

# AVERAGE PROBLEMS WITH SOLUTIONS

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# AVERAGE

Average is a very simple topic and just involves simple mathematical calculations. Average concept has various applications. We will discuss its applications in next session. Firstly we will try to make you understand the basics of this topic.

Average is just a mean value of all the given observations or we can say it is an arithmetic mean of observations.

$$\text{Average} = \frac{\text{Sum of all observations}}{\text{Number of observations}}$$

Example1: Find an average of following observations:

3, 4, 8, 12, 2, 5, 1

$$\text{Solution: Average} = \frac{\text{Sum of all observations}}{\text{Number of observations}}$$

$$\text{Average} = \frac{3+4+8+12+2+5+1}{7} = 5$$

So, Average = 5

\*\*\*But, remember that this formula does not directly apply on average speed. Discussed in special cases\*\*\*

## Properties of Average

- i) Average lies between maximum and minimum observation.
- ii) If value of each observation is multiplied by some value 'N', then average will also be multiplied by the same value i.e. N.

**For example:** Assume the previous set of observations. If 2 is multiplied with all observations, then new observations will be as follows:

6, 8, 16, 24, 4, 10, 2

$$\text{New Average} = \frac{70}{7} = 10 = 2(5) = 2 \times \text{Old Average}$$

iii) If value of each observation is increased or decreased by some number, then average will also be increased or decreased by the same number.

For example: Continuing with the same example. If 2 is added to all observations, then new observations will be as follows:

5, 6, 10, 14, 4, 7, 3

$$\text{New Average} = 49/7 = 7 = 5 + 2 = 2 + \text{Old Average}$$

iv) Similarly, if each observation is divided by some number, then average will also be divided by same number.

**For example 1:** If 2 is divided from all observations, then new observations will be as follows:

$$1.5, 2, 4, 6, 1, 2.5, 0.5$$

$$\text{New Average} = \frac{17.5}{7} = 2.5 = \frac{5}{2} = \frac{\text{Old Average}}{2}$$

Therefore, I can say any general operation applied on observations will have same effect on average.

**Example 2:** Find an average of first 20 natural numbers.

$$\text{Solution: Average} = \frac{\text{Sum of first 20 natural numbers}}{20}$$

$$\text{Now, we know that Sum of first } n \text{ natural numbers} = \frac{n(n+1)}{2}$$

$$\text{Therefore, Sum of first 20 natural numbers} = \frac{20 \times 21}{2}$$

$$\text{Average} = \frac{20 \times 21}{2 \times 20} = 10.5$$

**Example 3:** Out of three numbers, second number is twice the first and is also thrice the third. If average of these numbers is 44, then find the largest number.

Solution: Let 'x' be the third number

According to question, second number =  $3x = 2(\text{first number})$

$$\text{Therefore, first number} = \frac{3x}{2}$$

second number =  $3x$  and

third number =  $x$

$$\text{Now, average} = 44 = \frac{x + 3x + (3x)/2}{3}$$

$$\Rightarrow \frac{11x}{2} = 44 \times 3$$

$$\Rightarrow x = 24$$

So, largest number i.e.  $3x = 72$

**Example 4:** Average of four consecutive even numbers is 27. Find the numbers.

Solution: Let  $x, x+2, x+4$  and  $x+6$  be the four consecutive even numbers.

$$\text{According to question, } \frac{(x) + (x+2) + (x+4) + (x+6)}{4} = 27$$

$$\frac{4x + 12}{4} = 27$$

$$x = 24$$

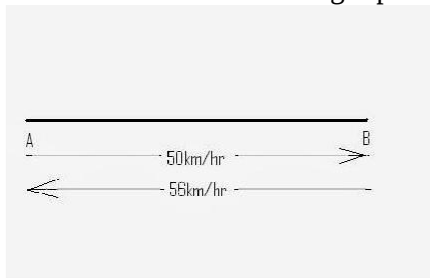
Therefore, numbers are 24, 26, 28, 30

## Special Case

To find average speed

Suppose a man covers a certain distance at  $x$  km/hr and covers an equal distance at  $y$  km/hr. The average speed during the whole distance covered will be  $\frac{2xy}{x+y}$

**Example 5:** A bike covers certain distance from A to B at 50 km/hr speed and returns back to A at 56 km/hr. Find the average speed of the bike during the whole journey.



