



1. (c) D 's weight = $4 \times 80 - 3 \times 84 = 320 - 252 = 68$.
 E 's weight = $68 + 3 = 71$.
 Now, we know that $A + B + C + D = 4 \times 80 = 320$
 and $B + C + D + E = 78 \times 4 = 312$.
 Hence, A 's weight is 8 kg more than E 's weight.
 $A = 71 + 8 = 79$.

2. (d) Let Arun's weight be x kg.
 According to Arun, $65 < x < 72$.
 According to Arun's brother, $60 < x < 70$.
 According to Arun's mother, $x < 68$
 The values satisfying all the above conditions are 66 and 67
 \therefore Required average

$$= \left(\frac{66 + 67}{2} \right) = \left(\frac{133}{2} \right) = 66.5 \text{ kg}$$

3. (b) The weight of the boxes are 1st box \rightarrow 200, 3rd box \rightarrow 250 kg, 2nd box \rightarrow 300 kg, 4th box \rightarrow 350 and 5th box \rightarrow 500 kg. Hence difference between the heavier 4 and the lighter 4 is 300. Hence, difference in the averages is 75.

4. (d) Let the numbers are x , y and z .

$$\text{Then, } \left(\frac{x+y}{2} \right) - \left(\frac{y+z}{2} \right) = 15 \text{ or } (x+y) - (y+z) \\ = 30 \text{ or } x - z = 30$$

5. (b) Required average income = (Total expenditure + total savings)/12
 $= [(1100 \times 3 + 2200 \times 4 + 4620 \times 5) + 2100]/12$
 $= 37300/12 = 3108.333$

6. (a) Earning in the 8 months = $600 \times 8 = 4800$

$$\text{Earning in the 4 months} = \left(600 \times \frac{3}{2} \right) \times 4 = 3600$$

Total earning = ₹ 8400

Saving in 8 months = $400 \times 8 = 3200$

$$\text{Saving in 4 months} = \left(400 \times \frac{5}{4} \right) \times 4 = 2000$$

Total savings = 5200

$$\text{Total expenditure for 12 months} = 8400 - 5200 \\ = 3200$$

$$\text{Therefore average saving per month} = \frac{3200}{12}$$

$$= 266.66$$

7. (d) $a + b + c + d + e = 5 \times 92 = 460$
 $a + b + c = 3 \times 83 = 249$
 $c + d + e = 3 \times 97 = 291$
 $\therefore c = (a + b + c) + (c + d + e) - (a + b + c + d + e)$
 or $c = 540 - 460$ or $c = 80$

8. (b) Total mistakes = $1007 \times 2 = 2014$
 Let x be average mistake per page for the remaining pages
 $434 + 395x = 2014$
 $395x = 1580$
 $x = 4$

9. (a) The number of rooms is 18 + 16 + 30 on the three floors respectively.
 Total revenues are: $18 \times 200 + 16 \times 100 + 30 \times 150 = 9700$ required average = $9700/110 = 88.18$.
 Note here that if you could visualize here that since the number of rooms is 110 the decimal values cannot be. (c) or (d) which effectively means that options 3 and 4 are rejected.

10. (d) The total age of the family at the birth of first child = $18 \times 3 = 54$
 While the total age of the couple at marriage = $25 \times 2 = 50$.
 \Rightarrow The years from marriage till the first child's birth

$$= \frac{54 - 50}{2} = 2 \text{ years.}$$

The total age of family at the birth of the second child = $15 \times 4 = 60$ years.

$$\Rightarrow \text{Second child was born} = \frac{60 - 54}{3} = 2 \text{ years after the first.}$$

$$\text{Similarly the twins were born} = \frac{(12 \times 6) - 60}{4} = 3 \text{ years.}$$

After the second child and today the twins are 4 years old.

(\therefore average age of the family became 16 years from 12 years)

\therefore Age of eldest son = $4 + 3 + 2 = 9$ years.

11. (c) Total annual rainfall = $2.7 \times 12 = 32.4$ inches
 Rainfall for first seven months = $(2.7 - 1.1) \times 7 = 11.2$
 Total for first 11 months = $11.2 + 20.8 = 32$ inches
 Rainfall for last month = $32.4 - 32 = 0.4$ inches

14-17. You have to take between 25th and 30th to mean that both these dates are also included.

