# 23. AVERAGES

- Average = $\frac{\text{Sum of all items in the group}}{\text{Number of items in the group}}$
- Sum of first 'n' natural numbers = $\frac{n(n+1)}{2}$ and Average of first 'n' natural numbers = $\frac{(n+1)}{2}$
- Average of numbers which are in A.P is the middle term or average of the middle terms.
  Eg: Average of the numbers 3, 6, 9, 12, 15, 18, 21 is 12.
  Eg: Average of the numbers 4, 9, 14, 19, 24, 29 is (14+19)/2 = 16.5
- If all the elements in a group are added by a constant number, then average of the group also gets added by the same number.
  Eg: If the average age of a family of 6 members today is 16 years, then the average age of the family after 4 years is 21years.
- If a constant number is subtracted from all the elements in a group, then average of the group also gets decreases by the same number.
  Eg: The average marks of a class of 25 students are 16 and if 2 marks are deducted for all the students for not submitting assignment, then the average marks of the class is 14.
- If all the elements of the group are multiplied are divided with a constant number, then the average also gets effected by the same result.

***Directions for questions 1 to 40:*** Select the correct alternative from the given choices.

1. The average temperature on M, T, W and T was 48$^o$c and for T, W, T and F was 46$^o$c. If the temperature on Friday was 34$^o$c, the temperature on Monday was
   (1) 41 (2) 42 (3) 43 (4) 44

**2.** In a town during a certain week, every day there was a 1°C increase in temperature over the previous day. If the average temperature for the first and last days (i.e., Monday and Sunday) was 39°C, what was the average for Monday, Tuesday and Wednesday?
(1) 36°C (2) 34°C (3) 38°C (4) 37°C

**3.** The average expenditure of a man for the first five months is Rs.12000 and for the rest months is Rs.13000. If his savings amount to Rs.29000, his average monthly income is Rs.
1) 10,000 2) 12,000 3) 13,000 4) 15,000

**4.** The average runs scored by a batsman who has played 52 innings, was increased by one after an innings of 126. Find the average runs of the batsman before this innings.
(1) 71 (2) 73 (3) 74 (4) 58

**5.** The average age of a class of 22 students is 22 years. If a new student, whose age is 22 years joins the class, find the new average age of the class (in years).
(1) 20 (2) 21 (3) 22 (4) 23

**6.** The average age of a group went up by 2 years when a man aged 34 years was replaced by an old man aged 58 years. How many members were there in the group?
(1) 10 (2) 18 (3) 14 (4) 12

**7.** The average age of 30 students of a class is 16 years. If the age of the teacher is also included, the average increases by 1 year. Find the age of the teacher. (in years)
(1) 47 (2) 44 (3) 42 (4) None of these

**8.** The average marks of the boys and the girls in a class are 30 and 40 respectively. Find the average marks of all the students in the class.
(1) 30 (2) 35
(3) 40 (4) cannot be determined

**9.** In an office, the average height of female employees is 150 cm and the average height of male employees is 160 cm. If there are 400 employees in the office, find the average height (in cm) of all the employees.
(1) 150 (2) 160
(3) 155 (4) cannot be determined

**10.** The average marks scored by Monika in five out of six subjects in an exam is 60. If Monika scores an average of 75 marks in the six subjects, find his score in the sixth subject.
(1) 100 (2) 125 (3) 150 (4) 90

**11.** The ratio of the number of boys to the number of girls in a class is 4 : 5. If the average age of boys and the girls in the class is 20 and 29 respectively, find the average age students in the class.
(1) 26 (2) 25
(3) 22 (4) cannot be determined

**12.** The average number of notebooks with six children is six. If another child joined them the average number of notebooks with the seven children will become 7. Find the number of notebooks with the seventh child.
(1) 11 (2) 12 (3) 13 (4) 14

**13.** In a class, two students aged 16 years and 18 years are replaced by two students whose ages are 19 years and 21 years. If the average age of the class increased by 3 months, how many students are there in the class?
(1) 20 (2) 24 (3) 32 (4) 40

**14.** In a hockey tournament the average number of goals scored by India in the first six matches was 2 while that in the last six matches was 4. If 3 goals were scored in the sixth match, find the average number of goals scored by India in the tournament if a total of 11 matches were played.
(1) 2 (2) 3 (3) 4 (4) None of these

**15.** The average age of a family of five members is the same today as it was five years ago. There is no change in the family, except the elder daughter being replaced by the daughter-in-law. If the age of the elder daughter is 48 years, how old is the daughter-in-law? (in years)
(1) 20 (2) 23 (3) 24 (4) 26

**16.** The average weight of certain number of boys in a group is 30 kg. If 5 boys with an average weight of 12 kg join the group, the average weight would be the same as if 5 boys with an average weight of 36 kg leave the group. Find the number of boys in the group.
(1) 15 (2) 20 (3) 25 (4) 10

**17.** Sixteen men went to a hotel. Fifteen of them paid Rs.80 each and the sixteenth man paid Rs.75 more than the average of all the sixteen men. Find the total bill.
(1) Rs.1020 (2) Rs.1280
(3) Rs.1360 (4) Cannot be determined

**18.** Out of 64 students ECE, the average of marks obtained is 88. If the top 10 students got, on an average, 142 marks, find the average of marks obtained by the remaining students.
(1) 80 (2) 78 (3) 74 (4) 66