Solution: Average speed =  $\frac{2xy}{x+y} = \frac{2 \times 50 \times 56}{50+56}$   
 $\Rightarrow 52.83$  km/hr

### PROBLEMS

- In the first 10 over's of a cricket game, the run rate was only 3.2. What should be the run rate in the remaining 40 over's to reach the target of 282 runs?
  - 6.25
  - 6.50
  - 6.75
  - 7
  - None of these
- 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?
  - $28\frac{1}{4}$  Years
  - $31\frac{1}{5}$  Years
  - $32\frac{1}{1}$  Years
  - Data inadequate
  - None of these
- A grocer has a sale of Rs. 6435, Rs. 6927, Rs. 6855, Rs. 7230 and Rs. 6562 for 5 consecutive months. How much sale must he have in the sixth month so that he gets an average sale of Rs. 6500?
  - Rs. 4991
  - Rs. 5991
  - Rs. 6001
  - Rs. 6991
  - None of these
- The average of 20 numbers is zero. Of them, at the most, how many may be greater than zero?
  - 0
  - 1
  - 10
  - 19
  - None of these

- 5) The average weight of 8 person's increases by 2.5 kg when a new person comes in place of one of them weighing 65 kg. What might be the weight of the newperson?  
a) 76Kg                      b) 76.5Kg                      c) 85Kg  
d) Data inadequate      e) None of these
- 6) The captain of a cricket team of 11 members is 26 years old and the wicket keeper is 3 years older. If the ages of these two are excluded, the average age of the remaining players is one year less than the average age of the whole team. What is the average age of the team?  
a) 23 years                      b) 24 years                      c) 25years  
d) Data inadequate      e) None of these
- 7) The average monthly income of P and Q is Rs. 5050. The average monthly income of Q and R is Rs. 6250 and the average monthly income of P and R is Rs5200. The monthly income of P is:  
a) 3500                      b) 4000                      c) 4050  
d) 5000                      e) None of these
- 8) The average age of husband, wife and their child 3 years ago was 27 years and that of wife and the child 5 years ago was 20 years. The present age of the husband is:  
a) 35 years                      b) 40 years                      c) 50 years  
d) Data inadequate      e) None of these
- 9) A car owner buys petrol at Rs.7.50, Rs. 8 and Rs. 8.50 per liter for three successive years. What approximately is the average cost per liter of petrol if he spends Rs. 4000 each year?  
a) Rs. 7.98                      b) Rs. 8                      c) Rs. 8.50  
d) Rs. 9                      e) None of these
- 10) In Arum's opinion, his weight is greater than 65 kg but less than 72 kg. His brother doest not agree with Arum and he thinks that Arum's weight is greater than 60 kg but less than 70 kg. His mother's view is that his weight cannot be greater than 68 kg. If all are them are correct in their estimation, what is the average of different probable weights of Arum?  
a) 67 kg                      b) 68 kg                      c) 69 Kg.  
d) Data inadequate      e) None of these
- 11) The average weight of A, B and C is 45 kg. If the average weight of A and B be 40 kg and that of B and C be 43 kg, then the weight of B is:  
a) 17 kg                      b) 20Kg                      c) 26Kg  
d) 31Kg                      e) None of these
- 12) The average weight of 16 boys in a class is 50.25 kg and that of the remaining 8 boys is 45.15 kg. Find the average weights of all the boys in the class.  
a) 47.55 kg                      b) 48 kg                      c) 48.55 kg  
d) 49.25 kg                      e) None of these

