milk. Now, as water is added so milk is still 36 litres. On adding water, 80% is milk and 20% is water.

80% of mixture = 36 litres (Milk)

So, 20% of mixture = 9 litres (water)

Water added =  $9 - 4 = 5$  litres.

**Q3) There is a mixture of 60 liters milk and water contains 30% water, how much milk is to be added to make it 20% water in the mixture?**

**Solution:**

In 60 litres, 18 litres is water and 42 litres is milk. Now, as milk is added so water is still 18 litres.

On adding milk, 80% is milk and 20% is water.

20% of mixture = 18 litres (Milk)

So, 80% of mixture = 72 litres (water)

Milk added =  $72 - 42 = 30$  litres.

**Q4) We have 100 litres of a mixture of milk and water, which is 10% water. How much more pure milk should be added so that the new mixture has only 5%?**

**Solution:**

In 100 litres, 10 litres is water and 90 litres is milk. Now, as milk is added so water is still 10 litres.

On adding milk, 95% is milk and 5% is water.

5% of mixture = 10 litres (Water)

So, 95% of mixture = 190 litres (Milk)

Milk added =  $190 - 90 = 100$  litres.

**Q5) A mixture of 140 litres of wine and water contains 10% water. How much water must be added to make the water 15% of the resulting mixture?**

**Solution:**

In 140 litres, 14 litres is water (10% of 140 litres) and 126 litres is wine (90% of 140 litres).

Now, as water is added so wine is still 126 litres.

On adding water, 85% is wine and 15% is water.

85% of mixture = 126 litres (Wine)

So, 15% of mixture =  $126 \times \frac{15}{85}$  litres =  $\frac{378}{17}$  litres (water)

Water added =  $\frac{378}{17} - 14 = \frac{140}{17}$  litres.

**Q6) A mixture contains milk and water in the ratio of 5:1. Adding 5 L of water changes the ratio to 5:2. What was the quantity of milk in the original mixture?**

**Solution:**

Initial: Milk =  $5x$ , Water =  $x$

Final: Milk =  $5x$ , Water =  $x + 5$

$$\frac{5x}{x + 5} = \frac{5}{2}$$

On solving,  $x = 5$

Quantity of milk in the original mixture =  $5x = 5 \times 5 = 25$  litres

**Q7) 24 litre of a mixture contains milk and water in a ratio of 3:1. How much milk must be added to get 5:1 milk and water respectively?**

**Solution:**

**Initial Mixture:** Milk = 18 litres, Water = 6 litres

Let 'x' litres of milk be added to the mixture. Total mixture =  $24 + x$

**Final Mixture:** Milk =  $(18+x)$  litres, Water = 6 litres

Milk: Water = 5:1 i.e. Water = total mixture/6

So,

$$6 = \frac{24 + x}{6}$$

On solving,  $x = 12$  litres

**Q8) 40 litres of a mixture contains milk and water in the ratio 3:2. If 8 litres of water is added to it, what will be the new ratio of milk and water in the final mixture?**

**Solution:**

**Initial Mixture:** Milk = 24 litres, Water = 16 litres

**Final Mixture:** Milk = 24 litres, Water =  $16 + 8 = 24$  litres

Required Ratio =  $24/24 = 1:1$

Q9) If there are 2 containers having a mixture of milk and water in the ratio of 5:3 and 2:3, in what ratio should the two mixtures be mixed so that the resulting mixtures have the milk and water in the same proportions?

**Solution:**

**Mixture-1:** Milk: Water = 5:3 i.e. Milk:Total = 5:8 i.e.  $a = \frac{5}{8}$

**Mixture-2:** Milk: Water = 2:3 i.e. Milk:Total = 2:5 i.e.  $b = \frac{2}{5}$

**Resultant mixture:** Milk: Water = 1:1 i.e. Milk:Total = 1:2 i.e.  $c = \frac{1}{2}$

Ratio of Mixture-1:Mixture-2 used =  $a - c : c - b$  (Using the formula of alligations)

$$= \frac{5}{8} - \frac{1}{2} : \frac{1}{2} - \frac{2}{5} = \frac{1}{8} - \frac{1}{10} = 10:8 = 5:4$$

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