Average 6

INTRODUCTION

Whenever we are asked the marks we scored in any examination, we usually tell the marks in terms of percentage, that is, taking the percentage of total marks of all subjects. This percentage is called *average percentage*. Also, in a class, if there are 100 students, instead of knowing the age of individual student, we usually talk about their average age.

The *average* or *mean* or *arithmetic mean* of a number of quantities of the same kind is equal to their sum divided by the number of those quantities. For example, the average of 3, 9, 11, 15, 18, 19 and 23 is

$$\frac{3+9+11+15+18+19+23}{7} = \frac{98}{7} = 14.$$

SOME BASIC FORMULAE

1. Average $= \dfrac{\text{Sum of quantities}}{\text{Number of quantities}}$

2. Sum of quantities = Average × Number of quantities

3. Number of quantities $= \dfrac{\text{Sum of quantities}}{\text{Average}}$

Illustration 1: A man purchased 5 toys at ₹200 each, 6 toys at ₹250 each and 9 toys at ₹300 each. Calculate the average cost of 1 toy.

Solution: Price of 5 toys = 200 × 5 = ₹1000

Price of 6 toys = 250 × 6 = ₹1500

Price of 9 toys = 300 × 9 = ₹2700

Total number of toys = 5 + 6 + 9 = 20

Average price of 1 toy $= \dfrac{1000+1500+2700}{20}$

$$= \frac{5200}{20} = ₹260.$$

Illustration 2: The average marks obtained by 200 students in a certain examination is 45. Find the total marks.

Solution: Total marks

= Average marks × Number of students

= 200 × 45 = 900.

Illustration 3: Total temperature for the month of September is 840°C. If the average temperature of that month is 28°C, find out the number of days is the month of September.

Solution: Number of days in the month of September

$$= \frac{\text{Total temperature}}{\text{Average temperature}} = \frac{840}{28}$$

= 30 days.

SOME USEFUL SHORTCUT METHODS

1. Average of two or more groups taken together.
   (a) If the number of quantities in two groups be n_1 and n_2 and their average is x and y, respectively, the combined average (average of all of them put together) is

   $$\frac{n_1 x + n_2 y}{n_1 + n_2}$$

Explanation

Number of quantities in the first group = n_1

Their average = x

∴ Sum = $n_1 \times x$

Number of quantities in the second group = n_2

Their average = y

∴ Sum = $n_2 \times y$

Number of quantities in the combined group = $n_1 + n_2$.

Total sum (sum of quantities of the first group and the second group) = $n_1x + n_2y$.

∴ Average of the two groups

$$= \frac{n_1x + n_2y}{n_1 + n_2}.$$

> (b) If the average of n_1 quantities is x, and the average of n_2 quantities out of them is y, the average of the remaining group (rest of the quantities) is
>
> $$\frac{n_1x - n_2y}{n_1 - n_2}.$$

Explanation

Number of quantities = n_1

Their average = x

∴ Sum = $n_1 x$

Number of quantities taken out = n_2

Their average = y

∴ Sum = n_2y

Sum of remaining quantities = $n_1x - n_2y$

Number of remaining quantities = $n_1 - n_2$

∴ Average of the remaining group $= \frac{n_1x - n_2y}{n_1 - n_2}$.

Illustration 4: The average weight of 24 students of section A of a class is 58 Kg, whereas the average weight of 26 students of section B of the same class is 60.5 Kg. Find out average weight of all the 50 students of the class.

Solution: Here, $n_1 = 24$, $n_2 = 26$, $x = 58$, and $y = 60.5$.

∴ Average weight of all the 50 students

$$= \frac{n_1x + n_2y}{n_1 + n_2}$$

$$= \frac{24 \times 58 + 26 \times 60.5}{24 + 26}$$

$$= \frac{1392 + 1573}{50} = \frac{2965}{50} = 59.3 \text{ Kg}.$$

Illustration 5: Average salary of all the 50 employees including 5 officers of a company is ₹850. If the average salary of the officers is ₹2500, find the average salary of the remaining staff of the company.

Solution: Here, $n_1 = 50$, $n_2 = 5$, $x = 850$ and $y = 2500$.

∴ Average salary of the remaining staff

$$= \frac{n_1x - n_2y}{n_1 - n_2} - \frac{50 \times 850 - 5 \times 2500}{50 - 5}$$

$$= \frac{42500 - 12500}{45} = \frac{30000}{45}$$

$$= ₹667 \text{ (approx.)}$$

> 2. If x is the average of $x_1, x_2, ..., x_n$, then
>   (a) The average of $x_1 + a, x_2 + a, ..., x_n + a$ is $x + a$.
>   (b) The average of $x_1 - a, x_2 - a, ... x_n - a$ is $x - a$.
>   (c) The average of $ax_1, ax_2, ..., ax_n$ is ax, provided $a \neq 0$.
>   (d) The average of $\frac{x_1}{a}, \frac{x_2}{a}, ..., \frac{x_n}{a}$ is $\frac{\bar{x}}{a}$, provided $a \neq 0$.

Illustration 6: The average value of six numbers 7, 12, 17, 24, 26 and 28 is 19. If 8 is added to each number, what will be the new average?

Solution: The new average = $\bar{x} + a$

$$= 19 + 8 = 27.$$

Illustration 7: The average of x numbers is $5x$. If $x - 2$ is subtracted from each given number, what will be the new average?

Solution: The new average = $\bar{x} - a$

$$= 5x - (x - 2) = 4x + 2.$$

Illustration 8: The average of 8 numbers is 21. If each of the numbers is multiplied by 8, find the average of a new set of numbers.

Solution: The average of a new set of numbers

$$= a\bar{x} = 8 \times 21 = 168$$

> 3. The average of n quantities is equal to x. If one of the given quantities whose value is p, is replaced by a new quantity having value q, the average becomes y, then $q = p + n(y - x)$.

Illustration 9: The average weight of 25 persons is increased by 2 Kg when one of them whose weight is 60 Kg, is replaced by a new person. What is the weight of the new person?

Solution: The weight of the new person

$$= p + n(y - x)$$

$$= 60 + 25(2) = 110 \text{ Kg}.$$

> 4. (a) The average of n quantities is equal to x. When a quantity is removed, the average becomes y. The value of the removed quantity is $n(x - y) + y$.
>   (b) The average of n quantities is equal to y. When a quantity is added, the average becomes y. The value of the new quantity is $n(y - x) + y$.

Illustration 10: The average age of 24 students and the class teacher is 16 years. If the class teacher's age is excluded, the average age reduces by 1 year. What is the age of the class teacher?

Solution: The age of class teacher

$$= n(x - y) + y$$
$$= 25(16 - 15) + 15 = 40 \text{ years.}$$

Illustration 11: The average age of 30 children in a class is 9 years. If the teacher's age be included, the average age becomes 10 years. Find the teacher's age.

Solution: The teacher's age

$$= n(y - x) + y$$
$$= 30(10 - 9) + 100 = 40 \text{ years.}$$

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5. (a) The average of first n natural numbers is $\dfrac{n+1}{2}$.

   (b) The average of square of natural numbers till n is $\dfrac{(n+1)(2n+1)}{6}$.

   (c) The average of cubes of natural numbers till n is $\dfrac{n(n+1)^2}{4}$.

   (d) The average of odd numbers from 1 to n is $\dfrac{\text{last odd number} + 1}{2}$.

   (e) The average of even numbers from 1 to n is $\dfrac{\text{last even number} + 2}{2}$.

Illustration 12: Find the average of first 81 natural numbers.

Solution: The required average

$$= \frac{n+1}{2} = \frac{81+1}{2} = 41.$$

Illustration 13: What is the average of squares of the natural numbers from 1 to 41?

Solution: The required average

$$= \frac{(n+1)(2n+1)}{6} = \frac{(41+1)(2\times41+1)}{6}$$
$$= \frac{42\times83}{6} = \frac{3486}{6} = 581.$$

Illustration 14: Find the average of cubes of natural numbers from 1 to 27.

Solution: The required average

$$= \frac{n(n+1)^2}{4} = \frac{27\times(27+1)^2}{4}$$

$$= \frac{27\times28\times28}{4} = \frac{21168}{4} = 5292.$$

Illustration 15: What is the average of odd numbers from 1 to 40?

Solution: The required average

$$= \frac{\text{last odd number} + 1}{2} = \frac{39+1}{2} = 20.$$

Illustration 16: What is the average of even numbers from 1 to 81?

Solution: The required average

$$= \frac{\text{last even number} + 2}{2} = \frac{80+2}{2} = 41.$$

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6. (a) If n is odd: The average of n consecutive numbers, consecutive even numbers or consecutive odd numbers is always the middle number.

   (b) If n is even: The average of n consecutive numbers, consecutive even numbers or consecutive odd numbers is always the average of the middle two numbers.

   (c) The average of first n consecutive even numbers is $(n + 1)$.

   (d) The average of first n consecutive odd numbers is n.

   (e) The average of squares of first n consecutive even numbers is $\dfrac{2(n+1)(2n+1)}{3}$.

   (f) The average of squares of consecutive even numbers till n is $\dfrac{(n+1)(n+2)}{3}$.

   (g) The average of squares of consecutive odd numbers till n is $\dfrac{n(n+2)}{3}$.

   (h) If the average of n consecutive numbers is m, then the difference between the smallest and the largest number is $2(n - 1)$.

Illustration 17: Find the average of 7 consecutive numbers 3, 4, 5, 6, 7, 8, 9.

Solution: The required average = middle number = 6.

Illustration 18: Find the average of consecutive odd numbers 21, 23, 25, 27, 29, 31, 33, 35.

Solution: The required average

$$= \text{average of middle two numbers}$$
$$= \text{average of 27 and 29}$$
$$= \frac{27 + 29}{2} = 28.$$

Illustration 19:   Find the average of first 31 consecutive even numbers.

Solution: The required average = $(n + 1) = 31 + 1 = 32$.

Illustration 20:   Find the average of first 50 consecutive odd numbers.

Solution: The required average = $n = 50$.

Illustration 21:   Find the average of squares of first 19 consecutive even numbers.

Solution: The required average $= \dfrac{2(n+1)(2n+1)}{3}$

$$= \frac{2(19+1)(2\times19+1)}{3}$$

$$= \frac{2\times20\times39}{3}$$

$$= \frac{1560}{3} = 520.$$

Illustration 22:   Find the average of squares of consecutive even numbers from 1 to 25.

Solution: The required average

$$= \frac{(n+1)(n+2)}{3} = \frac{(25+1)(25+2)}{3}$$

$$= \frac{26\times27}{3} = \frac{702}{3} = 234.$$

Illustration 23:   Find the average of squares of consecutive odd numbers from 1 to 31.

Solution: The required average

$$= \frac{n(n+2)}{3} = \frac{31\times(31+2)}{3}$$

$$= \frac{31\times33}{3} = 341.$$

Illustration 24:   If the average of 6 consecutive numbers is 48, what is the difference between the smallest and the largest number?

Solution: The required difference
$$= 2(n - 1) = 2(6 - 1) = 10.$$

> 7. Geometric Mean or Geometric Average.
>   Geometric mean of $x_1, x_2, ..., x_n$ is denoted by
> $$\text{G.M.} = \sqrt[n]{x_1 \times x_2 \times \cdots \times x_n}.$$
>   Geometric mean is useful in calculating averages of ratios such as average population growth rate, average percentage increase and, so on.

Illustration 25:   The production of a company for three successive years has increased by 10%, 20% and 40%, respectively. What is the average annual increase of production?

Solution: Geometric mean of x, y and $z = (x\times y\times z)^{1/3}$.