- 13) A library has an average of 510 visitors on Sundays and 240 on other days. The average number of visitors per day in a month of 30 days beginning with a Sunday is:  
a) 250                                      b) 276                                      c) 280  
d) 285                                      e) None of these
- 14) If the average marks of three batches of 55, 60 and 45 students respectively is 50, 55, 60, then the average marks of all the students is:  
a) 53.33                                      b) 54.68                                      c) 55  
d) Data inadequate                      e) None of these
- 15) A pupil's marks were wrongly entered as 83 instead of 63. Due to that the average marks for the class got increased by half  $\left[\frac{1}{2}\right]$ . The number of pupils in the class is:  
a) 10                                          b) 20                                          c) 40  
d) 73                                          e) None of these
- 16) There are two sections A and B of a class, consisting of 36 and 44 students respectively. If the average weight of sections A is 40 kg and that of section b is 35 kg. Find the average weight of the whole class?  
a) 36.25                                      b) 37.25                                      c) 38.35  
d) 39.25                                      e) None of these
- 17) A batsman makes a score of 87 runs in the 17th inning and thus increases his averages by 3. Find his average after 17th inning?  
a) 19                                          b) 29                                          c) 39  
d) 49                                          e) None of these
- 18) A Student was asked to find the arithmetic mean of the numbers 3, 11, 7, 9, 15, 13, 8, 19, 17, 21, 14 and x. He found the mean to be 12. What should be the number in place of x?  
a) 3                                              b) 7                                              c) 17  
d) 31                                              e) None of these
- 19) David obtained 76, 65, 82, 67 and 85 marks (out in 100) in English, Mathematics, Physics, Chemistry and Biology. What are his average marks?  
a) 65                                              b) 69                                              c) 72  
d) 75                                              e) None of these
- 20) Distance between two stations A and B is 778 km. A train covers the journey from A to B at 84 km per hour and returns back to A with a uniform speed of 56km per hour. Find the average speed of the train during the whole journey?  
a) 67.0Km/hr                                      b) 67.2Km/hr                                      c) 69.0km/hr  
d) 69.2km/hr                                      e) None of these

- 21) The average age of boys in a class is 16 years and that of the girls is 15 years. The average age for the whole class is  
a) 15 years                      b) 15.5 years                      c) 16 years  
d) cannot be computed    e) None of these
- 22) The average age of 36 students in a group is 14 years. When teacher's age is included to it, the average increases by one, what is the teacher's age in years?  
a) 31                              b) 36                              c) 51  
d) 55                              e) None of these
- 23) The average of five numbers is 27. If one number is excluded, the average becomes 25. The excluded number is  
a) 25                              b) 27                              c) 30  
d) 35                              e) None of these
- 24) The batting average for 40 innings of a cricket player is 50 runs. His highest score exceeds his lowest score by 172 runs. If these two innings are excluded, the average of the remaining 38 innings is 48 runs. The highest score of the player is  
a) 165 runs                      b) 175 runs                      c) 172 runs  
d) 174 runs                      e) None of these
- 25) The average score of a cricketer for ten matches is 38.9 runs. If the average for the first six matches are 42. Then find the average for the last four matches?  
a) 33.25                      b) 33.5                      c) 34.25  
d) 35                              e) None of these
- 26) The average of six numbers is X and the average of three of these is Y. If the average of the remaining three is z, then  
a)  $x = y + z$                       b)  $2x = y + z$                       c)  $x = 2y + 2z$   
d) Data inadequate                      e) None of these
- 27) A motorist travel to a place 150 km away at an average speed of 50 km/hr and returns at 30 km/hr. His average speed for the whole journey in km/hr is  
a) 30                              b) 37                              c) 37.5  
d) 40                              e) None of these
- 28) The average age of a husband and his wife was 23 years at the time of their marriage. After five years they have a one year old child. The average age of the family now is  
a) 19 years                      b) 23 years                      c) 28.5 years  
d) 29.3 years                      e) None of these
- 29) In an examination, a pupil's average marks were 63 per paper. If he had obtained 20 more marks for his Geography paper and 2 more marks for his history paper, his average per paper would have been 65. How many papers were there in the examination?  
a) 8                              b) 9                              c) 10

