



## AVERAGE

- If average of observation  $x_1, x_2, \dots, x_{20}$  is  $y$ , then the average of  $x_1 - 101, x_2 - 101, x_3 - 101, \dots, x_{20} - 101$  is  
(a)  $y - 20$  (b)  $y - 101$   
(c)  $20y$  (d)  $101y$
- The average of  $x$  numbers is  $y$  and average of  $y$  numbers is  $x$ . Then the average of all the numbers taken together is:  
(a)  $\frac{x+y}{2xy}$  (b)  $\frac{2xy}{x+y}$   
(c)  $\frac{x^2+y^2}{x+y}$  (d)  $\frac{xy}{x+y}$
- The average of  $x$  numbers is  $y^2$  and the average of  $y$  numbers is  $x^2$ . So the average of all the numbers taken together is :  
(a)  $\frac{x^3+y^3}{x+y}$  (b)  $xy$   
(c)  $\frac{x^2+y^2}{x+y}$  (d)  $xy^2 + yx^2$
- The average of three numbers is 135. The largest number is 195 and the difference between the order two is 20. The smallest number is:  
(a) 65 (b) 95  
(c) 105 (d) 115
- The average of three consecutive odd numbers is 12 more than one third of the first of these numbers. What is the last of the three numbers?  
(a) 15 (b) 17  
(c) 19 (d) Date inadequate
- The average of three number is 40. The first number is twice of the second and the second one is thrice the third number. The difference between the largest and the smallest numbers is  
(a) 30 (b) 36  
(c) 46 (d) 60
- Out of 4 numbers, whose average is 60, the first one is one fourth of the sum of the last three. The first number is :  
(a) 15 (b) 45  
(c) 48 (d) 60
- A, B, C, D & E are five consecutive even numbers. Average of A and E is 46. What is the largest number?  
(a) 52 (b) 42  
(c) 50 (d) 48  
(e) None of these
- 16 children are to be divided into two groups A and B in 10 and 6 children. The average per cent marks obtained by the children of Group A is 75 and the average per cent marks of all the 16 children is 76. What is the average per cent marks of children of Group B ?  
(a)  $78\frac{2}{3}$  (b)  $77\frac{1}{3}$   
(c)  $78\frac{1}{3}$  (d)  $77\frac{2}{3}$   
(e) None of these
- The average weight of a group of 20 boys was calculated to be 89.4 kg and it was later discovered that one weight was misread as 78 kg instead of 87 kg. The correct average weight is  
(a) 88.85 kg (b) 89.25 kg  
(c) 89.55 kg (d) 89.85 kg
- The average of 18 observations is recorded as 124. Later it was found that two observations with values 64 and 28 were entered wrongly as 46 and 82. Find the correct average of the 18 observations.  
(a)  $111\frac{7}{9}$  (b) 122  
(c) 123 (d)  $137\frac{3}{9}$
- The mean of 50 numbers is 30. Later is was discovered that two entries were wrongly entered as 82 and 13 instead of 28 and 31. Find the correct mean.  
(a) 36.12 (b) 30.66  
(c) 29.28 (d) 38.21