∴   Average increase $= (10 \times 20 \times 40)^{1/3}\% = 20\%$

Illustration 26:   The population of a city in two successive years increases at the rates of 16% and 4%, respectively. Find out the average increase in two years.

Solution: In case of population increase, the geometric mean is required.

∴   Geometric mean of 16% and 4% is
$$= (16 \times 4)^{1/2}\%, \text{ i.e., } 8\%$$

> 8. Harmonic Mean or Harmonic Average.
>   Harmonic mean of $x_1, x_2, ..., x_n$ is denoted by
> $$\text{H.M.} = \frac{1}{\dfrac{1}{n}\left(\dfrac{1}{x_1} + \dfrac{1}{x_2} + \cdots + \dfrac{1}{x_n}\right)}$$
>   Harmonic mean is useful in finding out average speed of a vehicle, average production per day and, so on.

Illustration 27:   A man runs 1 Km at a speed of 15 Km/h and another 1 Km he walks at a speed of 5 Km/h. Find out his average speed in covering 2 Km.

Solution: Harmonic mean is used when distance remains constant and speed varies. Harmonic mean of x and y is $\dfrac{2}{\dfrac{1}{x}+\dfrac{1}{y}}$ or, $\dfrac{2xy}{x+y}$.

∴   Average speed for the whole distance

$$= \frac{2\times15\times5}{15+5} = 7.5 \text{ Km/h.}$$

> 9. If a certain distance is covered at a speed of x Km/h and the same distance is covered at a speed of y Km/h, the average speed during the entire journey is
> $$\left(\frac{2xy}{x+y}\right) \text{Km/h.}$$

Illustration 28:   If half of the journey is travelled at a speed of 15 Km/h and the remaining half at a speed of 12 Km/h, find out average speed during the entire journey

Solution: The average speed

$$= \left(\frac{2xy}{x+y}\right) = \left(\frac{2\times15\times12}{15+12}\right)$$

$$= \frac{360}{27} = 13\frac{1}{3} \text{ Km/h.}$$

Illustration 29: A man goes to a certain place at a speed of 30 Km/h and returns to the original place at a speed of 20 Km/h, find out his average speed during this up and down journey.

Solution: The average speed

$$= \left(\frac{2xy}{x+y}\right) = \left(\frac{2\times30\times20}{30+20}\right) = \frac{1200}{50}$$

$$= 24\text{ Km/h.}$$

10. If a person or a motor car covers three equal distances at the speed of x Km/h, y Km/h and z Km/h, respectively, then for the entire journey average speed of the person or motor car is $\left(\dfrac{3xzy}{xy+yz+zx}\right)$ Km/h.

Illustration 30: A train covers the first 160 Km at a speed of 120 Km/h, another 160 Km at 140 Km/h and the last 160 Kms at 80 Km/h. Find out average speed of the train for the entire journey.

Solution: Average speed $= \dfrac{3xyz}{xy+yz+zx}$

$$= \frac{3\times120\times140\times80}{120\times140+140\times80+80\times120}$$

$$= \frac{360\times140\times80}{16800+11200+9600} = \frac{4032000}{37600}$$

$$= 107\frac{11}{47} \text{ Km/h.}$$

11. If a person covers A Km at a speed of x Km/h, B Km at a speed of y Km/h and C Km at a speed of z Km/h, the average speed during the entire journey is

$$\left(\frac{A+B+C}{\dfrac{A}{x}+\dfrac{B}{y}+\dfrac{C}{z}}\right) \text{ Km/h.}$$

Illustration 31: A person covers 9 Km at a speed of 3 Km/h, 25 Km at a speed of 5 Km/h and 30 Km at a speed of 10 Km/h. Find out average speed for the entire journey.

Solution: The average speed $= \left(\dfrac{A+B+C}{\dfrac{A}{x}+\dfrac{B}{y}+\dfrac{C}{z}}\right)$

$$= \left(\frac{9+25+30}{\dfrac{9}{3}+\dfrac{25}{5}+\dfrac{30}{10}}\right)$$

$$= \frac{64}{11} = 5\frac{9}{11} \text{ Km/h.}$$

12. If a person covers Ath part of the distance at x Km/h, Bth part of the distance at y Km/h and the remaining Cth part at z Km/h, then the average speed during the entire journey is

$$\left(\frac{1}{\dfrac{A}{x}+\dfrac{B}{y}+\dfrac{C}{z}}\right) \text{Km/h.}$$

Illustration 32: A person covers the first $\dfrac{1}{4}$ of the distance at 8 Km/h, the next $\dfrac{3}{5}$ at 6 Km/h and the remaining distance at 15 Km/h. Find the average speed during the entire journey.

Solution: The average speed

$$= \frac{1}{\left(\dfrac{A}{x}+\dfrac{B}{y}+\dfrac{C}{z}\right)} = \left(\frac{1}{\dfrac{1/4}{8}+\dfrac{3/5}{6}+\dfrac{3/20}{15}}\right)$$

$$\left[\text{Here, } A = \frac{1}{4}, B = \frac{3}{5} \text{ and } C = 1-\left(\frac{1}{4}+\frac{3}{5}\right) = \frac{3}{20}\right]$$

$$= \frac{1}{\dfrac{1}{32}+\dfrac{1}{10}+\dfrac{1}{100}} = \frac{3200}{452} = 7\frac{9}{113} \text{ Km/h.}$$

Illustration 33: A train covers 50% of the journey at 30 Km/h, 25% of the journey at 25 Km/h and the remaining at 20 Km/h. Find the average speed of the train during the entire journey.

Solution: The average speed

$$= \left(\frac{100}{\dfrac{A}{x}+\dfrac{B}{y}+\dfrac{C}{z}}\right) = \left(\frac{100}{\dfrac{50}{30}+\dfrac{25}{25}+\dfrac{25}{20}}\right)$$

$$\text{[Here, } A = 50, B = 25 \text{ and } C = 25]$$

$$= \frac{100}{47/12} = \frac{1200}{47} = 25\frac{25}{47} \text{ Km/h.}$$

1. The daily earnings of a taxi driver during a week are: ₹60, ₹65, ₹70, ₹52. 50, ₹63, ₹73 and ₹68. What is his average daily earning for the week?

   (a) ₹74.50　　　　(b) ₹54.50
   (c) ₹64.50　　　　(d) ₹84.50

2. The average of 10 numbers is 7. What will be the new average if each of the numbers is multiplied by 8?

   (a) 45　　　　(b) 52
   (c) 56　　　　(d) 55

3. The average weight of 5 persons, sitting in a boat, is 38 Kg. If 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

4. There are 35 students in a hostel. If the number of students increased by 7, the expenses of the mess were increased by ₹42 per day while the average expenditure per head decreased by ₹1. Find out the actual expenditure of the mess.

   (a) ₹480　　　　(b) ₹440
   (c) ₹520　　　　(d) ₹420

5. The daily maximum temperature in Delhi, for 7 consecutive days in May 1988, were 42.7°C, 44.6°C, 42.0°C, 39.1°C, 43.0°C, 42.5°C and 38.5°C. Find out the average daily maximum temperature.

   (a) 42.63° C　　　　(b) 45.65° C
   (c) 41.77° C　　　　(d) 39.60° C

6. The average salary per head of all the workers in a workshop is ₹850. If the average salary per head of 7 technicians is ₹1000 and the average salary per head of the rest is ₹780, find out the total number of workers in the workshop.

   (a) 26　　　　(b) 24
   (c) 28　　　　(d) 22

7. An aeroplane travels 2500 Km, 1200 Km and 500 Km at 500 Km/h, 400 Km, and 250 Km/h, respectively. The average speed is:

   (a) 420 Km/h　　　　(b) 410 Km/h
   (c) 405 Km/h　　　　(d) 575 Km/h

8. In an examination, out of 20 students in a class, in Mathematics 2 students scored 100 marks, 3 students scored 0, and average marks for rest of the students was 40. What is the average mark of the whole class?

   (a) 40 marks　　　　(b) 35 marks
   (c) 32 marks　　　　(d) 45 marks

9. The average weight of 24 students in section A of a class is 58 Kg, whereas the average weight of 26 students in section B of the same class is 60.5 Kg. Find out the average weight of all the 50 students of the class.

   (a) 57.4 Kg　　　　(b) 59.3 Kg
   (c) 58.9 Kg　　　　(d) 59.7 Kg

10. The average age of 5 members is 21 years. If the age of the youngest member be 5 years, find out the average age of the family at the birth of the youngest member.

    (a) 24 years　　　　(b) 25 years
    (c) 20 years　　　　(d) 28 years

11. The average of 7 numbers is 5. If the average of first six of these numbers is 4, the seventh number is:

    (a) 14　　　　(b) 12
    (c) 11　　　　(d) 15

12. Three years ago the average age of a family of 5 members was 27 years. On addition of a child to the family, the present average age of the family is still 27 years. Find out the present age of the child.

    (a) 16 years　　　　(b) 12 years
    (c) 24 years　　　　(d) 20 years

13. The average weight of 10 students is increased by half a Kg when one of the students weighing 50 Kg is replaced by a new student. Find out the weight of the new student.

    (a) 55 Kg　　　　(b) 60 Kg
    (c) 45 Kg　　　　(d) 40 Kg

14. The average monthly salary of a staff of 9 persons is ₹2450. One member of the staff whose monthly salary is ₹2650 is transferred. Find out the average salary of the remaining 8 persons of the staff.

    (a) ₹2425　　　　(b) ₹2625
    (c) ₹3025　　　　(d) ₹2825

15. The mean marks of 10 boys in a class is 70%, whereas the mean marks of 15 girls is 60%. The mean marks of all the 25 students is:

    (a) 64%　　　　(b) 60%
    (c) 55%　　　　(d) 52%

16. The average income of A for 15 days is ₹70. The average for first five days is ₹60 and that for the last nine days is ₹80. A's income for the sixth day is:

    (a) ₹80   (b) ₹60
    (c) ₹40   (d) ₹30

17. The average of five consecutive even numbers starting with 4, is:

    (a) 6   (b) 7
    (c) 8   (d) 7.5

18. Three years ago the average age of a family of 5 members was 17 years. With the birth of a new baby, the average remains the same three even today. Find out the age of the baby.

    (a) 1 year   (b) 3 years

    (c) $2\frac{1}{2}$ years   (d) 2 years

19. The average of 17 numbers is 10.9. If the average of first nine numbers is 10.5 and that of the last 9 numbers is 11.4, the middle number is:

    (a) 11.8   (b) 11.4
    (c) 10.9   (d) 11.7

20. A batsman has a certain average of runs for 12 innings. In the 13th innings, he scores 96 runs and thereby increasing his average by 5 runs. What is his average after the 13th innings?

    (a) 48   (b) 64
    (c) 36   (d) 72

21. A batsman in his 17th innings, makes a score of 85 runs, and thereby, increases his average by 3 runs. What is his average after the 17th innings? He had never been 'not out'?

    (a) 47   (b) 37
    (c) 39   (d) 43

22. The sum of three numbers is 98. If the ratio between first and second be 2:3 and between second and third be 5:8, then the second number is:

    (a) 30   (b) 20
    (c) 58   (d) 48

23. The average weight of 8 sailors in a boat is increased by 1 Kg if one of them weighing 56 Kg is replaced by a new sailor. The weight of the new sailor is:

    (a) 57 Kg   (b) 60 Kg
    (c) 64 Kg   (d) 62 Kg

24. A number, x, equals 80% of the average of 5, 7, 14 and a number y. If the average of x and y is 26, then value of y is:

    (a) 13   (b) 26
    (c) 39   (d) None of these

25. The average age of A, B, C, D five years ago was 45 years. By including x, the present average age of all the five is 49 years. The present age of x is:

    (a) 64 years   (b) 48 years
    (c) 45 years   (d) 40 years

26. It rained as much on Wednesday as on all the others days of the week combined. If the average rainfall for the whole week was 3 cm, then much did it rain on Wednesday?