- d) 11 e) None of these
- 30) The average salary of all the workers in a workshop is Rs.8000. The average salary of 7 technicians is Rs.12000 and the average salary of the rest is Rs.6000. The total number of workers in the workshop is  
a) 20 b) 21 c) 22  
d) 23 e) None of these
- 31) After replacing an old member by a new member, it was found that the average age of five members of a club is the same as it was 3 years ago. What is the difference between the ages of the replaced and the new member?  
a) 2 years b) 4 years c) 8 years  
d) 15 years e) None of these
- 32) Nine persons went to a hotel for taking their meals. Eight of them spent Rs.12 each on their meals and the ninth spent Rs.8 more than the average expenditure of all the nine. What was the total money spent by them?  
a) Rs.117 b) 130 c) 145  
d) 150 e) None of these
- 33) The average of 25 results is 18. The average of first twelve of them is 14 and that of last twelve is 17. Find the thirteenth result.  
a) 87 b) 78 c) 49  
d) 55 e) None of these
- 34) A has 8 pencils, B has 10 pencils and C has 15 pencils, then the average number of pencils with them :  
a) 8 b) 10 c) 15  
d) 11 e) None of these
- 35) A, B, C, D, E, F are the only six families in Indira Nagar. A, B, C, D, E and F has 7, 8, 10, 13, 6 and 10 members in their families respectively. If 1 member from all the six families left their respective families to accommodate themselves in the hostel of IIM Lucknow, then the average number of members now in each family of Indira Nagar is :  
a) 8 b) 9 c) 10  
d) 13 e) None of these
- 36) The salary of A, B, C, D, E is Rs.8000, Rs.5000, Rs.11000, Rs.7000, Rs.9000 per month respectively, then the average salary of A, B, C, D and E per month is :  
a) Rs.7000 b) 8000 c) Rs.8500  
d) Rs.9000 e) None of these
- 37) The average presence of students in a class on Monday, Tuesday and Wednesday is 30 and on the Wednesday, Thursday, Friday and Saturday is 28 then number of students who attended the class on Wednesday is, if the average number of students on all the six days is 27 :

- a) 24                                      b) 25                                      c) 20  
d) 40                                      e) None of these
- 38) The average salary of 12 employees of STAR plus is Rs.18,000 per month and 15 employees of NDTV is Rs.16,000 per month. The average salary of all the 27 employees is :  
a) Rs.17,000                                      b) Rs.16,500                                      c) Rs.16,888.88  
d) Data inadequate                                      e) None of these
- 39) Sri Krishna took the chariot and started his journey from Mathura to Gokul by his chariot at the speed of 40 km/hr and then, the same distance he travelled on his foot at the speed of 10 km/hr from Gokul to Brindaban. Then he returned from Brindaban to Mathura via Gokul at the speed of 24 km/hr riding on the horse. The average speed of the whole trip is :  
a) 20 km/hr                                      b) 25 km/hr                                      c) 19.2 km/hr  
d) 18.5 km/hr                                      e) None of these
- 40) The average age of 7 members of Patel's family is 25 years. The average age of the same family 3 years ago was :  
a) 21                                      b) 22                                      c) 25  
d) 28                                      e) None of these
- 41) The average salary of A, B is Rs.6000 and that of C, D and E is Rs.8000. The average salary of all the 5 people is :  
a) Rs.7200                                      b) Rs.7000                                      c) Rs.7500  
d) Cannot be determine                                      e) None of these
- 42) 6 months ago the present age of the student of class 10<sup>th</sup> was 14 years. 6 months hence, the age of the same students will be :  
a) 15 years                                      b)  $15\frac{1}{2}$  years                                      c) 20 years  
d) Data inadequate                                      e) None of these
- 43) The average salary of Rajesh, Bahadur and Amir is Rs.8000 per month. The average expenditure of Rajesh, Bahadur and Amir per month is Rs.5000. The average savings of all the 3 persons per month is :  
a) Rs.3000                                      b) Rs.5000                                      c) Rs.2500  
d) Rs.9000                                      e) None of these
- 44) The average of first five multiples of 3 is :  
a) 3                                      b) 9                                      c) 12  
d) 15                                      e) None of these
- 45) The average of the two digit numbers, which remain the same when the digits interchange their positions, is :  
a) 33                                      b) 44                                      c) 55  
d) 66                                      e) None of these

