AVERAGES

- KOUSTAV

CONCEPT

$$Average = \frac{Sum\ of\ the\ Terms}{No.\ of\ Terms}$$

$S = AN$

1. 2 dragons and 8 unicorns are bought at an average of Rs.140. If the average price of a unicorn is Rs.60. What is the average price of a dragon?

A) Rs. 480 B) Rs. 920 C) Rs. 460 D) Rs. 980

$$\frac{2D+8U}{10} = 140$$

$U = 60$

$2D + 8 \times 60 = 1400$

$\rightarrow 2D = 1400 - 480$

$= 920$

$D = 460$

2. A family consists of two grandparents, two parents and three grandchildren. The average age of the grandparents is 67 years, that of the parents is 35 years and that of the grandchildren is 6 years. What is the average age of the family?

A) $28^4/_9$ B) $31^5/_7$ C) $32^1/_6$ D) $31^2/_3$

$$\frac{67 \times 2 + 35 \times 2 + 6 \times 3}{2+2+3} = 31\frac{5}{7}$$

3. The average weight of 15 students in a group is 26 kg. When the teacher's weight is included it becomes 30 kg. What is the weight of the teacher?

A) 78 B) 86 C) 62 D) 90

$$\frac{15 \times 26 + T}{16} = 30$$

$T = 16 \times 30 - 15 \times 26$

$= 90$

New P = Old Avg + Diff b/w Avg x No. of people

$T = 26 + 4 \times 16$

$= 26 + 64$

$= 90$

If new avg = 25

$T = 26 - 1 \times 16$

$= 10$ kg

4. The average age of a class of 19 students is 15 years. If the age of the teacher be included, then the average increases by 9 months. Find the age of the teacher.

A) 40 B) 25 C) 30 D) 35

$T = 15 + \frac{9}{12} \times 20 = 30$

If Avg decreases by 3 months

$T = 15 - \frac{3}{4} \times 20 = 15 - 5 = 10$

5. If the average weight of 4 men increases by 3 kg when one of them weighing 90 kg is replaced by another man, then the weight of the new man is?

A) 80 kg B) 112 kg C) 78 kg D) 102 kg

Old Avg = A New Avg = A+3

Old P = 90 New P = N

$\frac{4A - 90 + N}{4} = A + 3$

$4A - 90 + N = 4A + 12$

$N = 90 + 12$

$= 102$

$\Theta = 90$

Diff (Θ, N) = Diff b/w avgs × No. of Terms

$= 3 \times 4 = 12$

$N = 90 + 12$

$90 - 12$

6. If the average weight of 4 men increases by 3 kg when one of them is replaced by another man weighing 90 kg, then the weight of the replaced man is?

A) 80 kg B) 112 kg C) 78 kg D) 102 kg

Old Avg = A New Avg = A+3

Old P = Q New P = 90

$$\frac{4A - Q + 90}{4} = A + 3$$

$$4A - Q + 90 = 4A + 12$$

$$Q = 90 - 12$$

$$= 78$$

N = 90

Diff (Q, N) = 3 × 4

= 12

Q = 90 + 12

90 − 12

7. The average age of 8 men is decreased by 2 years when one of them is replaced by a 40-year-old woman. What is the age of the man who was replaced?

A) 56 years B) 48 years C) 32 years D) 24 years

N = 40

Diff = 2 × 8 = 16

Q = 40 + 16 = 56

40 − 16

8. Ross Geller finds the average of 10 two-digit positive integers. By mistake, he interchanges the digits of one number, say AB. Due to this, the average becomes 1.8 less than the correct one. Find the value of |A-B|.