    (a) 2.625 cm   (b) 3 cm
    (c) 10.5 cm   (d) 15 cm

27. The average monthly expenditure of a family for the first four months is ₹2750, for the next three months is ₹2940, and for the last five months ₹3130. If the family saves ₹5330 throughout year, find the average monthly income of the family for that year.

    (a) ₹3800   (b) ₹3500
    (c) ₹3400   (d) ₹4200

28. The average age of 8 men is increased by 2 years. When 2 of them, whose ages are 20 years and 24 years respectively, are replaced by 2 women. What is the average age of these two women?

    (a) 36 years   (b) 30 years
    (c) 40 years   (d) 42 years

29. The average of 50 numbers is 38. If two numbers 45 and 55 are discarded, the average of the remaining set of numbers is:

    (a) 38.5   (b) 37.5
    (c) 37.0   (d) 36.5

30. The average speed of a train running at a speed of 30 Km/h during the first 100 kilometres, at 40 Km/h during the second 100 kilometres and at 50 Km/h during the last 100 kilometres is nearly:

    (a) 38.5 Km/h   (b) 38.3 Km/h
    (c) 40.0 Km/h   (d) 39.2 Km/h

31. The average of 6 observations is 12. A new seventh observation is included and the new average is decreased by 1. The seventh observation is:

    (a) 1   (b) 3
    (c) 5   (d) 6

32. The average age of 20 boys in the class is 15.6 years. Five new boys join and the new average becomes 15.56 years. What was the average age of the five new boys?

(a) 15.5   (b) 15.4
(c) 15.25   (d) 15.3

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

(a) 70 Kg   (b) 72 Kg
(c) 75 Kg   (d) 80 Kg

34. There was one mess for 30 boarders in a certain hostel. On the number of boarders being increased by 10, the expenses of the mess were increased by ₹40 per month while the average expenditure per head diminished by ₹2. Find out actual monthly expenses.

(a) ₹390   (b) ₹410
(c) ₹360   (d) ₹480

35. Of the three numbers, the first is twice the second and the second is thrice the third. If the average of the three numbers is 10, the numbers are:

(a) 18, 3, 9   (b) 9, 3, 18
(c) 3, 9, 18   (d) 18, 9, 3

36. The average weight of 36 students is 50 Kg. It was found later that the figure of 37 Kg was misread as 73 Kg. What is the correct average?

(a) 49 Kg   (b) 51 Kg
(c) 50.5 Kg   (d) None of these

37. The average earning of a mechanic for the first four days of a week is ₹18 and for the last four days is ₹22. If he earns ₹20 on the fourth day, his average earning for the whole week is:

(a) ₹18.95   (b) ₹16
(c) ₹20   (d) ₹25.71

38. The average of marks obtained by 120 candidates was 35. If the average of marks of passed candidates was 39 and that of failed candidates was 15, the number of candidates who passed the examination is:

(a) 100   (b) 110
(c) 120   (d) 150

39. In a class, there are 20 boys whore average age is decreased by 2 months, when one boy aged 18 years in replaced by a new boy. The age of the new boy is:

(a) 14 years and 8 months
(b) 15 years
(c) 16 years 4 months
(d) 17 years 10 months

40. The average temperature from Monday to Thursday is 48°C and from Tuesday to Friday is 52°C. If the temperature on Monday is 42°C, what was it on Friday?

(a) 52°C   (b) 55°C
(c) 58°C   (d) 51°C

41. A man spends on an average ₹269.47 for the first 7 months and ₹281.05 for the next 5 months. Find out his monthly salary if he saved ₹308.46 during the year.

(a) ₹400   (b) ₹500
(c) ₹300   (d) ₹600

42. The average of two numbers is 62. If 2 is added to the smaller number, the ratio between the numbers becomes 1:2. The smaller number is:

(a) 60   (b) 30
(c) 84   (d) 40

43. In a coconut grove, $(x + 2)$ trees yield 60 nuts per year, x trees yield 120 nuts per year, and $(x - 2)$ trees yield 180 nuts per year. If the average yield per year per tree be 100, find the value of x.

(a) 4   (b) 2
(c) 8   (d) 6

44. Average temperature of first 4 days of a week is 38.6°C and that of the last 4 days is 40.3°C. If the average temperature of the week be 39.1°C, the temperature on 4th day is.

(a) 36.7°C   (b) 38.6°C
(c) 39.8°C   (d) 41.9°C

45. The average daily wages of A, B and C is ₹120. If B earns ₹40 more than C per day and A earns double of what C earns per day, the wages of A per day is

(a) ₹80   (b) ₹120
(c) ₹160   (d) ₹100

46. With an average speed of 40 Km/h, a train reaches its destination on time. If it goes with an average speed of 35 Km/h, it reaches late by 15 minutes. The total journey is:

(a) 30 Km   (b) 40 Km
(c) 70 Km   (d) 80 Km

47. In a competitive examination, the average marks obtained was 45. It was later discovered that there was some error in computerization and the marks of 90 candidates had to be changed from 80 to 50, and the average came down to 40 marks. The total number of candidates appeared in the examination is:

(a) 520   (b) 550
(c) 540   (d) 525

48. Visitors to a show were charged ₹15.00 each on the first day, ₹7.50 on the second, ₹2.50 on the third day. Visitors total attendance for three days were in the ratio 2:5:13. Find out the average charge per visitor for the entre show.

(a) ₹7 (b) ₹5
(c) ₹9 (d) ₹11

49. The mean daily profit made by a shopkeeper, in a month of 30 days, was ₹350. If the mean profit for the first 15 days was ₹275, then the mean profit for the last 15 days would be:

(a) ₹200 (b) ₹275
(c) ₹350 (d) ₹425

50. A man whose bowling average is 12.4, takes 5 wickets for 26 runs and, thereby, decreases his average by 0.4. The number of wickets, taken by him, before his last match is:

(a) 85 (b) 78
(c) 72 (d) 64

51. Out of three numbers, the first is twice the second and is half of the third. If the average of the three numbers is 56, the three numbers in order are:

(a) 48, 96, 24 (b) 48, 24, 96
(c) 96, 24, 48 (d) 96, 48, 24

52. There were 35 students in a hostel. If the number of students increases by 7, the expenses of the mess increase by ₹42 per day while the average expenditure per head diminishes by ₹1. Find the actual expenditure of the mess.

(a) ₹480 (b) ₹420
(c) ₹520 (d) ₹460

53. The average of 50 numbers is 38. If two numbers, namely, 45 and 55 are discarded, what is the average of the remaining numbers?

(a) 37.5 (b) 38.5
(c) 39.5 (d) 36.5

54. In a cricket team of 11 boys, one player weighing 42 Kg is injured and replaced by another player. If the average weight of the team is increased by 100 gm as a result of this, then what is the weight of the new player?

(a) 42.1 Kg (b) 45.1 Kg
(c) 44.1 Kg (d) 43.1 Kg

55. The average of these consecutive numbers is *n*. If the next two consecutive numbers are also included, the average of the five numbers will:

(a) remain the same. (b) increase by 0.5.
(c) increase by 1. (d) increase by 1.5.

56. The average salary of 20 workers in an office is ₹1900 per month. If the manager's salary is added, the average becomes ₹2000 per month. The manager's salary (in ₹) is:

(a) 24000 (b) 25200
(d) 45600 (d) None of these

57. The average age of students of a class is 15.8 years. The average age of boys in the class is 16.4 years and that of the girls is 15.4 years. The ratio of number of boys to the number of girls in the class is:

(a) 1:2 (b) 3:4
(c) 3:5 (d) 2:3

58. The average expenditure of a man for the first five months is ₹3600 and for next seven months it is ₹3900. If he saves ₹8700 during the year, his average income per month is:

(a) ₹4500 (b) ₹4200
(c) ₹4050 (d) ₹3750

59. Of the three numbers, second is twice the first and is also thrice the third. If the average of the three numbers is 44, the largest number is:

(a) 24 (b) 36
(c) 72 (d) 108

60. The average age of a committee of 8 members is 40 years. A member, aged 55 years, retired and he was replaced by a member aged 39 years. The average age of the present committee is:

(a) 39 years (b) 38 years
(c) 36 years (d) 35 years

EXERCISE-2
(BASED ON MEMORY)

1. The mean of the marks obtained by 100 students is 60. If the marks obtained by one of the students was incorrectly calculated as 75, whereas the actual marks obtained by him was 65, what is the correct mean of the marks obtained by the students?

(a) 59 (b) 58.50
(c) 50 (d) None of these
[NABARD PO, 2008]

2. In one-day cricket match the captain of one of the teams scored 30 runs more than the average runs

scored by the reamaining six batsmen of that team who batted in the match. If the total runs scored by all the batsmen of that team were 310, how many runs did the captain score?

(a) 60   (b) 70
(c) 50   (d) Cannot be determined
(e) None of these

3. The average of four number A, B, C and is 40. The average of four numbers A, B, E and F is also 40. (A, B are common). Which of the following must be true?

(a) $(A+B) \neq (C+D)$

(b) $(C+D) = (E+F)$

(c) Either $C = E$ or F; and $D = F =$ or E
(d) $C = E =$ and $D = F$

4. The average (Arithmetic Mean) and the Median of a set of numbers is the same. Which of the following must be true?

(a) All the numbers are odd in the set
(b) All the numbers are even in the set
(c) All numbers are consecutive integers in the set
(d) The data set has even numbers of observations
(e) None of these

5. The average of four positive integers is 72.5. The highest integer is 117 and the lowest integer is 15. The difference between the remaining two integers is 12. Which is the higher of these two remaining integers?

(a) 73   (b) 84
(c) 70   (d) Cannot be determined
(e) None of these

6. If $16a + 16b = 48$, what is the average of a and b?

(a) 3   (b) 2.5
(c) 1.5   (d) 5
(e) None of these

7. A, B, C and D are four consecutive even numbers respectively and their average is 65. What the product of A and D?

(a) 3968   (b) 4216
(c) 4092   (d) 4352
(e) None of these

8. The sum of five numbers is 555. The average of the first two numbers is 75 and the third number is 115. What is the average of the last two numbers?

(a) 145   (b) 290
(c) 265   (d) 150
(e) None of these

9. The average age of A, B and C is 26 years, if the average age of A and C is 29 years, what is the age of B in years?

(a) 26   (b) 20
(c) 29   (d) 23
(e) None of these

10. The sum of three consecutive even numbers is 44 more than the average of these numbers. Which of the following is the third (largest) of these numbers?

(a) 16   (b) 18
(c) 24   (d) Cannot be determined
(e) None of these

11. Average weight of 10 boys is more than the average weight of 15 girls by 5 Kg. If the total weight of the 10 boys is 550, what is the average weight of the 10 boys and 15 girls together?

(a) 52 Kg   (b) 52.5 Kg
(c) 53 Kg   (d) 53.5 Kg
(e) None of these

12. The average age of a class of 65 boys was 14 years, the average age of 20 of them was 14 years, and that of another 15 was 12 years, Find the average age of the remaining boys.

(a) 16 years   (b) 13 years
(c) 17 years   (d) 15 years
(e) None of these

13. The average of 5 numbers is is 306.4. The average of the first two numbers is 431 and the average of the last two numbers is 214.5. What is the third number?

(a) 108   (b) 52
(c) 321   (d) Cannot be determined
(e) None of these

14. Kamlesh bouth 65 books for ₹1,050 from one shop and 50 books for ₹1,020 from antoher. What is the average price he paid per book?