**19.** The average of the first 50 natural numbers is
(1) 12.25 (2) 21.15 (3) 25 (4) 25.5

**20.** In a class, there are three groups A, B and C. If one student from group A and two students from group B are shifted to group C, then what happens to the average weight of the students of the class?
(1) Increases (2) Decreases
(3) Remain same (4) Data insufficient

**21.** The average age of 10 boys and the principal is 15 years. When the principal's age is excluded, the average age decreases by 1 years. What is the age of the principal?
(1) 29 (2) 31 (3) 25 (4) 33

**22.** The average of a batsman after 25 innings was 56 runs per innings. If after the 26th inning his average increased by 2 runs, then what was his score in the 26th inning?
(1) 108 (2) 109 (3) 110 (4) 107

**23.** If we take four numbers, the average of the first three is 20 and that of the last three is 10. If the first number is 20, the last number is
(1) -20 (2) -10 (3) -30 (4) -15

**24.** The average height of 30 girls out of a class of 40 is 160 cm, that of the remaining girls is 156 cm. The average height of the whole class is?
(1) 155 cm (2) 157 cm
(3) 159 cm (4) None of these

**25.** Ram bought 2 toys for Rs. 5.50 each, 3 toys for Rs.3.66 each and 6 toys for Rs.1.833 each. The average price per toy is (in Rs)
(1) 3 (2) 10 (3) 5 (4) 9

**26.** 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?
(1) 23 years (2) 24 years
(3) 25 years (4) None of these

**27.** The average of 20 numbers is zero. Of them, at the most, how many may be greater than zero?
(1) 0 (2) 1 (3) 10 (4) 19

**28.** The average score of a cricketer in three matches is 44 runs and two other matches, it is 33 runs. Find the average in all the five matches.
(1) 39.6 (2) 29 (3) 49.6 (4) 39

**29.** The average monthly income of a person in a certain family of 5 Rs. 10,000. What will be the average monthly income of a person in the same family if the income of one person increased by Rs. 1,20,000 per year?
(1) Rs.12,000 (2) Rs.16,000
(3) Rs.20.000 (4) Rs.34.000

**30.** The average marks of 100 student are given to be 40. It was found later that marks of one student were 53 which were misread as 83. The corrected mean marks are
(1) 39 (2) 39.7 (3) 40 (4) 40.3

**31.** A family has two children along with their parents. The average of the weights of the children and their mother is 50 kg. The average of the weights of the children and their father is 52 kg. If the weight of the father is 60 kg, then what is the weight of the mother?
(1) 48 kg (2) 50 kg (3) 52 kg (4) 54 kg

**32.** The average score of a batman after his 50th innings was 46.4. after 60th innings, his average score increases by 2.6. What was his average score in the last ten innings?
(1) 122 (2) 91 (3) 62 (4) 49

**33.** In a class, there are three groups A, B and C. If one student form group B are shifted to group C, then what happens to the average weight of the students of the class?

(1) It increases (2) It decreases
(3) It remains the same (4) insufficient data

**34.** The average age of a teacher and three students is 20 years. If all the three students are of same age and the difference between the age of the teacher and each student is 20 years, then what is the age of the teacher?
(1) 25 years (2) 30 years
(3) 35 years (4) 45 years

**35.** 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:
(1) 35 years (2) 40 years
(3) 50 years (4) None of these

**36.** The average of first 10 natural numbers is?
(1) 5 (2) 5.5 (3) 6 (4) 6.5

**37.** There are two classes A and B having 25 and 30 students respectively. In class-A the highest score is 21 and lowest score is 17. In class-B the highest score is 30 and lowest score is 22. Four students are shifted form class-A to class-B. Consider the following statements:

**1**. The average score of class-B will definitely decrease.
**2.** The average score of class-A will definitely increase.
Which of the above statements is/are correct?

**(1)** 1 only (2) 2 only
(3) Both 1 and 2 (4) Neither 1 nor 2

**38.** The average marks of a group of 20 students on a test is reduced by 4 when the topper who scored 90 marks is replaced by a new student. How many marks did the new student have?
(1) 30 (2) 10 (3) 20 (4) 40

**39.** The average age of 10 men is increased by 3 years when one of them, whose age is 54 years is replaced by a woman. What is age of the woman?
(1) 68 years (2) 82 years
(3) 72 years (4) 84 years

**40.** The average weight of A, B, C is 40 kg, the average weight of B, D, E is 42 kg and the weight of F is equal to that of B. what is the average weight of A, B, C, D, E and F?
(1) 40.5 kg (2) 40.8 kg (3) 41 kg
(4) data is inadequate

| Averages | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | 2 | **6** | 4 | **11** | 2 | **16** | 4 | **21** | 3 | **26** | 1 | **31** | 4 | **36** | 2 |
| **2** | 4 | **7** | 1 | **12** | 3 | **17** | 3 | **22** | 1 | **27** | 4 | **32** | 3 | **37** | 1 |
| **3** | 4 | **8** | 4 | **13** | 2 | **18** | 2 | **23** | 2 | **28** | 1 | **33** | 3 | **38** | 2 |
| **4** | 2 | **9** | 4 | **14** | 2 | **19** | 4 | **24** | 3 | **29** | 1 | **34** | 3 | **39** | 4 |
| **5** | 3 | **10** | 3 | **15** | 2 | **20** | 3 | **25** | 1 | **30** | 2 | **35** | 2 | **40** | 3 |