A) 3 B) 6 C) 2 D) 4

$O = \overline{AB} = 10A + B$

$N = BA = 10B + A$

$\text{Diff}(O, N) = 1.8 \times 10 = 18$

$O - N = 18$

$10A + B - (10B + A) = 18$

$9A - 9B = 18$

$A - B = \frac{18}{9} = 2$

9. The average weight of three men A, B and C is 84 kg. Another man D joins the group and the average now becomes 80 kg. If another man E, whose weight is 3 kg more than that of D, replaces A, then the average weight of B, C, D and E becomes 79 kg. The weight of A is:

A) 67 kg B) 72 kg C) 75 kg D) 80 kg

$A + B + C = 84 \times 3$

$A + B + C + D = 80 \times 4$

$D = 84 - 4 \times 4 = 68$

$E = 68 + 3 = 71$

$B + C + D + E = 79 \times 4$

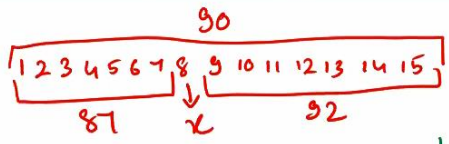
$\text{Diff}(A, E) = 1 \times 4 = 4$

$A = 71 + 4 = 75$

$71 - 4$

10. The average wages of a worker during a fortnight comprising 15 consecutive working days was Rs.90 per day. During the first 7 days, his average wages was Rs.87/day and the average wages during the last 7 days was Rs.92 /day. What was his wage on the 8th day?

A) 83 B) 92 C) 90 D) 97



$15 \times 90 = 7 \times 87 + x + 7 \times 92$

$x = 15 \times 90 - 7(87+92)$

Units place

$10 - 7 \times 9$

$= 10 - 3 = 7$

Ans ⇒ 97 [From Options]

$90 = 7(-3) + x + 7(2)$

$= 7(-3+2) + x$

$= -7 + x$

$x = 90 + 7 = 97$

11. Ten years ago, the ages of the members of a joint family of eight people added up to 231 years. Three years later, one member died at the age of 60 years and a child was born during the same year. After another three years, one more member died, again at 60, and a child was born during the same year. The current average age of this eight-member joint family is nearest to:

A) 25 B) 24 C) 26 D) 22

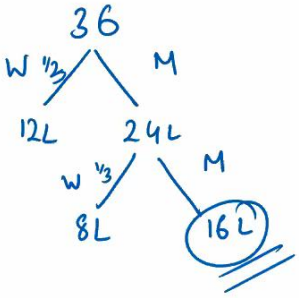
−10y	231
−7y	$231 + 3 \times 8 - 60 + 0 = 195$
−4y	$195 + 3 \times 8 - 60 + 0 = 159$
present	$159 + 4 \times 8 = 191$

$\text{Avg} = \frac{191}{8} \simeq \frac{192}{8} = 24$

12. A vessel contains 36L of milk. 12L of milk is taken out and replaced by an equal amount of water. If this process is repeated once proportionally, what is the final quantity of milk in the vessel?

A)10 B) 12 C) 16 D) 2

$$36\left(1-\frac{12}{36}\right)^2 = 36\times\left(\frac{2}{3}\right)^2 = 36\times\frac{2}{3}\times\frac{2}{3} = 16$$



13. In what ratio must a grocer mix two varieties of pulses costing Rs.15 and Rs.20 per kg respectively so as to get a mixture worth Rs.16.50 per kg?