(a) ₹36.40   (b) ₹18.20
(c) ₹24   (d) ₹18
(e) None of these

15. A, B, C and D are four consecuvie odd numbers and their average is 42. What is the producto of B and D?

(a) 36   (b) 40
(c) 1845   (d) 60
(e) None of these

[Andhra Bank PO, 2006]

16. The sum of five numbers is 260. The average of the first two numbers is 30 and average of the last two numbers is 70. What is the third number?

(a) 33   (b) 60
(c) 75   (d) Cannot be determined
(e) None of these

[Andhra Bank PO, 2006]

17. The average of 5 consecutive odd numbers A, B, C, D and E is 47. What is the product of A and D?

(a) 2107   (b) 1935
(c) 2021   (d) 2193
(e) None of these

[LIC ADO, 2007]

18. 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 the students is 7 years, then the numbe of students is:

(a) 396   (b) 400
(c) 408   (d) 416

[SSC (GL) Prel. Examination, 2005]

19. A grocer has a sale of ₹6435, ₹6927, ₹6855, ₹7230 and ₹6562 for 5 consecutive months. How much sale must he have in the sixth month so that he gets an average sale of ₹6500?

(a) ₹4991   (b) ₹5991
(c) ₹6991   (d) ₹6001

[SSC (GL) Prel. Examination, 2003]

20. The average weight of three men A, B and C is 84 Kg. D joins them and the average weight of the four becomes 80 Kg. If E, whose weight is 3 Kg more than that of D, replaces A, the average weight of B, C, D and E becomes 79 Kg. The weight of A is:

(a) 65 Kg   (b) 70 Kg
(c) 75 Kg   (d) 80 Kg

[SSC (GL) Prel. Examination, 2003]

21. The average salary of all the workers in a workshop is ₹8000. The average salary of 7 technicians is ₹12000 and the average salary of the rest is ₹6000. The total number of workers in the workshop is:

(a) 20   (b) 21
(c) 23   (b) 22

[SSC (GL) Prel. Examination, 2003]

22. The average marks scored by Ganesh in English, Science, Mathematics and History is less than 15 from that scored by him in English, History, Geography and Mathematics. What is the difference of marks in Science and Geography secured by him?

(a) 40   (b) 50
(c) 60   (d) Data inadequate
(e) None of these

[BSRB Chennai PO, 2000]

23. A Mathematics teacher tabulated the marks secured by 35 students of 8th class. The average of their marks was 72. If the marks secured by Reema was written as 36 instead of 86 then find the correct average marks up to two decimal places.

(a) 73.41   (b) 74.3
(c) 72.43   (d) 73.43
(e) Cannot be determined

[BSRB Bangalore PO, 2000]

24. The average weight of 8 persons increases by 1.5 Kg. If a person weighting 65 Kg is replaced by a new person, what could be the weight of the new person?

(a) 76 Kg   (b) 77 Kg
(c) 76.5 Kg   (d) Data inadequate
(e) None of these

25. The average of four consecutive even numbers is one-fourth of the sum of these numbers. What is the difference between the first and the last number?

(a) 4   (b) 6
(c) 2   (d) Cannot be determined
(e) None of these

[BSRB Delhi PO, 2000]

26. Of the three numbers, the average of the first and the second is greater than the average of the second and the third by 15. What is the difference between the first and the third of the three numbers?

(a) 15   (b) 45
(c) 60   (d) Data inadequate
(e) None of these

[BABARD Asst. Manager Examination, 2002]

27. The average of 25 results is 18, that of first 12 is 14 and of the last 12 is 17. Thirteenth result is:

(a) 72   (b) 78
(c) 85   (d) 28

[Canara Bank PO, 2003]

28. Average age of seven persons in a group is 30 years. The average age of five persons of this group is 31 years. What is the average age of the other two persons in the group?

(a) 55 years   (b) 26 years

(c) 15 years   (d) Cannot be determined

(e) None of these

[PNB Management Trainee Examination, 2003]

29. Average weight of three boys P, T and R is $54\frac{1}{3}$ Kg while the average weight of three boys T, F and G is 53 Kg. What is the average weight of P, T, R, F and H?

(a) 53.8 Kg   (b) 52.4 Kg

(c) 53.2 Kg   (d) Data inadequate

(e) None of these

[Bank of Maharashtra, 2003]

30. In a class of 52 students the number of boys is two less than the number of girls. Average weight of the boys is 42 Kg, while the average weight of all the 52 students is 40 Kg. Approximately what is the average weight of the girls?

(a) 41 Kg   (b) 29 Kg

(c) 40 Kg   (d) 38 Kg

(e) 42 Kg

[IBPS, 2003]

31. The average of 4 consecutive even numbers a, b, c and d is 45. What is the product of A and C?

(a) 2025   (b) 1842

(c) 1932   (d) 2016

[CBC PO Examination, 2003]

32. The average of 7 consecutive numbers is 20. The largest of these numbers is:

(a) 24   (b) 23

(c) 22   (d) 20

[SSC (GL) Prel. Examination, 2000]

33. The average age of 14 girls and their teacher is 15 years. If the teacher's age is excluded, the average reduces by 1 year. What is the teacher's age?

(a) 35 years   (b) 32 years

(c) 30 years   (d) 29 years

[SSC (GL) Prel. Examination, 2000]

34. The average age of four brothers is 12 years. If the age of their mother is also included, the average is increased by 5 years. The age of their mother (in years) is:

(a) 37 years   (b) 43 years

(c) 48 years   (d) 53 years

[SSC (GL) Prel. Examination, 2000]

35. The average age of A and B is 20 years, that of B and C is 19 years and that of A and C is 21 years. What is the age (in years) of B?

(a) 39   (b) 21

(c) 20   (d) 18

[SSC (GL) Prel. Examination, 2000]

36. There are in all 10 balls; some of them are red and others are white. The average cost of all balls is ₹28. If the average cost of red balls is ₹25 and that of white balls is ₹30, then the number of white balls is:

(a) 3   (b) 5

(c) 6   (d) 7

[SSC (GL) Prel. Examination, 2000]

37. The average of marks of 14 students was calculated as 71. But, it was later found that the marks of one student had been wrongly entered as 42 instead of 56 and of another as 74 instead of 32. The correct average is:

(a) 67   (b) 68

(c) 69   (d) 71

[SSC (GL) Prel. Examination, 2000]

38. Of the four numbers whose average is 60, the first is one-fourth of the sum of the last three. The first number is:

(a) 15   (b) 45

(c) 48   (d) 60.25

[SSC (GL) Prel. Examination, 2000]

39. Average age of father and his two sons is 27 years. Five years ago, the average age of the two sons was 12 years. If the difference between the ages of the two sons is 4 years, then the present age of the father is:

(a) 34 years   (b) 47 years

(c) 64 years   (d) 27 years

[SSC (GL) Prel. Examination, 2000]

40. The average age of 30 boys in a class is 15 years. A boy, aged 20 years, left the class, but two new boys came is his place whose ages differ by 5 years. If the average age of all the boys now in the class becomes 15 years, the age of the younger newcomer is:

(a) 20 years   (b) 15 years

(c) 10 years   (d) 8 years

[SSC (GL) Prel. Examination, 2002]

41. Out of three numbers, the first is twice the second and is half of the third. If the average of the three numbers is 56, then difference of first and third numbers is:

(a) 12   (b) 20
(c) 24   (d) 48

[SSC (GL) Prel. Examination, 2002]

42. Of the three numbers, second is twice the first and is also twice the third. If the average of the three numbers is 44, the largest number is:

(a) 24   (b) 72
(c) 36   (d) 108

[SSC (GL) Prel. Examination, 2002]

43. The average of 8 men is increased by 2 years when 2 of them whose ages are 21 and 23 years are replaced by two new men. The average age of two new men is:

(a) 22 years   (b) 24 years
(c) 28 years   (d) 30 years

[SSC (GL) Prel. Examination, 2002]

44. The average age of A and B is 30 years, that of B and C is 32 years, and the average age of C and A is 34 years. The age of C is:

(a) 33 years   (b) 34 years
(c) 35 years   (d) 36 years

[SSC (GL) Prel. Examination, 2002]

45. In a certain year, the average monthly income of a person is ₹3400 and that for the first eight months is ₹3160 and for the last five months is ₹4120. The income in the eight month of the year is:

(a) ₹5080   (b) ₹6080
(c) ₹5180   (d) ₹3880

[SSC (GL) Prel. Examination, 2003]

46. Average age of six sons of a family is 8 years. Average age of sons together with their parents is 22 years. If the father is older than the mother by 8 years, the age of the mother (in years) is:

(a) 44   (b) 52
(c) 60   (d) 68

[SSC (GL) Prel. Examination, 2003]

47. A grocer has a sale of ₹6435, ₹6927, ₹6855, ₹7230 and ₹6562 for 5 consecutive months. How much sale must he have in the sixth month so that he gets an average sale of ₹6500?

(a) ₹4991   (b) ₹5991
(c) ₹6991   (d) ₹6001

[SSC (GL) Prel. Examination, 2003]

48. The average weight of three men A, B and C is 84 Kg. D joins them and the average weight of the four becomes 80 Kg. If E, whose weight is 3 Kg more than that of D, replaces A, the average weight of B, C, D and E becomes 79 Kg. The weight of A is:

(a) 65 Kg   (b) 70 Kg
(c) 75 Kg   (d) 80 Kg

[SSC (GL) Prel. Examination, 2003]

49. The average marks scored by Ganesh in English, Science, Mathematics and History is 15 marks less than what he scored in English, History, Geography and Mathematics. What is the difference of marks in Science and Geography, Ganesh scored?

(a) 40   (b) 50
(c) 60   (d) Data inadequate

[BSRB Chennai PO, 2000]

50. A Mathematics teacher tabulated the marks scored by 35 students of 8th class. The average of their marks was 72. If the marks scored by Reema was written as 36 instead of 86, then find out the correct average marks (up to two decimal places).

(a) 73.41   (b) 74.3
(c) 72.43   (d) 73.43

[BSRB Bangalore PO, 2000]

51. The average of four consecutive even numbers is one-fourth of the sum of these numbers. What is the difference between the first and the last number?

(a) 4   (b) 6
(c) 2   (d) Cannot be determined

[BSRB Delhi PO, 2000]

52. Of the three numbers, the average of the first and the second is greater than the average of the second and the third by 15. What is the difference between the first and the third of the three numbers?

(a) 15   (b) 45
(c) 60   (d) None of these

[BABARD Asst. Manager Examination, 2002]

53. The average of 25 results is 18, that of first 12 is 14 and of the last 12 is 17. The 13th result is:

(a) 72   (b) 78
(c) 85   (d) 28

[Canara Bank PO, 2003]

54. Average age of seven persons in a group is 30 years. The average age of five persons of this group is 31 years. What is the average age of the other two persons in the group?

(a) 55 years   (b) 26 years

(c) 15 years   (d) None of these

[PNB Management Trainee Examination, 2003]

55. Average weight of three boys P, T and R is $54\frac{1}{3}$

Kg while the average weight of three boys T, F and G is 53 Kg. What is the average weight of P, T, R, F and H?

(a) 53.8 Kg   (b) 52.4 Kg

(c) 53.2 Kg   (d) Data inadequate

[Bank of Maharashtra, 2003]

56. In a class of 52 students, the number of boys is two less than the number of girls. Average weight of the boys is 42 Kg, while the average weight of all the 52 students is 40 Kg. Approximately, what is the average weight of the girls?