- 46) The average score of a cricketer for ten matches is 38.9 runs. If the average for the first six matches is 42, then find the average for the last four matches.
- a) 33.25                      b) 33.5                      c) 34.25  
d) 35                      e) None of these
- 47) Of the three numbers, the first is twice the second and the second is twice the third. The average of the reciprocal of the numbers is  $\frac{7}{72}$ . The numbers are:
- a) 16, 8, 4                      b) 20, 10, 5                      c) 24, 12, 6  
d) 36, 18, 9                      e) None of these
- 48) The average temperature of the town in the first four days of a month was 58 degrees. The average for the second, third, fourth and fifth days was 60 degrees. If the temperatures of the first and fifth days were in the ratio 7 : 8, then what is the temperature on the fifth day?
- a) 64 degrees                      b) 62 degrees                      c) 56 degrees  
d) Data inadequate                      e) None of these
- 49) The average age of 8 men is increased by 2 years when two of them whose ages are 21 years and 23 years are replaced by two new men. The average age of the two new men is :
- a) 22 years                      b) 24 years                      c) 28 years  
d) 30 years                      e) None of these
- 50) 10 years ago, the average age of a family of 4 members was 24 years. Two children having been born (with age difference of 2 years), the present average age of the family is the same. The present age of the youngest child is :
- a) 1 year                      b) 2 years                      c) 3 years  
d) 5 years                      e) None of these
- 51) The average age of 30 students of a class is 30 years. When the average age of class teacher is also included, the average age of the whole class increases by 1 year. The age of the class teacher is :
- a) 31 years                      b) 60 years                      c) 61 years  
d) 65 years                      e) None of these

## Solutions

1. Option A

$$\frac{282 - (302 \times 10)}{40} = \frac{250}{40} = 6.25$$

2. Option E

$$\left[ \frac{67 \times 2 + 35 \times 2 + 6 \times 3}{2 + 2 + 3} \right]$$

$$\left[ \frac{134 + 70 + 18}{7} \right]$$

$$= \frac{222}{7}$$

$$= 31 \frac{5}{7}$$

### 3. Option A

Total sale for 5 months = Rs. (6435 + 6927 + 6855 + 7230 + 6562) = Rs. 34009.

∴ Required sale = Rs. [(6500 × 6) - 34009]

= Rs. 39000 - 34009

= Rs. 4991

### 4. Option D

Average of 20 numbers = 0

∴ Sum of 20 numbers (0 × 20) = 0

It is quite possible that 19 of these numbers may be positive and if their sum is  $a$  then 20th number is  $(-a)$

### 5. Option C

Total weight increased = (8 × 2.5) kg = 20 kg.

Weight of new person = (65 + 20) kg = 85 kg.

### 6. Option A

Let the average age of the whole team by  $x$  years.

∴  $11x - (26 + 29) = 9(x - 1)$

$\Rightarrow 11x - 9x = 46$

$\Rightarrow 2x = 46$

$\Rightarrow x = 23$

So, average age of the team is 23 years

### 7. Option B

Let P, Q and R represent their respective monthly incomes. Then, we have:

$P + Q = (5050 \times 2) = 10100$  .... (i)

$Q + R = (6250 \times 2) = 12500$  .... (ii)

$P + R = (5200 \times 2) = 10400$  .... (iii)

Adding (i), (ii) and (iii), we get:  $2(P + Q + R) = 33000$  or  $P + Q + R = 16500$  .... (iv)

Subtracting (ii) from (iv), we get  $P = 4000$

### 8. Option B

Sum of the present ages of husband, wife and child =  $(27 \times 3 + 3 \times 3)$  years = 90 years.