	No. of family members	Average	Total
Eleven years earlier	4	28	112
Presently	if 4	39	156
	6	28	168

Since it is obvious that just after the birth of the youngest member (*i.e.*, child) was 6 family members in the family. Therefore at the time of the birth of the youngest child the elder child's age was 6 years.

Now the sum of their ages

$$= x + (x + 6) = 12 = (168 - 156)$$

$$\Rightarrow x = 3$$



13. (d) Let there be n people (initially) in the group, then the total earning of the group $= n \times 50$
 Again $n \times 50 = (n - 2) \times 49 + (2x + 45)$
 $\Rightarrow n = 2x - 53$; where x is the lowest earning of any person.

Now, since $42 < x < 47$ and $n \in$ prime numbers
 Then the only possible value of $n = 37$ for $x = 45$.

14. (b) Let a, b, c, d , the number of students in section A, B, C, D respectively then,

$$= \frac{45(a+b+c) + 55(a+c+d) + 50(a+b+d) + 60(b+c+d)}{3(a+b+c+d)}$$

$$= 50 + \frac{5b + 10c + 15d}{3(a+b+c+d)}$$

Clearly, a, b, c, d are natural no. put $a = b = c = d = 1$

$$\text{Then, required average} = 50 + \frac{30}{12} = 50 + 2.5 = 52.5$$

15. (a) The net decrease in the average can be expressed as

$$\frac{y + y - \left(\frac{y}{2}\right)}{3} = 1 \Rightarrow y = 2$$

16. (e) Correct average

$$= \frac{(24 \times 56) + (48 + 59 + 67) - (44 + 45 + 61)}{24}$$

$$= \frac{1344 + 174 - 150}{24} = \frac{1368}{24} = 57$$

17. (d) Marks scored by Ritu $= 875 \times \frac{56}{100} = 490$

$$\text{Marks scored by Smita} = 875 \times \frac{92}{100} = 805$$

\therefore Average marks scored by all the three together

$$= \frac{490 + 805 + 634}{3} = \frac{1929}{3} = 643$$

18. (c) Let average for 14 innings be x . Then,

$$\frac{14x + 58}{15} = x + 3 \Rightarrow 15x + 45 = 14x + 58 \Rightarrow x = 13$$

$$\therefore \text{New average} = (x + 3) = 13 + 3 = 16 \text{ runs}$$

19. (b) Let the numbers be $n - 2, n - 1, n, n + 1$ and $n + 2$.
 Their average $= n$.

Next two consecutive numbers are $n + 3$ and $n + 4$.
 Therefore the average of 7 consecutive numbers

$$= \frac{(n-2) + (n-1) + n + (n+1) + (n+2) + (n+3) + (n+4)}{7}$$

$$= \frac{5n + 2n + 7}{7} = n + 1$$

20. (d) Average weight of 30 boys $= 60$ kg

$$\Rightarrow \text{Sum of weight of 30 boys} = 1800$$

$$\text{Average weight of 10} = 56 \text{ kg}$$

$$\Rightarrow \text{Sum of weight of 10 boys} = 560$$

Average weight of the whole class

$$= \frac{\text{Sum of weight of all boys}}{40}$$

$$= \frac{\text{sum of weight of 30 boys} + \text{sum of weight of 10 boys}}{40}$$

$$= \frac{60 \times 30 + 56 \times 10}{40} = 59 \text{ kg}$$

21. (b) Average $= \frac{7 + 14 + 21 + 28 + 35}{5} = 21$

22. (c) Number of boys $= \frac{4}{5} \times 50 = 40$

$$\text{Number of girls} = \frac{1}{5} \times 50 = 10$$

$$\text{Average age of boys} = 2 \times 10 = 20$$

$$\text{Total ages of the boys} = 40 \times 20 = 800$$

23. (c) Total marks of all three sections $= 84 \times 100 = 8400$

$$\text{total marks of (B + C)} = 87.5 (n_2 + n_3)$$

$$\text{total marks of A} = 70 \times n_1$$

$$n_1 + n_2 + n_3 = 100 \quad \dots(1)$$

$$70n_1 + 87.5 n_2 + 87.5 n_3 = 8400 \quad \dots(2)$$

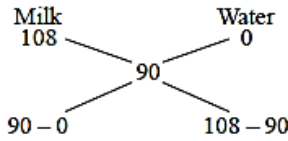
Multiplying equation (1) by 87.5 and subtract from equation (2)

$$\text{We get } 17.5 n_1 = 350$$

$$n_1 = 20$$



1. (c) The mean value is 90 P and the price of water is 0 P.



