Mixture and Alligation

Q What ratio water mixed to milk to gain 20%?

→ To gain 20% we sold to 120₹ in which milk is of 100₹

∴ In 100 litre milk we add 20 litre water.

∴ Ratio 20/100

Q. Tea worth ₹125, ₹145 and third varity mixed in 1:1:2 Sold at cp of 160₹ per kg price of third variety is?

→

$$125\left(\tfrac{1}{4}\right) + 145\left(\tfrac{1}{4}\right) + \left(\tfrac{x \times 2}{4}\right) = 160$$

$$x = 185 ₹$$

Q. Selling 1000 kg sugar, Part sold at 10% profit, rest at 30% profit he have 15% profit overall find quantity sold at 30%?

→ here we have to find in what ratio if two quantities added then they give 15₹/kg if they give 10₹,30₹ per kg. then we will use that ratio to find two parts of 1000 kg.

∴   10   30   hence ratio is $\frac{3}{1}$
            15
        15 : 5   to find quantities we will use ratio

as $\boxed{\tfrac{1}{4} \times 1000 = 250\,kg}$ & $\boxed{\tfrac{3}{4} \times 1000 = 750\,kg}$

Q. 50% alcohol mix. replaced some amount with another 20% alcohol mix. to get 25% alcohol, The replaced quantity is?

→ Let alcohol replaced with price.

    50₹   20₹   Ratio of final mix is $\frac{1}{5}$
        25₹   that means first type (50%) is $\frac{1}{6}$
    5 : 25   and second type (20%) is $\frac{5}{6}$

Hence second type is replaced amount.

∴ Quantity Replaced is 5/6

Q. Container have 30 lit milk; 5 lit taken replaced with wa
it is repeated twice. what is amount of milk now?

→ Process done 3 times total.

milk remained $= A[1 - \frac{B}{A}]^n$

$$= 30[1 - \frac{5}{30}]^3$$

$$\approx 17$$

Q. Two alloys Cu & Al, one have copper half as much as Alum
another have copper thrice of Al how many times seco
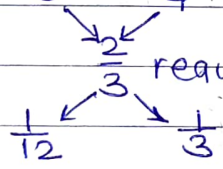alloy must be added to get Cu twice of Al?

→ To find how much time we need to add second alloy
first we find ratio of first: second alloys and part th
second have is his frequency of addition.

∴ Take copper as our property like price/kg, then

<u>first alloy copper is $\frac{1}{3}$ and Aluminium is $\frac{2}{3}$</u>

<u>Second alloy Copper is $\frac{3}{4}$ and Aluminium is $\frac{1}{4}$</u>

① $\frac{1}{3}$ $\frac{3}{4}$ ②

$\frac{2}{3}$ required proportion of mix.

$\frac{1}{12}$ $\frac{1}{3}$

Ratio of first & second is

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

Here $\frac{1}{5}$ is first alloy $\frac{4}{5}$ is second alloy hence second
alloy added 4 times.

Q. vessel is filled with 3 parts water 5 part syrup how mu
mixture must be drawn off and replaced with
water so that half water half syrup?

→ if x lit. is removed and x water added.

water is $= 3 - \frac{3x}{8} + x$

syrup is $= 5 - \frac{5x}{8}$

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

∴ $\boxed{x = \frac{8}{5}}$

(m) Part of mixture replaced is $\left(\frac{8}{5}\times\frac{1}{8}\right)=\frac{1}{5}$

Q. Can contain mixture of two liquids A & B in ratio 7:5 when 9 litre mixture drawn off and the can filled with B ratio A and B becomes 7:9 How many litres of liquid A was contained initially

→ $A \Rightarrow \left(7x-\frac{7}{12}\times9\right) \Rightarrow \left(\frac{28x-21}{4}\right)$

$B \Rightarrow \left(5x-\frac{5}{12}\times9\right)+9 \Rightarrow \left(\frac{20x-15}{4}+9\right) \Rightarrow (20x+21)$

$\therefore \frac{28x-21}{20x+21}=\frac{7}{9}$

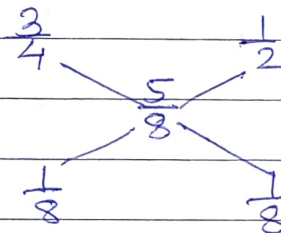$\therefore x=3$

$\therefore \boxed{A \Rightarrow (7\times3)=21}$

Q. 2 cans of milk in first 25% water second have 50% in how much quanitity they should mix to get 12 litres of milk in 3:5?

→ Let Prices according to mixture quality be
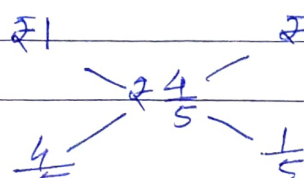
① $\Rightarrow \frac{3}{4}$ ₹

② $\Rightarrow \frac{1}{2}$ ₹

then

$$\begin{array}{ccc} \frac{3}{4} & & \frac{1}{2} \\ & \frac{5}{8} & \\ \frac{1}{8} & & \frac{1}{8} \end{array}$$

Ratio of water to milk in 12 litre from two cans

1:1

$\boxed{6 \text{ litre } 6 \text{ litre should mix}}$

Q. Dishonest milkman sells milk at CP but make 25% profit what is amount of water?

→ let he sells 125 litre milk then to make 25% CP should be 100 hence milk is $\frac{4}{5}$

₹1   ₹0   Ratio = 4:1

$$\begin{array}{ccc} & \frac{4}{5} & \\ \frac{4}{5} & & \frac{1}{5} \end{array}$$

milk = 80 litre
water = 20 litre.

Q. Jar of whiskey with 40% alcohol, part replaced by alcohol and now percentage of alcohol found to be 26%. quantity of replaced whisky.

→

①	②
40%	19%

26%

7   14

Ratio = 1 : 2

for 1:2 ratio quantity replaced is $\frac{2}{3}$.

Q. The cost of rice type ① 15 ₹/kg & ② 20 ₹/kg if the mixed in 2:3

→

15   20

x

20−x x−15

$$\frac{20-x}{x-15} = \frac{15}{20} = \frac{3}{4}$$

$$\boxed{x = 18}$$

Q. 8 litre drawn from wine then filled with water, This operation is performed three more times. The ratio of quantity of wine now left in cask to that water 16:65, How much wine did cask held?

→ $$\frac{x\left[1-\frac{8}{x}\right]^4}{x} = \frac{16}{81}$$

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

$$\boxed{x = 24}$$

Q. merchant has 1000 kg of sugar, Part of which he sells at 8% profit rest 18% he gains 14% of whole quantity sold at 18% is?

→

①	②
8	18

14

4   6

2   :   3

Quantity of 18% = $\frac{2}{2+3} \times 1000$

= 600 kg