Sum of the present ages of wife and child =  $(20 \times 2 + 5 \times 2)$  years = 50 years

Husband's present age =  $(90 - 50)$  years = 40 years

9. Option A

$$\begin{aligned} \text{Total quantity of petrol} & \left[ \frac{4000}{7.50} + \frac{4000}{8} + \frac{4000}{8.50} \right] \\ \text{consumer in 3 years} & = 4000 \left[ \frac{2}{15} + \frac{1}{8} + \frac{2}{17} \right] \text{ litres} \end{aligned}$$

$$= \left[ \frac{76700}{51} \right] \text{ litres}$$

Total amount spent = Rs.  $(3 \times 4000)$  = Rs. 12000

$$\text{Average Cost} = \text{Rs.} \left[ \frac{12000 \times 51}{76700} \right] = \text{Rs.} \frac{6120}{767} = 7.98$$

10. Option A

Let Arun's weight by X kg.

According to Arun,  $65 < X < 72$

According to Arun's brother,  $60 < X < 70$

According to Arun's mother,  $X \leq 68$

The values satisfying all the above conditions are 66, 67 and 68

$$\text{Required Average} = \left[ \frac{66 + 67 + 68}{3} \right] = \left[ \frac{201}{3} \right] = 67\text{kg.}$$

11. Option D

Let A, B, C represent their respective weights. Then, we have:

$$A + B + C = (45 \times 3) = 135 \dots (i)$$

$$A + B = (40 \times 2) = 80 \dots (ii)$$

$$B + C = (43 \times 2) = 86 \dots (iii)$$

$$\text{Adding (ii) and (iii), we get: } A + 2B + C = 166 \dots (iv)$$

$$\text{Subtracting (i) from (iv), we get : } B = 31$$

$$\therefore B\text{'s weight} = 31 \text{ kg.}$$

12. Option C

$$\text{Required Average} = \left[ \frac{50.25 \times 16 + 45.15 \times 8}{16 + 8} \right]$$

$$= \left[ \frac{804 + 361.20}{24} \right]$$

$$= \frac{1165.20}{24}$$

$$= 48.55$$

13. Option D

Since the month begins with a Sunday, to there will be five Sundays in the month.

$$\begin{aligned}\text{Required Average} &= \left[ \frac{510 \times 5 + 240 \times 25}{30} \right] \\ &= \frac{8550}{30} \\ &= 285\end{aligned}$$

14. Option B

$$\begin{aligned}\text{Required Average} &= \left[ \frac{55 \times 50 + 60 \times 55 + 45 \times 60}{55 + 60 + 45} \right] \\ &= \left[ \frac{2750 + 3300 + 2700}{160} \right] \\ &= \frac{8750}{160} \\ &= 54.68\end{aligned}$$

15. Option C

Let there be  $x$  pupils in the class.

$$\begin{aligned}\text{Total increase in marks} &= \left[ X \times \frac{1}{2} \right] = \frac{X}{2} \\ \frac{X}{2} &= (83-63) \rightarrow \frac{X}{2} = 20 \rightarrow X=40\end{aligned}$$

16. Option B

$$\begin{aligned}\text{Total weight of (36+44) Students} &= (36 \times 40 + 44 \times 35) \\ &= 2980 \text{ kg.}\end{aligned}$$

$$\begin{aligned}\text{Average weight of the whole class} &= \frac{2980}{80} \\ &= 37.25\end{aligned}$$

17. Option C

Let the average after 17th inning =  $x$ . Then, average after 16th inning =  $(x - 3)$

$$\begin{aligned}\text{Average} &= 16(x-3) + 87 \\ &= 17x \text{ or } x = (87-48) \\ &= 39\end{aligned}$$