13. The average salary of 15 persons is Rs. 5,500. If the salary of one person is added, the average increases to Rs 5,700. What is the salary of this one person?  
(a) Rs 8,700 (b) Rs 9,500  
(c) Rs 7,800 (d) Rs 8,500  
(e) None of these
14. The average age of 40 students of a class is 18 years. When 20 new students are admitted to the same class, the average age of the students of the class is increased by 6 months. The average age of newly admitted students is  
(a) 19 years  
(b) 19 years 6 months  
(c) 20 years  
(d) 20 years 6 months  
(e) None of these
15. The average age of 11 players of a cricket team is increased by 2 months when two of them aged 18 years and 20 years are replaced by two new players. The average age of the new players is  
(a) 19 years 1 month  
(b) 19 years 6 months  
(c) 19 years 11 months  
(d) 19 years 5 months  
(e) None of these
16. In a school, the average age of students is 6 years, and the average age of 12 teachers is 40 years. If the average age of the combined group of all the teachers and students is 7 years, then the number of students is  
(a) 396 (b) 400  
(c) 408 (d) 416  
(e) None of these
17. In a class, the average score of girls in an examination is 73 and that of boys is 71. The average score for the whole class is 71.8. Find the percentage of girls.  
(a) 40% (b) 50%  
(c) 55% (d) 60%
18. 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 players of  
(a) 165 runs (b) 170 runs  
(c) 172 runs (d) 174 runs
19. The batting average of a cricket player for 64 innings is 62 runs. His highest score exceeds his lowest score by 180 runs. Excluding these two innings, the average of remaining innings becomes 60 runs. His highest score was;  
(a) 180 runs (b) 209 runs  
(c) 212 runs (d) 214 runs
20. A cricketer had a certain average of runs for his 64 innings. In his 65th innings, he is bowled out for no score on his part. This brings down his average by 2 runs. His new average of runs is  
(a) 130 (b) 128  
(c) 70 (d) 68  
(e) None of these
21. The average of runs of a cricket player of 10 innings was 32. How many runs must he make in his next innings so as to increase his average of runs by 4?  
(a) 76 (b) 70  
(c) 4 (d) 2  
(e) None of these
22. Five years ago, the average age of P and Q was 25. The average age of P, Q and R today is 25. Age of R after 5 years will be  
(a) 15 years (b) 20 years  
(c) 40 years (d) 35 years
23. The average age of 12 players of a team is 25 years. If the captain's age is included, the average age increases by 1 year. The age of the captain is  
(a) 25 yrs (b) 38 yrs  
(c) 36 yrs (d) 36 yrs  
(e) None of these
24. The average age of 30 students is 9 years. If the age of their teacher is included, the average age becomes 10 years. The age of the teacher (in years) is



- (a) 27 (b) 31 (a) 39.2 kg (b) 36.5 kg  
(c) 35 (d) 40 (c) 38.35 kg (d) 37.3 kg  
(e) None of these
25. 3 years ago, the average age of a family of 5 members was 17 years. A baby having been born, the average age of the family is the same today. The present age of the baby is  
(a) 3 years (b) 2 years  
(c)  $1\frac{1}{2}$  years (d) 1 year  
(e) None of these
26. The average of 11 numbers is 10.8. If the average of the first six be 10.4 and that of the last six is 11.5 then the middle (6th number is)  
(a) 10.3 (b) 12.6  
(c) 13.5 (d) 15.5  
(e) None of these
27. The average weight of five persons sitting in a boat is 38 kg. The average weight of the boat and the persons sitting in the boat is 52 kg. What is the weight of the boat?  
(a) 228 kg (b) 122 kg  
(c) 232 kg (d) 242 kg
28. In an exam, the average was found to be 50 marks. After deducting computational errors that marks of the 100 candidates had to be changed from 90 to 60 each and the average came down to 45 marks. The total number of candidates who took the exam were  
(a) 300 (b) 600  
(c) 200 (d) 150  
(e) None of these
29. There were 35 students in a hostel. If the number of students increases by 7, the expenses of the mess increase by Rs. 42 per day while the average expenditure per head diminishes by Re 1. Find the original expenditure of the mess.  
(a) Rs. 420 (b) Rs. 520  
(c) Rs. 450 (d) Rs. 550  
(e) None of these
30. The average weight of 40 children of a class is 36.2 kg. When three more children with weight 42.3 kg, 39.7 kg and 39.5 kg join the class, the average weight of the 43 children in the class is:



## HINTS & SOLUTIONS

1. (b) According to question

$$\frac{x_1 + x_2 + x_3 + x_4 + \dots + x_{20}}{20} = x$$

$$x_1 + x_2 + x_3 + x_4 + \dots + x_{20} = 20x$$

$$\begin{aligned} & x_1 - 101 + x_2 - 101 + x_3 - 101 + \\ \Rightarrow & \frac{\dots + x_{20} - 101}{20} \end{aligned}$$

$$\Rightarrow \frac{(x_1 + x_2 + x_3 + \dots + x_{20}) - 20 \times 101}{20}$$

$$\Rightarrow \frac{20y - 20 \times 101}{20} \Rightarrow y - 101$$

2. (b) According to question

The avg. of x is = y

Sum of x no. is = xy

The avg. of y no. is = y

Sum of y no. is = xy

$$\therefore \text{Then avg. of all no. is} = \frac{xy + xy}{x + y} = \frac{2xy}{x + y}$$

3. (b) According to the question

Avg. of x no. is  $y^2$

$\therefore$  Sum of x no. is =  $xy^2$

Avg. of y no. is =  $x^2$

$\therefore$  Sum of y no. is =  $xy^2$

$$\text{Avg of all no. is} = \frac{xy^2 + yx^2}{x + y}$$

$$= \frac{xy(x + y)}{x + y} = xy$$

4. (b) According to the question

$$\frac{I + II + III}{3} = 135$$

$$I + II + III = 405 \dots\dots (i)$$

Let largest no. is  $III = 195$

$$\therefore I + II = 405 - 195$$

$$I + II = 210 \dots\dots (ii)$$

$$I - II = 20 \dots\dots (iii) \text{ (given)}$$

Solve equation (ii) and (iii)

$$\therefore I - 115 \text{ and } II = 95$$

Smallest number is = 95

5. (c) Let the three consecutive odd numbers are

$$= x, x + 2, x + 4$$

According to the question

$$\frac{x + x + 2 + x + 4}{3} = \frac{1}{3}x + 12$$

$$\frac{3x + 6}{3} = \frac{x + 36}{3}$$

$$3x + 6 = x + 36$$

$$2x = 30$$

$$x = 15$$

$$\therefore \text{last no. is} = x + 4$$

$$= 15 + 4$$

$$= 19$$

6. (d) According to the question

$$\frac{I + II + III}{3} = 40$$

$$I + II + III = 120 \dots\dots (i)$$

$$\text{Given : } I = 2II$$

$$\text{and } II = 3 III$$

$$\frac{I}{II} = \frac{2}{1}$$

$$\frac{II}{III} = \frac{3}{1}$$

To make 'II' number same

$$\begin{array}{ccc} I & II & III \\ 6 & 3 & 1 \end{array} \Rightarrow 10 \text{ units}$$

5 units difference

$$10 \text{ units} = 120$$

$$1 \text{ unit} = \frac{120}{10} = 12$$

$$5 \text{ units} = 12 \times 5 = 60$$

$$\text{Difference between the largest and the smallest} = 60$$

7. (c) According to the question

$$\frac{I + II + III + IV}{4} = 60$$



$$I + II + III + IV = 240 \dots\dots (i)$$

**Given:**  $I = \frac{1}{4} (II + III + IV)$

$$4I = II + III + IV \dots\dots (ii)$$

Compare equation (i) and (ii)

$$I + 4I = 240$$

$$5I = 240$$

$$I = 48$$

8.(c); Let the first even number A be  $(x + 2)$

$$\therefore E \Rightarrow (x + 10)$$

Now, according to the question

$$\frac{x+2+x+10}{2} = 46$$

$$\text{or, } 2x + 12 = 92$$

$$\text{or, } 2x = 92 - 12 = 80$$

$$\text{or, } x = 40$$

$$\therefore \text{largest number } E = x + 10 = 40 + 10 = 50$$

9. (d)

10.(d) According to the question

$$\text{Avg. weight of a 20 boys} = 89.4 \text{ kg}$$

$$\text{Sum of a weight of 20 boys} = 89.4 \times 20 = 1788 \text{ kg}$$

It was later discovered that one weight was misread as 78 kg instead of 87 kg.