(a) 41 Kg   (b) 29 Kg

(c) 40 Kg   (d) 38 Kg

[IBPS, 2003]

57. 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) Data inadequate

[SSC (GL), 2011]

58. Out of four 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

[SSC (GL), 2011]

59. There are three baskets of fruits. The 1st basket has twice the number of fruits in the 2nd basket. The 3rd basket has three-fourths of the fruits in the first. The average of the fruits in all the baskets is 30. What is the number of fruits in the first basket?

(a) 20   (b) 30

(c) 35   (d) 40

[SSC (GL), 2011]

60. The average weight of 45 students in a class was calculated as 36 Kg. It was later found that the weight of two students in the class was wrongly calculated. The actual weight of one of the boys in the class was 32 Kg, but it was calculated as 34 Kg, and the weight of another boy in the class was 45 Kg, whereas it was calculated as 40 Kg. What is the actual average weight of the 45 students in the class? (Rounded off to two-digits after decimal)

(a) 36.07 Kg   (b) 36.16 Kg

(c) 35.84 Kg   (d) Cannot be determined

[PNB PO, 2010]

61. The cost of 5 Kg of apples is ₹450. The cost of 12 dozen mangoes is ₹4320, and the cost of 4 Kg of oranges is ₹240. What is the total cost of 8 Kg of apples, 8 dozens of mangoes and 8 Kg of oranges?

(a) ₹4020   (b) ₹4080

(c) ₹4000   (d) ₹4050

[PNB PO, 2010]

62. 12% of Kaushal's monthly salary is equal to 16% of Nandini's monthly salary. Suresh's monthly salary is half that of Nandini's monthly salary. If Suresh's annual salary is ₹1.08 lacs. What is Kaushal's monthly salary?

(a) ₹20000   (b) ₹18000

(c) ₹26000   (d) ₹24000

[CBI (PO), 2010]

63. In a test, a candidate scored 336 marks out of maximum marks 'x'. If the maximum marks 'x' were converted into 400 marks, he would have secured 192 marks. What were the maximum marks of the test?

(a) 700   (b) 750

(c) 500   (d) 650

[Corporation Bank PO, 2009]

64. The average marks in Science subject of a class of 20 students is 68. If the marks of two students were misread as 48 and 65 of the actual marks 72 and 61, respectively, then what would be the correct average?

(a) 68.5   (b) 69

(c) 69.5   (d) 70

[Corporation Bank PO, 2009]

65. The average age of the family of 5 members is 24. If the present age of youngest member is 8 years, then what was the average age of the family at the time of the birth of the youngest member?

(a) 20 years   (b) 16 years

(c) 12 years   (d) 18 years

[Corporation Bank PO, 2009]

66. In a family, the average age of a father and a mother is 35 years. The average age of the father, mother and their only son is 27 years. What is the age of the son?

(a) 12 years   (b) 11 years

(c) 10.5 years   (d) 10 years

[SSC (GL), 2010]

67. The average marks in English subject of a class of 24 students is 56. If the marks of three students were misread as 44, 45 and 61 of the actual marks 48, 59 and 67, respectively, then what would be the correct average?

(a) 56.5　　　　　　(b) 59

(c) 57.5　　　　　　(d) None of these

[IBPS Bank PO, 2011]

68. The sum of five numbers is 290. The average of the first two numbers is 48.5 and the average of last two numbers is 53.5. What is the third number?

(a) 72　　　　　　(b) 84

(c) 96　　　　　　(d) None of these

[IOB PO, 2009]

69. The average of the first 100 positive integers is:

(a) 100　　　　　　(b) 51

(c) 50.5　　　　　　(d) 49.5

[SSC (GL), 2010]

70. The average contribution of 5 men to a fund is ₹35. A sixth man joins and pays ₹35 more than the resultant average of 6 men. The total contribution of all the six men is:

(a) ₹210　　　　　　(b) ₹245

(c) ₹250　　　　　　(d) ₹252

[UPPCS, 2012]

71. Sum of eight consecutive numbers of Set A is 376. What is the sum of 5 consecutive numbers of another set if its minimum number is 15 ahead of average of Set A?

(a) 296　　　　　　(b) 320

(c) 324　　　　　　(d) 284

[Union Bank of India PO, 2011]

72. In a class, the average height of 35 girls was measured 160 cm. Later, on it was discovered that height of one of the girls was misread as 144 cm, while her actual height was 104 cm. What was the actual average height of the girls in the class? (rounded off to two digits after decimal)

(a) 159.86 cm　　　　(b) 158.54 cm

(c) 159.56 cm　　　　(d) None of these

[Syndicate Bank PO, 2010]

73. The frequency distribution date is given below. If the average age is 17 years, the value of m is Age (in years):8202629.

Number of people: 32 m 1

(a) 1　　　　　　(b) 2

(c) 3　　　　　　(d) 4

[SSC, 2014]

74. The average monthly expenditure of a family for the first four months is ₹2570, for the next three months ₹2490 and for the last five months ₹3030. If the family saves ₹5320 during the whole year, the average monthly income of the family during the year is:

(a) ₹3000　　　　　　(b) ₹3185

(c) ₹3200　　　　　　(d) ₹3580

[SSC, 2014]

75. A man spends ₹1800 monthly on an average for the first four months and ₹2000 monthly for the next eight months and saves ₹5600 a year. His average monthly income is:

(a) ₹2000　　　　　　(b) ₹2200

(c) ₹2400　　　　　　(d) ₹2600

[SSC, 2014]

76. The arithmetic mean of the following numbers is 1, 2, 2, 3, 3, 3, 4, 4, 4, 4, 5, 5, 5, 5, 5, 6, 6, 6, 6, 6, 6, 7, 7, 7, 7, 7, 7, 7

(a) 4　　　　　　(b) 5

(c) 14　　　　　　(d) 20

[SSC, 2014]

77. The average of six numbers is 20. If one number is removed, the average becomes 15. What is the number removed?

(a) 5　　　　　　(b) 35

(c) 112　　　　　　(d) 45

[SSC, 2014]

78. The average of first three numbers is double of the fourth number. If the average of all the four numbers is 12, find the 4th number.

(a) 16　　　　　　(b) $\dfrac{48}{7}$

(c) 20　　　　　　(d) $\dfrac{18}{7}$

[SSC, 2013]

79. If the average of 6 consecutive even numbers is 25, the difference between the largest and the smallest number is:

(a) 18　　　　　　(b) 10

(c) 12　　　　　　(d) 14

[SSC, 2013]

80. The arithmetic mean of 100 observations is 24.6 is added to each of the observations and, then each of them is multiplied by 2.5. Find the new arithmetic mean.

(a) 30   (b) 75
(c) 35   (d) 60

[SSC, 2013]

81. Sachin Tendulkar has a certain average for 11 innings. In the 12th innings he scores 120 runs and thereby increases his average by 5 runs. His new average is:

(a) 60   (b) 62
(c) 65   (d) 66

[SSC, 2013]

82. The average of 11 results is 50. If the average of the first six results is 49 and that of the last six is 52. The sixth result is:

(a) 48   (b) 50
(c) 52   (d) 56

[SSC, 2013]

83. There are two groups A and B of a class, consisting of 42 and 28 students, respectively. If the average weight of group A is 25 Kg and that of group B is 40 Kg, find the average weight of the whole class.

(a) 69   (b) 31
(c) 70   (d) 30

[SSC Assistant Grade III, 2013]

84. The average monthly salary of all the employees in an industry is ₹12,000. The average salary of male employees is ₹15,000 and that of female employees is ₹8,000. What is the ratio of male employees to female employees?

(a) 5:2   (b) 3:4
(c) 4:3   (d) 2:5

[SSC Assistant Grade III, 2013]

85. The sum of five consecutive integers is a and the sum of next five consecutive integers is b. Then $\dfrac{(b-a)}{100}$ is equal to:

(a) $\dfrac{1}{4}$ (b) $\dfrac{1}{2}$
(c) 3   (d) 2

[SSC Assistant Grade III, 2012]

86. Ten years ago the average age of P and Q was 20 years. Average age of P, Q and R is 30 years now. After 10 years, the age of R will be:

(a) 35 years   (b) 40 years
(c) 30 years   (d) 45 years

[SSC Assistant Grade III, 2012]

87. The average value of the numbers 15, 21, 32, 35, 46, x, 59, 65, 72 should be greater than or equal to 43 but less than or equal to 44. Then the value of x should be:

(a) $42 \leq x \leq 51$ (b) $43 \leq x \leq 50$
(c) $42 < x \leq 49$ (d) $43 < x < 50$

[SSC Assistant grade III, 2012]

88. 5 members of a team are weighed consecutively and their average weight calculated after each member is weighed. If the average weight increases by one Kg each time, how much heavier is the last player than the first one?

(a) 4 Kg   (b) 20 Kg
(c) 8 Kg   (d) 5 Kg

[SSC, 2012]

89. Out of nine persons, 8 persons spent ₹30 each for their meals. The ninth one spent ₹20 more than the average expenditure of all the nine. The total money spent by all of them was:

(a) ₹260   (b) ₹290
(c) ₹292.50   (d) ₹400.50

[SSC, 2012]

90. In a school with 600 students, the average age of the boys is 12 years and that of the girls is 11 years. If the average age of the school is 11 years and 9 months, then the number of girls in the school is:

(a) 450   (b) 150
(c) 250   (d) 350

[SSC, 2012]

91. The mean of 100 items was 46. Later on it was discovered that an item 16 was misread as 61 and another item 43 was misread as 34. It was also found that the number of items was 90 and not 100. Then what is the correct mean?

(a) 50   (b) 50.7
(c) 52   (d) 52.7

[SSC, 2012]

92. Average rainfall on Monday, Tuesday, Wednesday and Thursday is 420.5 cm and average on Tuesday, Wednesday, Thursday and Friday is 440.5 cm. If the ratio of rainfall for Monday and Friday is 20:21, find the rainfall in cm on Monday and Friday.

(a) 1800, 1890   (b) 1600, 1680
(c) 1700, 1470   (d) 1682, 1762

[SSC, 2012]

93. The average of 5 consecutive integers starting with 'm' is n. What is the average of 6 consecutive integers starting with $(m + 2)$?

(a) $\dfrac{2n+5}{2}$ (b) $(n + 2)$
(c) $(n + 3)$ (d) $\dfrac{2n+9}{2}$

[SSC, 2012]

94. The batting average for 40 innings of a cricketer 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   (b) 170

(c) 172   (d) 174

[SSC, 2011]

95. The average of three numbers is 154. The first number is twice the second and the second number is twice the third. The first number is:

(a) 264   (b) 132

(c) 88   (d) 66

[SSC, 2011]

96. The average salary of all the staff in an office of a corporate house is ₹5,000. The average salary of the officers is ₹14,000 and that of the rest is ₹4,000. If the total number of staff is 500, the number of officers?

(a) 10   (b) 15

(c) 25   (d) 50

[SSC, 2011]

97. The average marks of 40 students in an English exam is 72. Later it is found that three marks 64, 62 and 84 were wrongly entered as 68, 65 and 73. The average after mistakes were rectified is:

(a) 70   (b) 72

(c) 71.9   (d) 72.1

[SSC, 2011]

98. Of three numbers, the second is thrice the first and the third number is three-fourths of the first. If the average of the three numbers is 114, the largest number is:

(a) 72   (b) 216

(c) 354   (d) 726

[SSC, 2011]

99. A batsman, in his 12th innings, makes a score of 63 runs and thereby increases his average score by 2. The average of his score after 12 thinnings is:

(a) 41   (b) 42

(c) 34   (d) 35

[SSC, 2010]

100. The average of two numbers A and B is 20, that of B and C is 19 and of C and A it is 21. What is the value of A?

(a) 24   (b) 22

(c) 20   (d) 18

[SSC, 2010]

101. A professional institute's total expenditure on students for a particular course is partly fixed and partly varies linearly with the number of students. The average expense per student is ₹615 when there are 24 students and ₹465 when there are 40 students. What is the average expense when there are 60 students?