18. Option B

Clearly, we have

$$\left[ 3+11+7+9+15+13+8+19+17+21+14+\frac{x}{12} \right]$$

Number in place of x is

$$137 + x = 144$$

$$x = 144 - 137$$

$$x = 7$$

19. Option D

$$\text{Average} = \frac{375}{5}$$

$$76 + 65 + 82 + 67 + \frac{85}{5} = 75$$

20. Option B

Required average speed

$$= \frac{2xy}{x+y} \text{ km/hr}$$

$$= \frac{2 \times 84 \times 56}{84 + 56}$$

$$= \frac{2 \times 84 \times 85}{140}$$

$$= 67.2 \text{ km/hr.}$$

21. Option D

Clearly, to find the average, we ought to know the numbers of boys, girls or students in the class, neither of which has been given. So, the data provided is inadequate.

22. Option C

Age of the teacher

$$= (37 \times 15 - 36 \times 14)$$

$$= 51 \text{ years.}$$

23. Option D

Excluded number

$$= (27 \times 5) - (25 \times 4)$$

$$= 135 - 100$$

$$= 35$$

24. Option D

Let the highest score be x. Then,  
lowest score = (x-172)

$$= [(50 \times 40) - (x + (x-172))]$$

$$= 38 \times 48$$

$$2x = 2000 + 172 - 1824$$

$$2x = 348$$

$$x = 174$$

$$= \frac{38.9 \times 10 - 42 \times 6}{4}$$

25. Option C

Required average

$$= \frac{137}{4}$$
$$= 34.25$$

26. Option B

Clearly, we have

$$X = \left[ 3y + \frac{3z}{6} \right]$$

Or

$$2x = y + z$$

27. Option C

Average Speed

$$= \left[ \frac{2xy}{x+y} \right] \text{ km/hr}$$
$$= \left[ 2 \times 50 \times \frac{30}{50} + 30 \right]$$
$$= 37.5 \text{ km/hr.}$$

28. Option A

Sum of the present ages on  
husband, wife and child  
Required average

$$= \left[ 23 \times 2 + 5 \times 2 \right] + 1$$
$$= 57 \text{ years}$$
$$= \left[ \frac{57}{3} \right]$$
$$= 19 \text{ years.}$$

29. Option D

Let the number of papers be x.

Then,  $63x + 20 + 2 = 65x$

$$65x - 63x = 22$$

$$2x = 22$$

$$x = 11$$

30. Option B

Let the total number of workers be x.

Then  $8000x = (12000 \times 7) + 6000(x - 7)$

$$2000x = 42000$$

$$x = 21$$

31. Option D

Age decreased

$$= (5 \times 3) \text{ years}$$

$$15 \text{ years}$$

So, required difference = 15 years.

32. Option A

Let the average expenditure of all the nine be Rs.x

Then,  $12 \times 8 + (x + 8) = 9x$  or  $8x = 104$  or  $x = 13$

So, total money spent =  $9x = \text{Rs.}(9 \times 13) = 117$

33. Option B

Clearly, thirteenth result = (sum of 25 results) - (sum of 24 results)

$$= (18 \times 25) - [(14 \times 12) + (17 \times 12)]$$

$$= 450 - (168 + 204) = 450 - 372 = 78$$

34. Option D

$$\text{Average number of pencils} = \frac{8 + 10 + 15}{3} = 11$$

35. Option A

$$\begin{aligned} \text{Required average} &= \frac{(7-1) + (8-1) + (10-1) + (13-1) + (6-1) + (10-1)}{6} \\ &= \frac{7+8+10+13+6+10}{6} - \frac{6 \times 1}{6} \\ &= 9 - 1 = 8 \end{aligned}$$

36. Option B

$$\begin{aligned} \text{Average salary} &= \frac{8000 + 5000 + 11000 + 7000 + 9000}{5} \\ &= \text{Rs.}8000 \end{aligned}$$

37. Option D

$$\begin{aligned} \text{Since } W &= (M + T + W) + (W + Th + F + S) - (M + T + W + Th + F + S) \\ &= (30 \times 3) + (28 \times 4) - (27 \times 6) \\ &= 202 - 162 = 40 \end{aligned}$$