By the Alligation Rule, Milk and water are in the ratio of 5 : 1.

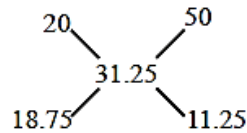
∴ quantity of milk in the mixture = 5 × 16 = 80 litres.

2. (a) Go through options :

$$30 \times 50 + 50 \times 20 = 2500 \text{ paise}$$

Alternatively : Since the average price of a coin

$$= \frac{2500}{80} = 31.25 \text{ paise}$$



So the ratio of no. of 20 paise coins to the no. of 50 paise coins

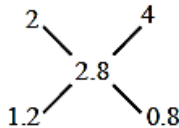
$$= 18.75 : 11.25 \\ = 75 : 45 = 5 : 3$$

Therefore, the no. of coins of the denominations of 50 paise is 30.

3. (c) Go through options :

$$24 \times 4 + 36 \times 2 = 168$$

Alternatively :



⇒ 3 : 2

Therefore, the ratio of men and sheep is 3 : 2

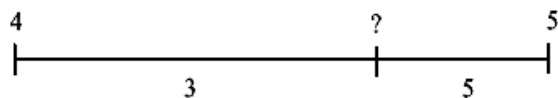
Alternatively : Suppose there are only men, then the no. of legs = 60 × 2 = 120.

Now since there are 48 = (168 - 120) legs extra, it

means there are $24 = \left(\frac{48}{2}\right)$ sheep, since a sheep has 2

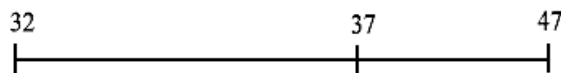
extra legs than a man has.

4. (b) Solving the following alligation figure:



The answer would be 4.625/kg

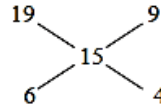
5. (a) The ratio would be 1 : 2 as seen from the figure:



6. (b) Short-Cut-Method : In such questions the ratio is

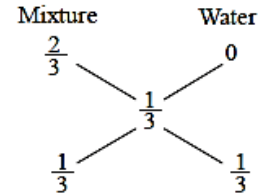
$$\text{water : milk} = 16\frac{2}{3} : 100 = 1 : 6$$

7. (b) Gold Copper



∴ Gold : Copper = 6 : 4 = 3 : 2

8. (c) Apply the alligation on fraction of milk in each mixture.



Ratio of mixture to water = 1 : 1

Therefore, if there is 60 litre of solution, 60 litres of water should be added.

9. (c) Quantity of milk = $45 \times \frac{4}{5} = 36$ litres

$$\text{Quantity of water} = 45 \times \frac{1}{5} = 9 \text{ litres}$$

Let x litres of water be added to make the ratio 3 : 2

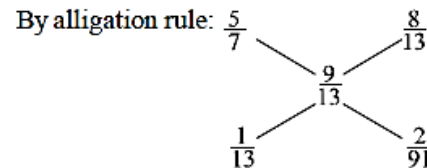
$$\text{Then, } \frac{36}{9+x} = \frac{3}{2} \Rightarrow 72 = 27 + 3x \Rightarrow x = 15 \text{ litres}$$

10. (d) Since we do not know either the average weight of the whole class or the ratio of no. of boys to girls.

11. (c) In vessel A, milk = $\frac{5}{7}$ of the weight of mixture

In vessel B, milk = $\frac{8}{13}$ of the weight of mixture. Now,

we want to form a mixture in which milk will be $\frac{9}{13}$ of the weight of this mixture.