A) 3 : 7 B) 5 : 7 C) 7 : 3 D) 7 : 5

P_1	P_2
15	20
x :	y

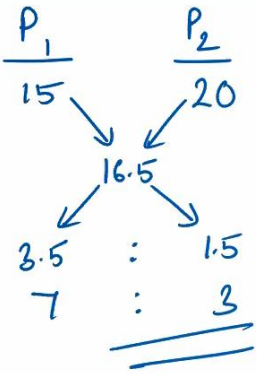
$$\frac{15x+20y}{x+y} = 16.5$$

$$15x+20y = 16.5x+16.5y$$

$$16.5x-15x = 20y-16.5y$$

$$1.5x = 3.5y$$

$$\frac{x}{y} = \frac{3.5}{1.5} = \frac{7}{3}$$



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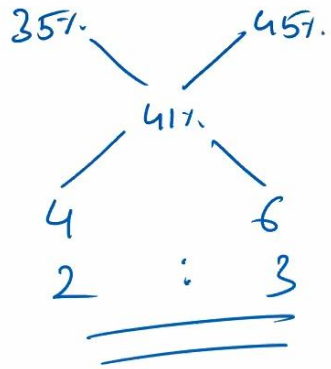
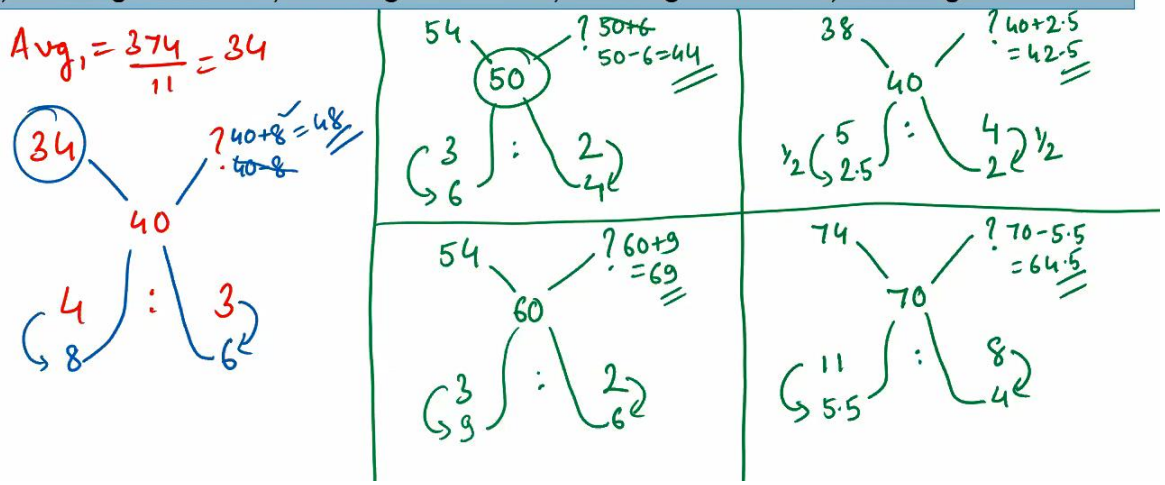
14. The ratio in which 35% alcohol solution should be mixed with 45% solution in order to get a 41% solution:

A) 2:1 B) 1:3 C) 3:1 D) 2:3



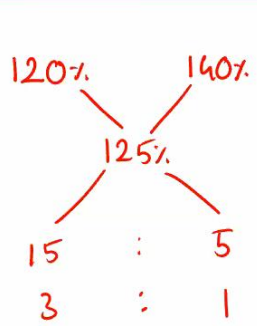
15. A dealer buys 11 kg of wheat at Rs. 374 and mixes it with another quality of wheat in the ratio of 4:3. The price of the resulting mixture is Rs. 40 per kg. The price of the other quality of wheat is _____?

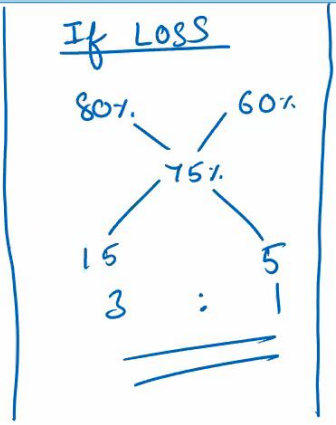
A) Rs 48/kg B) Rs 50/kg C) Rs 42/kg D) Rs. 32/kg

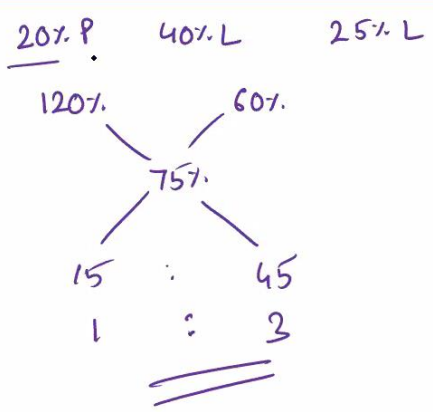


16. A shopkeeper has 50 kg of rice. He sells a part of it at 20% profit and the rest at 40% profit. He gains 25% on the whole. Find the ratio of the two parts.