38. Option C

$$\text{Required average salary} = \frac{12 \times 18,000 + 15 \times 16,000}{12 + 15} = \frac{4,56,000}{27} = \text{Rs.}16,888.88$$

39. Option C

Since the distance from Mathura to Gokul is same as that of Gokul to Brindaban.

$$\text{So, the average speed from Mathura to Brindaban} = \frac{2 \times 40 \times 10}{(40 + 10)} = 16 \text{ km/hr}$$

Again since he returned on the same path, so the distance from Mathura to Brindaban is same in both the directions.

$$\text{Thus, the required average speed} = \frac{2 \times 16 \times 24}{(16 + 24)} = 19.2 \text{ km/hr}$$

40. Option B

Present average age of family = 25 years

3 years ago average age of family =  $25 - 3 = 22$  years

41. Option A

$$\text{Required average salary} = \frac{6000 \times 2 + 8000 \times 3}{(2 + 3)} = \frac{36000}{5} = \text{Rs.}7200$$

42. Option A

Since the time difference between two dates is 1 year, hence the average age will be increased by 1 year.

Thus, the average age of the class 6 months hence will be 15 years.

43. Option A

$$\begin{aligned}\text{Average saving} &= \text{Average income} - \text{Average expenditure} = \\ &= 8000 - 5000 = 3000\end{aligned}$$

44. Option B

$$\text{Average} = \frac{3(1+2+3+4+5)}{5} = \frac{45}{5} = 9$$

45. Option C

$$\begin{aligned}\text{Average} &= \frac{11 + 22 + 33 + 44 + 55 + 66 + 77 + 88 + 99}{9} \\ &= \frac{(11+99) + (22+88) + (33+77) + (44+66) + 55}{9} \\ &= \left[ 4 \times \frac{110}{9} + 55 \right] = \frac{495}{9} = 55\end{aligned}$$

46. Option C

$$\text{Required average} = \frac{38.9 \times 10 - (42 \times 6)}{4} = \frac{137}{4} = 34.25$$

47. Option C

Let the third number be  $x$ . Then, second number =  $2x$ . First number =  $4x$

$$\text{So, } \frac{1}{x} + \frac{1}{2x} + \frac{1}{4x} = \left[ \frac{7}{72} \times 3 \right] \text{ or } \frac{7}{4x} = \frac{7}{24} \text{ or } 4x = 24 \text{ or } x = 6$$

So, the numbers are 24, 12, 6

48. Option A

Sum of temperatures on 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> days =  $(58 \times 4) = 232$  degrees .. (i)

Sum of temperatures on 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> days =  $(60 \times 4) = 240$  degrees .. (ii)

Subtracting (i) from (ii), we get

Temp. on 5<sup>th</sup> day - Temp. on 1<sup>st</sup> day = 8 degrees

Let the temperatures on 1<sup>st</sup> and 5<sup>th</sup> days be  $7x$  and  $8x$  degrees respectively.

Then,  $8x - 7x = 8$  or  $x = 8$

So, Temperature on 5<sup>th</sup> day =  $8x = 64$  degrees

49. Option D

Total age increased =  $(8 \times 2)$  years = 16 years

Sum of ages of two new men =  $(21 + 23 + 16)$  years = 60 years

So average age of two new men =  $\left[ \frac{60}{2} \right]$  years = 30 years

50. Option C

Total age of 4 members, 10 years ago =  $(24 \times 4) = 96$  years

Total age of 4 members now =  $(96 + 10 \times 4)$  years = 136 years

Total age of 6 members now =  $(24 \times 6) = 144$  years

Sum of the ages of 2 children =  $(144 - 136) = 8$  years

Let the age of the younger child be  $x$  years.

Then, age of the elder child =  $(x + 2)$  years

So,  $x + x + 2 = 8$

$2x = 6$

$x = 3$

So, age of younger child = 3 years

51. Option C

31       $\times$       31      -      30       $\times$       30      =      61      ye

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