(a) ₹370   (b) ₹450

(c) ₹350   (d) ₹420

(e) ₹390

[IBPS PO/MT, 2014]

102. The average marks in English of a class of 24 students is 56. If the Marks of three students were misread as 44, 45 and 61 in lieu of the actual marks 48, 59 and 67 respectively, then what would be the correct average?

(a) 56.5   (b) 59

(c) 57.5   (d) 58

(e) None of these

[IBPS PO/MT, 2011]

103. In an entrance examination, Ritu scored 56 percent marks, Smita scored 92 percent marks and Rina scored 634 marks. The maximum marks of the examination is 875. What is the average marks scored by all the three girls together?

(a) 1929   (b) 815

(c) 690   (d) 643

(e) None of these

[IBPS PO/MT, 2011]

104. The sum of five numbers is 260. The average of the first two numbers is 30 and the average of the last two numbers is 70. What is the third number?

(a) 33   (b) 60

(c) 75   (d) Cannot be determined

(e) None of these

[Andhra Bank PO, 2011]

105. A, B, C and D are four consecutive odd numbers and their average is 42. What is the product of B and D?

(a) 1860   (b) 1890

(c) 1845   (d) 1677

(e) None of these

[Andhra Bank PO, 2011]

106. The average score of Rahul, Manish and Suresh is 63. Rahul's score is 15 less than Ajay and 10 more than Manish. If Ajay scored 30 marks more than the average score of Rahul, Manish and Suresh, what is the sum of Manish's and Suresh's scores?

(a) 120   (b) 111

(c) 117   (d) Cannot be determined

(e) None of these

[Corporation Bank PO, 2011]

107. The average age of 80 boys in a class is 15. The average age of a group of 15 boys in the class is 16 and the average age of another 25 boys in the class

is 14. What is the average age of the remaining boys in the class?

(a) 15.25 (b) 14
(c) 14.75 (d) Cannot be determined
(e) None of these

[Corporation Bank PO, 2010]

108. The total marks obtained by a student in Physics, Chemistry and Mathematics together is 120 more than the marks obtained by him in Chemistry. What is the average marks obtained by him in Physics and Mathematics together?

(a) 60 (b) 120
(c) 40 (d) Cannot be determined
(e) None of these

[Allahabad Bank PO, 2010]

109. The sum of 5 numbers is 924. The average of the first two numbers is 201.5 and the average of the last two numbers is 196. What is the third number?

(a) 133 (b) 129
(c) 122 (d) Cannot be determined
(e) None of these

[NABARD Bank Officer, 2009]

110. The average marks in Science subject of a class of 20 students is 68. If the marks of two students were misread as 48 and 65 instead of the actual marks 72 and 61 respectively, what would be the correct average?

(a) 68.5 (b) 69
(c) 69.5 (d) 70
(e) 66

[Corporation Bank PO, 2009]

111. What is the age of a class teacher?
 I. There are 11 students in the class.
 II. The average age of the students and the teacher is 14 years.
 III. The average age of the teacher and the students is 3 years more than that of the students.

(a) Both I and III
(b) Both I and II
(c) II and either I or III
(d) All I, II and III
(e) None of these

[IBPS PO/MT, 2013]

ANSWER KEYS3

EXERCISE-1

1. (c)	**2.** (c)	**3.** (b)	**4.** (d)	**5.** (c)	**6.** (d)	**7.** (a)	**8.** (a)	**9.** (b)	**10.** (c)	**11.** (c)	**12.** (b)	**13.** (a)
14. (a)	**15.** (a)	**16.** (d)	**17.** (c)	**18.** (d)	**19.** (a)	**20.** (c)	**21.** (b)	**22.** (a)	**23.** (c)	**24.** (c)	**25.** (c)	**26.** (c)
27. (c)	**28.** (b)	**29.** (b)	**30.** (b)	**31.** (c)	**32.** (b)	**33.** (c)	**34.** (c)	**35.** (d)	**36.** (a)	**37.** (c)	**38.** (a)	**39.** (a)
40. (c)	**41.** (c)	**42.** (d)	**43.** (a)	**44.** (d)	**45.** (c)	**46.** (c)	**47.** (c)	**48.** (b)	**49.** (d)	**50.** (a)	**51.** (b)	**52.** (b)
53. (a)	**54.** (d)	**55.** (c)	**56.** (d)	**57.** (d)	**58.** (a)	**59.** (c)	**60.** (b)					

EXERCISE-2

1. (d)	**2.** (b)	**3.** (b)	**4.** (c)	**5.** (e)	**6.** (c)	**7.** (b)	**8.** (a)	**9.** (b)	**10.** (c)	**11.** (a)	**12.** (d)	**13.** (e)
14. (d)	**15.** (c)	**16.** (b)	**17.** (d)	**18.** (a)	**19.** (a)	**20.** (c)	**21.** (b)	**22.** (c)	**23.** (d)	**24.** (b)	**25.** (b)	**26.** (e)
27. (b)	**28.** (e)	**29.** (d)	**30.** (d)	**31.** (c)	**32.** (b)	**33.** (d)	**34.** (a)	**35.** (d)	**36.** (c)	**37.** (c)	**38.** (c)	**39.** (b)
40. (b)	**41.** (d)	**42.** (b)	**43.** (d)	**44.** (d)	**45.** (a)	**46.** (c)	**47.** (a)	**48.** (c)	**49.** (c)	**50.** (d)	**51.** (b)	**52.** (d)
53. (b)	**54.** (d)	**55.** (d)	**56.** (d)	**57.** (c)	**58.** (c)	**59.** (d)	**60.** (a)	**61.** (b)	**62.** (d)	**63.** (a)	**64.** (b)	**65.** (b)
66. (b)	**67.** (d)	**68.** (d)	**69.** (c)	**70.** (d)	**71.** (b)	**72.** (d)	**73.** (a)	**74.** (b)	**75.** (c)	**76.** (b)	**77.** (d)	**78.** (b)
79. (b)	**80.** (b)	**81.** (c)	**82.** (d)	**83.** (b)	**84.** (c)	**85.** (a)	**86.** (b)	**87.** (a)	**88.** (c)	**89.** (c)	**90.** (b)	**91.** (b)
92. (b)	**93.** (a)	**94.** (d)	**95.** (a)	**96.** (d)	**97.** (d)	**98.** (b)	**99.** (a)	**100.** (b)	**101.** (e)	**102.** (e)	**103.** (d)	**104.** (b)
105. (c)	**106.** (b)	**107.** (a)	**108.** (d)	**109.** (a)	**110.** (b)	**111.** (d)						

EXPLANATORY ANSWERS

EXERCISE-1

1. **(c)** Total earning for 7 days
   = ₹(60 + 65 + 70 + 52.50 + 63 + 73 + 68)
   = ₹451.50

   Average daily earning = ₹$\frac{451.50}{7}$ = ₹64.50.

2. **(c)** The average of 10 numbers = 7
   Total of 10 numbers = 10 × 7 = 70
   New total of 10 numbers after each of given
   numbers is multiplied by 8 = 70 × 8 = 560

   ∴ New average = $\frac{560}{10}$ = 56.

3. **(b)** Average weight of 5 persons = 38 Kg
   ∴ Total weight of these five persons
   = 38 × 5 = 190 Kg
   Now, average weight of (the boat + 5 persons)
   = 52 Kg
   ∴ Total weight of (the boat + 5 persons)
   = 52 × 6 = 312 Kg
   ∴ Weight of the boat = 312 − 190 = 122 Kg.

4. **(d)** Let, the original expenditure = ₹x

   Original average expenditure = $\frac{x}{35}$

   New average expenditure = $\frac{x+42}{42}$

   ⇒ $\frac{x}{35} - \frac{x+42}{42}$ = 1 ⇒ x = 420
   ∴ Original expenditure = ₹420.

5. **(c)** Average daily maximum temperature

   = $\dfrac{42.7 + 44.6 + 42.0 + 39.1 + 43.0 + 42.5 + 38.5}{7}$

   = $\frac{292.4}{7}$ = 41.77°C.

6. **(d)** Let, the total number of workers be x.
   ⇒ 850 × x = 7 × 1000 + (x − 7) × 780 ⇒ x = 22.

7. **(a)** The total time taken can be calculated as shown below:

Distance	Speed	Time
2500 Km	500 Km/h	5 hrs
1200 Km	400 Km/h	3 hrs
500 Km	250 Km/h	2 hrs
Total 4200 Km		10 hrs

   Average speed = $\frac{4200}{10}$ = 420 Km/h

8. **(a)** Marks scored by 2 students = 100 × 2 = 200
   Marks scored by 3 students = 3 × 0 = 0

Marks scored by 15 students = 15 × 40 = 600
∴ Marks scored by 20 students
= 200 + 0 + 600 = 800

∴ Average marks = $\frac{800}{20}$ = 40.

9. **(b)** Average weight of 24 students of section A = 58 Kg
   Total weight of 24 students of section A = 58 × 24 = 1392 Kg
   Average weight of 26 students of section B = 60.5 Kg
   Total weight of 26 students of section B = 60.5 × 26 = 1573 Kg
   Total weight of 50 students = (1392 + 1573) Kg
   = 2965 Kg
   Average weight of the students in the class
   = $\frac{2965}{50}$ = 59.3 Kg.

10. **(c)** Total age of 5 members = 21 × 5 = 105 years.
    Total age of 4 members at the birth of the younger member, that is, 5 years ago
    = 105 − (5 × 5) = 80 years
    Before the birth of the youngest member, the family consisted of only 4 members.
    Average age of 4 members 5 years ago
    = $\frac{80}{4}$ = 20 years.

11. **(c)** Sum of seven numbers = 7 × 5 = 35
    Sum of first six numbers = 6 × 4 = 24
    Therefore, the seventh number = 35 − 24 = 11.

12. **(b)** Present average age of 5 members
    = 27 + 3 = 30 years
    Sum of present age of 5 members
    = 30 × 5 = 150 years
    Let, the present age of the child be x years.
    Present average age of 6 members
    = $\frac{150+x}{6}$ and this is equal to 27 years.
    So, $\frac{150+x}{6}$ = 27
    or, x = 27 × 6 − 150 or, x = 12 years.

13. **(a)** Weight of the new student
    = 50 + 10 × 112 = 55 Kg.

14. **(a)** Average salary of 9 persons = ₹2450
    Total salary of 9 persons
    = ₹2450 × 9 = ₹2650
    Total salary of the person who is transferred
    = ₹2650

Thus, the total salary of remaining 8 persons
= ₹22050 − ₹2650 = ₹19400
The average salary of the remaining 8 persons
= ₹$\dfrac{19400}{8}$ = ₹2425.

15. **(a)** The mean marks of 10 boys = 70%
Total marks of 10 boys = 70% × 10 = 700%
The mean marks of 15 girls = 60%
Total marks of 15 girls = 60% × 15 = 900%
∴ Sum of the total marks of 25 students
= 700 + 900 = 1600%
∴ The mean marks of all the 25 students
= $\dfrac{1600}{25}$ = 64%

16. **(d)** Income for 6th day in rupees
= 15 × 70 − 5 × 60 − 9 × 80 = 30.

17. **(c)** The five even consecutive numbers are
4, 6, 8, 10 and 12
Their average $= \dfrac{4+6+8+10+12}{5} = \dfrac{40}{5}$ = 8.