$$\therefore \text{difference} = 87 - 78 = 9 \text{ kg}$$

$$\therefore \text{Actual sum of a weight of 20 boys}$$

$$= 1788 + 9 = 1797 \text{ kg}$$

$$\text{Actual Avg.} = \frac{1797}{20} = 89.85 \text{ kg}$$

11.(b) According to the question

$$\text{Avg. of 18 observations is} = 124$$

$$\therefore \text{Sum of 18 observations are} = 124 \times 18 = 2232$$

later it was found that two observations with values 64 and 28 were wrongly entered as 46 and 82

$$\therefore \text{Difference} = [(82 + 46) - (64 + 28)] = [128 - 92] = 36$$

$$\therefore \text{Actual sum of 18 observations}$$

$$= 2232 - 36 = 2196$$

$$\text{Avg of 18 observations} = \frac{2196}{18} = 122$$

12.(c) According to the question

The mean of 50 no. is = 30

$$\text{Sum of 50 no. is } s = 50 \times 30 = 1500$$

Later it was discovered that two entries were wrongly entered as 82 and 13 instead of 28 and 31.

$$\therefore \text{Difference} = (82 + 13) - (28 + 31) = 95 - 59 = 36 \text{ (Extra)}$$

$$\therefore \text{Actual sum of 50 number is}$$

$$= 1500 - 36 = 1464$$

$$\therefore \text{Actual avg.} = \frac{1464}{50} = 29.28$$

**Alternate:**

$$\text{Sum of wrongly entered numbers} = 82 + 13 = 95$$

$$\text{Sum of correct numbers} = 28 + 31 = 59$$

$$\text{Required average} = 30 + \frac{59-95}{50} = 30 - 0.72$$

$$= 29.28$$

13. (a); Salary of new person

$$= 5700 + 15(5700 - 5500) = \text{Rs. } 8700$$

14. (b); Let the third number =  $x$

$$\text{The second number} = 3x$$

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

According to the question,

$$x + 3x + \frac{3x}{2} = 3 \times 44$$

$$\text{P } \frac{2x + 6x + 3x}{2} = 132$$

$$\text{P } 11x = 264$$

$$\therefore x = \frac{264}{11} = 24$$

$$\therefore \text{The largest number} = 3x = 3 \times 24 = 72$$

15. (c) 16. (a)

17. (a) Let the number of girls =  $x$

$$\text{The number of boys} = y$$

According to question

$$73x + 71y = 71.8 (x + y)$$

$$1.2 = 0.8y$$

$$\frac{x}{y} = \frac{2}{3}$$



$$\therefore \frac{50x - 100(90 - 60)}{x} = 45$$

$$\therefore x = 600$$

29. (a); Suppose the average expenditure was Rs.  $x$ .

Then total expenditure =  $35x$

When 7 more students join the mess, total expenditure =  $35x + 42$

Now, the average expenditure

$$= \frac{35x + 42}{35 + 7} = \frac{35x + 42}{42}$$

$$\text{Now, we have } \frac{35x + 42}{42} = x - 1$$

$$\text{or, } 3x + 42 = 42x - 42$$

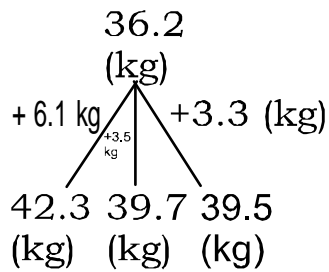
$$\text{or, } 7x = 84 \quad \therefore x = 12$$

The original expenditure of the mess

$$= 35 \times 12 = \text{Rs. } 420$$

30.(b) According to the question average weight of

40 children ( $40 = 36.2 \text{ kg}$ )



Total increase weight of 3 student =  $6.1 + 3.5 + 3.3$

=  $12.9 \text{ kg}$

$\therefore$  This increase weight effect the average of 43 children

$$\therefore \frac{12.9}{43} = 0.3$$

Old average =  $36.2 \text{ kg}$

New average =  $36.2 + 0.3 = \mathbf{36.5 \text{ kg}}$ .