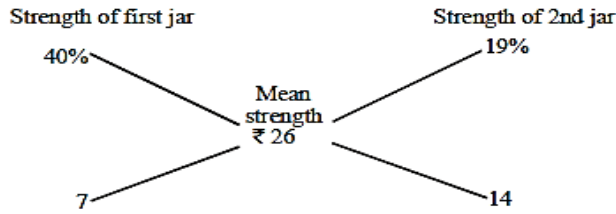


∴ required proportion is $\frac{1}{13} : \frac{2}{91} = 7 : 2$

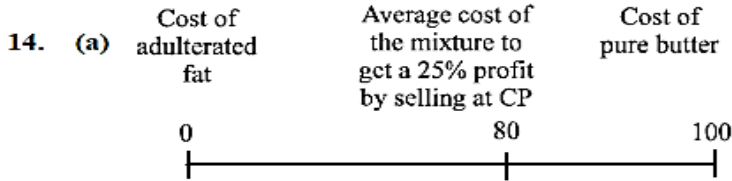
12. (b) The amount of spirit left
 $= 20 \times \frac{4}{5} \times \frac{4}{5} \times \frac{4}{5} \times \frac{4}{5} \times \frac{4}{5}$
 $= 4096/625 = 6 (346/625)$



13. (b) By the rule of alligation, we have:

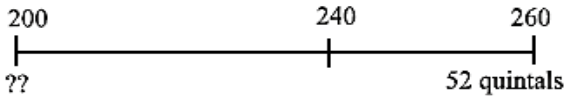


∴ So, Ratio of 1st and 2nd quantities = 7 : 14 = 1 : 2
 ∴ Required quantity replaced = $\frac{2}{3}$



The ratio of mixing required would be 1 : 4 which means that the percentage of adulterated fat would be 20%.

15. (c) By selling at 300 if we need to get a profit of 25% it means that the cost price would be $300/1.25 = 240$.



Ratio of mixing required to get an average of ₹ 240 per quintal = 1 : 2

Thus, in 52 quintals of the second we need to mix 26 quintals of the first.

16. (b) The percentage of honey in the new mixture would be:

$(2 \times 25 + 3 \times 75)/5 = 275/5 = 55\%$. The ratio of honey to water in the new mixture would be $55 : 45 = 11 : 9$

17. (c) 90% and 97% mixed to form 94% means that the mixing ratio is 3 : 4. The first solution would be $3 \times 21/7 = 9$ litres.

18. (d) We cannot determine the answer to this question as we do not know the price per kg of the other type of ghee. Hence, we cannot find the ratio of mixing which would be required in order to move further in this question.

19. (d) Number of articles made in 1st hour = 60
 Number of articles made in 2nd hour = 45
 Number of articles made in 3rd hour = 63
 Number of articles made in 4th hour = 42
 Number of articles made in 5th hour = 63

So, obviously articles made in 4th hour is minimum.

20. (c) Let x liters of 50% solution and y litres of 80% solutions are used

$$\frac{x}{y} = \frac{80 - 62}{62 - 50} = \frac{18}{12} = \frac{x}{y} = \frac{3}{2}$$

Solution get mixed in the ratio 3 : 2.

Now, suppose the value of acid is Z litres

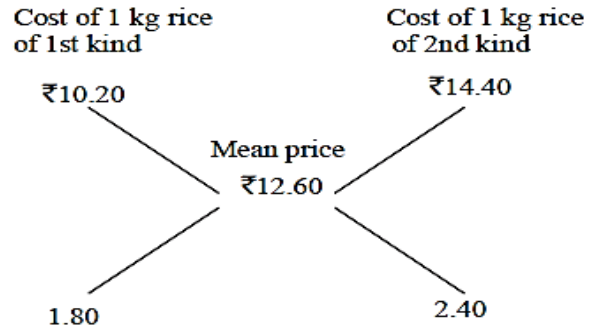
$$\Rightarrow \frac{0.62z}{z+6} = \frac{1}{2}$$

$$\Rightarrow 1.24 Z = Z + 6 \Rightarrow 0.24 Z = 6$$

$$Z = 25$$

Hence, required rate = $\frac{2}{5} \times 25 = 10$ litres

21. (a) By the rule of alligation:

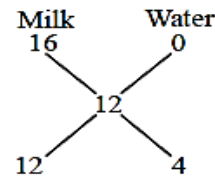


∴ Required ratio = 1.80 : 2.40 = 3 : 4.

22. (a) ∴ SP of the mixture = ₹ 15

$$\therefore \text{CP of the mixture} = 15 \times \frac{100}{125} = ₹ 12$$

Now, by the rule of mixture,



∴ Ratio of milk and water in the mixture = 12 : 4 = 3 : 1