18. **(d)** Present age of 5 members
= (5 × 17 + 3 × 5) years.
= 100 years.
Present age of 5 members and a baby
= 17 × 6 = 102 years.
∴ Age of the baby = (102 − 100) years.
= 2 years.

19. **(a)** Sum of first nine numbers + sum of last nine numbers
= 10.5 × 9 + 11.4 × 9 = 21.9 × 9 = 197.1
Hence, the middle number
= 197.1 − 17 × 10.9
= 197.1 − 185.3 = 11.8.

20. **(c)** To improve his average by 5 runs per innings he has to contribute 12 × 5 = 60 runs for the previous 12 innings. Thus, the average after the 13th innings
= 96 − 60 = 36.

21. **(b)** Average score before 17th innings
= 85 − 3 × 17 = 34
∴ Average score after 17th innings
= 34 + 3 = 37.

22. **(a)** Let, the numbers be x, y and z. Then,
$x + y + z = 98$, $\dfrac{x}{y} = \dfrac{2}{3}$ and $\dfrac{y}{z} = \dfrac{5}{8}$
∴ $x = \dfrac{2y}{3}$ and $z = \dfrac{8y}{5}$
So, $\dfrac{2y}{3} + y + \dfrac{8y}{5}$ = 98
or, $\dfrac{49y}{15}$ = 98 or, $y = 30$.

23. **(c)** The sailor weighing 56 Kg is replaced and the average is increased by 1 Kg. Hence, the weight of the new sailor is (56 + increase in total weight) = 56 + 1 × 8
= 56 + 8 = 64 Kg.

24. **(c)** Average of 5, 7, 14 and y = $\dfrac{5+7+14+y}{4}$
Therefore, x = 80% of $\dfrac{5+7+14+y}{4} = \dfrac{80}{100} \times \dfrac{26+y}{4}$
⇒ $x = \dfrac{26+y}{5}$ (1). Also $\dfrac{x+y}{2}$ = 26 (2)
From, (1) and (2), we get $52 - y = \dfrac{26+y}{5}$ ⇒ $y = 39$.

25. **(c)** Present age of x
= [(49 × 5) − (4 × 45 + 4 × 5)] years
= 45 years.

26. **(c)** Let, the rainfall on Wednesday be x cm so that on the other 6 days, the total is also x.
Since average rainfall for the week = 3 cm
∴ $x + x = 3 \times 7$ or, x = 10.5 cm.

27. **(c)** Average monthly expenditure of 4 months
= ₹2700
Total expenditure for 4 months = ₹2700 × 4
= ₹11000
Average monthly expenditure of 3 months
= ₹2940
Total expenditure for 3 months = ₹2940 × 5
= ₹8820   ···(1)
Average monthly expenditure of 5 months
= ₹3130
Total expenditure of 5 months = ₹31020
= ₹1560   ···(2)
Total expenditure in the whole year
= ₹11000 + 8820 + ₹15650
= ₹35470.
Saving during the whole year = ₹5330
Total income of the family during the year
= ₹35470 + ₹5330 = ₹40800
∴ Average monthly income during the year
= $\dfrac{40800}{12}$ = ₹3400.

28. **(b)** Let, the average age of 8 men be x years.
∴ Sum of the ages of 8 men = 84 years.
Now, according to the condition of the question, average age of (6 men + 2 women) = (x + 2) years.
∴ Sum of the ages of (6 men + 2 women)
= 8(x + 2) = 8x + 16 years
Hence, it is clear that on replacing 2 men by 2 women, sum of their ages increased by 16 years.
Therefore, sum of the ages of two women

$= (20 + 24) + 16 = 60$ years

$\therefore$ Average age of the women $= \dfrac{60}{2} = 30$ years.

29. (b) Average of the remaining set of numbers

$= \dfrac{50 \times 38 - (45 + 55)}{50 - 2} = \dfrac{1900 - 100}{48} = 37.5$.

30. (b) Time taken to cover first 100 kilometres

$= \dfrac{100}{30} = 3\dfrac{1}{3}$ hrs

Time taken to cover second 100 kilometres

$= \dfrac{100}{40} = 2\dfrac{1}{2}$ hrs

Time take to cover last 100 kilometres

$= \dfrac{100}{50} = 2$ hrs

Total time taken $= 3\dfrac{1}{3} + 2\dfrac{1}{2} + 2 = \dfrac{10}{3} + \dfrac{5}{2} + 2$

$\qquad\qquad = \dfrac{47}{6}$ h

Total distance covered $= 300$ Km

$\therefore$ Average speed $= \dfrac{300}{47/6} = \dfrac{300 \times 6}{47} = 38.3$ Km/h.

31. (c) Seventh observation

$= 7 \times 11 - 6 \times 12 = 5$.

32. (b) Average age of the five new boys

$= (25 \times 15.56 - 20 \times 15.6) \div 5$

$= 15.4$ years,

33. (c) Weight of D $= (80 \times 4 - 84 \times 3)$ Kg $= 68$ Kg

Weight of E $= (68 + 3)$ Kg $= 71$ Kg

(B + C + D + E)'s weight $= (79 \times 4)$ Kg $= 316$ Kg

$\therefore$ (B + C)'s weight $= [316 - (68 + 71)]$ Kg

$\qquad\qquad\qquad = 177$ Kg

Hence, A's weight $= [(84 \times 3) - 177]$ Kg $= 75$ Kg.

34. (c) Let, ₹x be the average expenditure for 30 boarders.

$\therefore$ $30x + 40 = (x - 2) \times 40$ or, $x = 12$

Hence, actual expenditure $= ₹12 \times 30 = ₹360$.

35. (d) Let, the numbers be $2x$, x and $\dfrac{x}{3}$.

Then, average $= \dfrac{2x + x + \dfrac{x}{3}}{3} = 10 \implies \dfrac{9x + x}{3 \times 3} = 10$

or, $\dfrac{10x}{9} = 10$, or, $x = 9$

Hence, the numbers are 18, 9 and 3.

36. (a) Correct average

$= \dfrac{50 \times 36 - 73 + 37}{36}$

$= \dfrac{1764}{36} = 49$ Kg.

37. (c) Total earning for the week

$= ₹(4 \times 18 + 4 \times 22 - 20) = ₹140$

$\therefore$ Average earning $= ₹\dfrac{140}{7} = ₹20$.

38. (a) Let, the number of candidates who passed $= x$.

Then, $39 \times x + 15 \times (120 - x) = 120 \times 35$

$\therefore$ $24x = 4200 - 1800$

or, $x = \dfrac{2400}{24}$

$x = 100$.

39. (a) Total decrease $= (20 \times 2)$ months

$= 3$ years 4 months

$\therefore$ Age of the new boy $= 18$ years $- 3$ years 4 months

$= 14$ years 8 months.

40. (c) Temperature on Monday + Tuesday + Wednesday + Thursday $= 4 \times 48° = 192°$

Temperature on Monday $= 42°$

$\therefore$ Tuesday + Wednesday + Thursday

$= (192° - 42°) = 150°$

Temperature on Tuesday + Wednesday + Thursday + Friday $= 4 \times 52° = 208°$

Friday's temperature $= 208° - 150° = 58°$.

41. (c) Total spending in 12 months

$= ₹[269.47 \times 7 + 281.05 \times 5]$

$= ₹3291.54$

Total income $=$ spendings + savings

$= ₹3291.54 + ₹308.46$

$= ₹3600.00$

$\therefore$ Monthly salary $= ₹\dfrac{3600}{12} = ₹300$.

42. (d) Let, the numbers be x and y, $x < y$.

Then, $x + y = 124$; $\dfrac{x + 2}{y} = \dfrac{1}{2} \implies y = 2x + 4$.

Solving the above equations, we get

$y = 84$, $x = 40$.

43. (a) $\dfrac{(x + 2) \times 60 + x \times 120 + (x - 2) \times 180}{x + 2 + x + x - 2} = 100$

$\therefore$ $x = 4$.

44. (d) Let, temperature on the 4th day be $x°$C

$\therefore$ $4 \times 38.6 + 4 \times 40.3 - x = 7 \times 39.1$

or, $x = 41.9$

$\therefore$ Temperature on the 4th day $= 41.9°$C.

45. (c) Let, daily wages of C $= x$.

Then, daily wages of A $= 2x$

and, daily wages of B $= x + 40$

Hence, average daily wages of A, B and C

$= \dfrac{x + 2x + x + 40}{3} = \dfrac{4x + 40}{3}$

$\therefore \quad \dfrac{4x+40}{3} = 120$ or, $4x + 40 = 360$

$\Rightarrow \quad 4x = 320$ or, $x = 80$

$\therefore$ Daily wages of A = 2 × 80 = ₹160.

46. (c) $\dfrac{x}{35} - \dfrac{x}{40} = \dfrac{15}{60}$ or, $\dfrac{5x}{35 \times 40} = \dfrac{1}{4}$

or, $x = \dfrac{35 \times 40}{5 \times 4} = 70$

$\therefore$ Total journey = 70 Km.

47. (c) Let, the number of candidates be x. Then, total marks obtained by all the candidates = $45x$.

Marks reduced for 90 candidates = 30 × 90 = 2700

Total reduced marks = $45x − 2700$.

Reduced average = $\dfrac{45x - 2700}{x}$.

$\therefore \quad 40 = \dfrac{45x - 2700}{x}$ or, $40x = 45x − 2700$

$\Rightarrow \quad 5x = 2700$ or, $x = 540$.

48. (b) Let, attendance on first, second and third day be 2, 5 and 13, respectively.

Total number of visitors for three days = 2 + 5 + 13 = 20

Total amount of money collected

= 2 × 15 + 5 × 7.50 + 13 × 2.50

= 30 + 37.5 + 32.5 = 100

Average charge per person = $\dfrac{100}{20}$ = 5.

49. (d) Total profit for 30 days = 30 × 350

= ₹10500

Profit for the first 15 days = 15 × 275 = ₹4125

$\therefore$ Profit for the last 15 days = ₹10500 − 4125 = ₹6375

Average profit for the last 15 days = ₹$\dfrac{6375}{15}$ = ₹425.

50. (a) Let, the number of wickets taken before the last match = x.

Then, $\dfrac{12.4x + 26}{x + 5} = x \Rightarrow x = 85$.

51. (b) Let, the numbers be $2x$, x and $4x$.

Average = $\dfrac{2x + x + 4x}{3}$ $\Rightarrow$ $\dfrac{7x}{3} = 56$.

$\therefore \quad x = \dfrac{3 \times 56}{7} = 24$.

Hence, the numbers in order are 48, 24 and 96.

52. (b) Suppose, the average expenditure was ₹x.

Then, total expenditure = $35x$.

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

Now, the average expenditure

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

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

$\therefore \quad x = 12$

Thus, the actual expenditure of the mass

= 35 × 12 = ₹420.

53. (a) Sum total of 50 numbers = 50 × 38 = 1900

Sum total of the remaining 48 numbers

= 1900 − (45 + 55) = 1800

$\therefore$ Average = $\dfrac{1800}{48}$ = 37.5.

54. (d) Average weight of 11 boys is increased by 100 gm (= 0.1 Kg.)

$\therefore$ Their total increase in weight

= 0.1 × 11 = 1.1 Kg

Hence, the weight of the boy = 42 + 1.1 = 43.1 Kg.

55. (c) Let, the numbers be $n − 1$, n and $n + 1$. Their average = n.

The next two consecutive numbers are $n + 2$ and $n + 3$.

Therefore, the average of the five numbers

= $\dfrac{(n-1) + n + (n+1) + (n+2) + (n+3)}{5}$

= $\dfrac{5n + 5}{5}$ = $n + 1$.