A) 3 : 1 B) 2 : 1 C) 1 : 3 D) 4 : 1

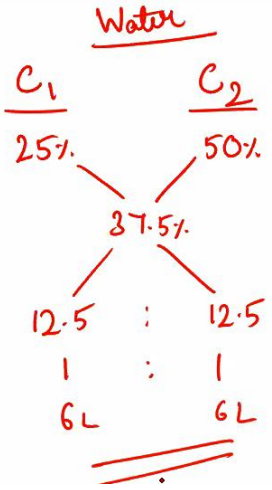






17. A milk vendor has 2 cans of milk. The first contains 25% water and the rest milk. The second contains 50% water. How much milk should he mix from each container so as to get 12 litres of milk such that the ratio of water to milk is 3 : 5?

A) 4 litres, 8 litres B) 6 litres, 6 litres C) 5 litres, 7 litres D) 7 litres, 5 litres



W : M = 3 : 5

$W\% = \frac{3}{8} \times 100 = 37.5\%$

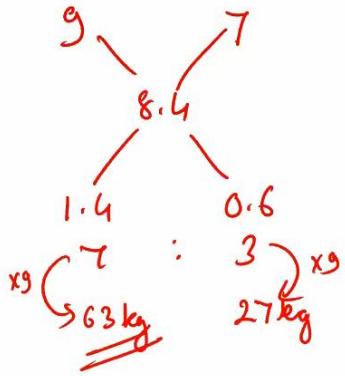
18. How many kilogram of sugar costing Rs. 9 per kg must be mixed with 27 kg of sugar costing Rs. 7 per kg so that there may be a gain of 10% by selling the mixture at Rs. 9.24 per kg?

A) 36 kg B) 42 kg C) 54 kg D) 63 kg

SP = 9.24

G% = 10%

$CP = \frac{100}{110} \times 9.24 = 8.4$



19. A dishonest milkman professes to sell his milk at cost price, but he mixes it with water and thereby gains 25%. The percentage of water in the mixture is

A) 4% B) 6% C) 20% D) 25%

Let CP of 1L Milk = Re 1

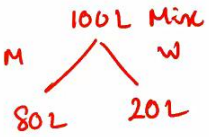
" " " Water = 0

CP of 100L Milk = 100

SP of 100L Mixe = 100

G% = 25%

CP of 100L Mixe = $\frac{100}{125} \times 100 = 80$



$W\% = \frac{20}{100} \times 100$

= 20%

Sell

100L Milk ← Profit

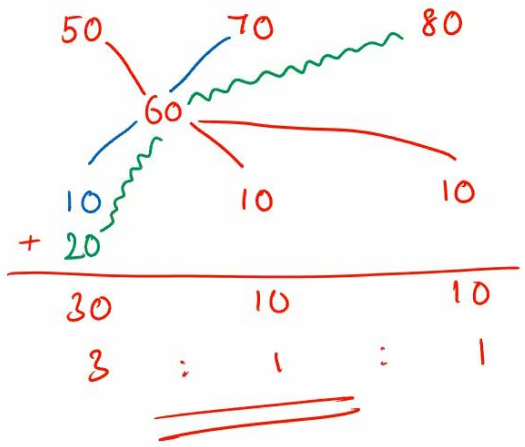
100L + 25L = Mixe

25L Water

$\% W = \frac{25}{125} \times 100 = 20\%$

20. In what ratio must a grocer mix three varieties of sugar costing Rs.50, Rs.70 and Rs.80 per kg respectively so as to get a mixture worth Rs.60 per kg?

A) 2 : 1 : 1 B) 2 : 2 : 1 C) 3 : 1 : 1 D) 3 : 2 : 1



$$\frac{50\times3+70\times1+80\times1}{3+1+1}$$

$$=60$$