56. (d) Total monthly salary of 21 persons

= ₹(21 × 2000) = ₹42000

Total monthly salary of 20 persons

= ₹(20 × 1900) = ₹38000

Monthly salary of the manager = ₹4000

Annual salary of the manager = ₹48000.

57. (d) Let, the number of boys be x and the number of girls be y.

Sum of ages of boys = $16.4x$

Sum of ages of girls = $15.4y$

The average age of all the students

= $\dfrac{16.4x + 15.4y}{x + y}$ = 15.8

$\Rightarrow \quad 16.4x + 15.4y = 15.8x + 15.8y$

or, $16.4x − 15.8x = 15.8y − 15.4y$

or, $0.6x = 0.4y$

or, $\dfrac{x}{y} = \dfrac{0.4}{0.6} = \dfrac{2}{3}$ or $x{:}y$ = 2:3.

58. (a) Total expenditure for the first five months

= 5 × 3600 = ₹18000

Total expenditure for the next seven months

= 7 × 3900 = ₹27300

Savings = ₹8700

Total income during the year

= 18000 + 27300 + 8700 = ₹54000

Average income per month = $\dfrac{54000}{12}$ = ₹4500.

59. (c) Let, the numbers be x, $2x$, $\dfrac{2}{3}x$.

Average $= \dfrac{x + 2x + \dfrac{2}{3}x}{3}$ $\Rightarrow$ $\dfrac{11x}{9} = 44$

$\therefore$ $x = \dfrac{44 \times 9}{11} = 36$

So, the numbers are 36, 72 and 24.

Hence, the largest one is 72.

60. (b) New average of the committee (in years)

$= \dfrac{8 \times 40 - 55 + 39}{8} = \dfrac{320 - 16}{8}$

$= \dfrac{304}{8}$

$= 38$ years.

Exercise-2
(Based on Memory)

1. (d) Correct means $= 60 - \dfrac{75 - 65}{100} = 59.9$

2. (b) Let the average of runs made by other 6 batsmen be x

$\therefore$ Runs made by the captain

$= x + 30$

$\therefore$ $x + 60 + 6x = 310$

$7x = 280$

$\therefore$ $x = 40$

$\therefore$ Number of runs scored by the captains $= 40 + 30 = 70$

3. (b) $\because$ $A + B + C + D = A + B + E + F$

$C + D = E + F$

5. (e) 85

We have, $117 + x + (x + 12) + 15 = 72.5 \times 4$

[where x is the lower integer among the remaining two integers]

$\Rightarrow$ $2x = 290 - 144$ $\therefore$ $x = 73$

Hence the higher integer (among the remaining two integers)
$= 73 + 12 = 85$

6. (c) $16a + 16b = 48$

or, $16(a + b) = 48$ $\therefore$ $a + b = 3$

Hence, the required average of a and b $= \dfrac{3}{2} = 1.5$

7. (b) We have

$\dfrac{x + (x + 2) + (x + 4) + (x + 6)}{4} = 65$

$\therefore$ $x = 62$ and $x + 6 = 68$

Now,

Required value of $x(x + 6) = 62 \times 68 = 4216$

8. (a) Sum of the last two numbers

$= 555 - (72 \times 2) - 115 = 290$

Thus required average $= \dfrac{290}{2} = 145$

9. (b) Age of B = Age of $(A + B + C)$ – Age of $(A + C)$
$= 216 \times 3 - 29 \times 2 = 78 - 58 = 20$ years

10. (c) Suppose the three consecutive even numbers are $x - 2$, x and $x + 2$. Then

$(x - 2) + x + (x + 2) = x + 44$

$\Rightarrow$ $3x = x + 44$ $\therefore$ $x = 22$

$\therefore$ largest number $= 22 + 2 = 24$

11. (a) Average weight of 10 boys $= \dfrac{550}{10} = 55$ Kg

Average weight of 15 girls $= 55 - 5 = 50$ Kg

$\therefore$ Average weight of 10 boys and 15 girls

$= \dfrac{10 \times 15 + 15 \times 50}{25} = 52$ Kg

12. (d) Required average

$= \dfrac{(65 \times 14) - (20 \times 14 + 15 \times 12)}{65 - (20 + 15)}$

$= \dfrac{910 - 460}{30} = \dfrac{450}{30} = 15$

13. (e) Total fo five numbers
$= 306.4 \times 5 = 1532$

$\therefore$ reqd third no.

$= 1532 \, /0 \, [(431 \times 2) + (214.5 \times 2)]$

$= 1532 - [862 + 429] = 241$

14. (d) Average price per book $\dfrac{1050 + 1020}{115} = ₹18$

15. (c) Suppose the consecutive odd numbers are
$x + 1$, $x + 3$, $x + 5$ and $x + 7$

Then we have $\dfrac{(x + 1) + (x + 3)(x + 5) + (x + 7)}{4} = 42$

or, $4x + 16 = 42 \times 4$ or, $x = 38$

Hence, the numbers are 39, 41, 43, and 45.

Now, B $\times$ D $= 41 \times 45 = 1845$

16. (b) Third number
$= 260 - (2 \times 30) - (2 \times 70) = 60$

17. (d) The numbers are 43, 45, 47, 49, 51

$\therefore$ A $\times$ D $= 43 \times 51 = 2193$

18. (a) Let the number of students be x.

$\therefore \quad 6x + 12 \times 40 = 7(x + 12)$

$\Rightarrow \quad 6x + 480 = 7x + 84 \quad \Rightarrow \quad x = 396$

19. (a) Sale amount of grocer in the sixth month

$= 6 \times 6500 - (6435 + 6927 + 6855 + 7230 + 6562)$

$= 39000 - 34009 = ₹4991.$

20. (c) Sum of weights of A, B and C = 84×3 Kg = 252 Kg

Weight of D = $4 \times 80 - 252 = 320 - 252 = 68$ Kg

Weight of E = $68 + 3 = 71$ Kg

$A + B + C + D = 320$

$B + C + D + E = 79 \times 4 = 316$

$\Rightarrow \quad A - E = 4$ Kg

$\therefore \quad A = 4 + E = 4 + 71 = 75$ Kg.

21. (b) By the method of Alligation:

Technicians : Rest

$$12000 \quad : \quad 6000$$

$$8000$$

$$1 \quad : \quad 2$$

Total no. of workers = $7 \times 3 = 21$.

22. (c) $\dfrac{E + S + M + H}{4} - \dfrac{E + H + G + M}{4} = 15$

or, $E + S + M + H - E - H - G - M = 60$

$\therefore \quad S - G = 60.$

23. (d) Correct average = $\dfrac{35 \times 72 + (86 - 36)}{35}$

$\approx 72 + 1.43$

$= 73.43.$

25. (b) Let the four consecutive even numbers be $2x$, $2x + 2$, $2x + 4$ and $2x + 6$, respectively.

Required difference = $2x + 6 - 2x = 6$.

26. (e) Let the three numbers be x, y and z.

or, $\dfrac{x + y}{2} - \dfrac{y + z}{2} = 15$

or, $\dfrac{x + y - y - z}{2} = 15$ or, $x - z = 30$.

27. (b) Total of 25 results = $25 \times 18 = 450$

Total of first 12 results = $12 \times 14 = 168$

Total of last 12 results = $12 \times 17 = 204$

$\therefore$ Thirteenth result = $450 - 168 - 204 = 78$.

28. (e) Total age of seven persons = $30 \times 7 = 210$ years.

Total age of five persons = $31 \times 5 = 155$ years.

$\therefore$ Total age of two persons = $(210 - 155)$ years

$= 55$ years.

$\therefore$ Average age of two persons = $\dfrac{55}{2} = 27.5$ years.

29. (d) We are to determine the average weight of P, T, R, F and H.

Obviously, this cannot be determined as we do not know the weight of H.

30. (d) Let number of boys = x

and number of girls = y

Now, $y - 2 = x$ and $x + y = 52$

$y - 2 + y = 52$

$2y = 54$

$\therefore \quad y = 27 \qquad \therefore \quad x = 25$

Let the average weight of the girls be 'a'.

Then, $\dfrac{(25 \times 42) + (27 \times a)}{52} = 40$

or, $27 \times a = (52 \times 40) - (25 \times 42)$

or, $27 \times a = 2080 - 1050$

$\therefore \quad a = \dfrac{1030}{27} = 38.148 \approx 38$ Kg.

31. (c) $\dfrac{x + x + 2 + x + 4 + x + 6}{4} = 45$

$4x + 12 = 180 \quad 4x = \Rightarrow x = 42$

Product of A and C is

$42 \Rightarrow 46 = 1932$

32. (b) Let, the 7 consecutive numbers be $x - 3$, $x - 2$, $x - 1$, x, $x + 1$, $x + 2$ and $x + 3$

$\therefore \quad \dfrac{(x-3) + (x-2) + (x-1) + x + (x+1) + (x+2) + (x+3)}{7}$

$= 20$

$\Rightarrow \quad \dfrac{7x}{7} = 20 \Rightarrow x = 20$

$\therefore$ largest number = $x + 3 = 20 + 3 = 23$.

33. (d) Let, the teacher's age be x years

$\therefore \quad \dfrac{15 \times 15 - x}{14} = 14$

$\Rightarrow \quad 225 - x = 196$

$\Rightarrow \quad x = 29$.

34. (a) Let, the age of the mother be x years

$\therefore \quad \dfrac{14 \times 12 + x}{5} = 17 \Rightarrow x = 37$.

35. (d) Total age of A and B = 40

Total age of B and C = 38

Total age of A and C = 42

Total age of A + B + C = 60

$\therefore$ Age of B = $60 - 40 = 18$.

36. (c) Total cost of all the balls = ₹280

Let, the number of red balls = x

$\therefore$ Number of white balls = $10 - x$

$\therefore \quad 25x + 30(10 - x) = 280$

$\Rightarrow \quad x = 4$

$\therefore$ Number of white balls = $10 - 4 = 6$.

37. **(c)** Marks obtained by 14 students

= 14 × 71 = 994

Exact marks of 14 students

= 994 + {(56 − 42) + (32 − 74)}

= 994 + {14 + (−42)} = 994 + {−28}

= 994 − 28 = 966

∴ Correct average = $\frac{966}{14}$ = 69.

38. **(c)** Let, the numbers be x, y, z and t

∴ $x + y + z + t$ = 240 and $x = \frac{1}{4}$ $(y + z + t)$

∴ $x = 48$

∴ The first number = 48.

39. **(b)** $F + S_1 + S_2 = 81$

$(S_1 − 5) + (S_2 − 5) = 24$

⟹ $S_1 + S_2 = 34$

Also, $S_1 − S_2 = 4$

∴ $S_1 = 19$, $S_2 = 15$

∴ Age of the father = 47.

40. **(b)** $31 × 15 − (30 × 15 − 20) = x + x + 5$

∴ $x = 15$

41. **(d)** $2x + x + 4x$ = 56 × 3

∴ $2x = 48$.

42. **(b)** Let, the first number be x.

∴ The second number = $2x$

and the third number = $\frac{2}{3}x$

∴ $\frac{x + 2x + \frac{2}{3}x}{3} = 44$ or, $\frac{11x}{9} = 44$

∴ $x = 36$

∴ The second number is the largest = $2x = 2 × 36 = 72$.

43. **(d)** When 2 new men are replaced, average age is increased by 2 years.

∴ Increase in the total age of 8 men

= 8 × 2 = 16 years

∴ Total age of 2 new men

= 16 + 44 = 60 years

∴ Average age of 2 new men

= $\frac{60}{2}$ = 30 years.

44. **(d)** $A + B = 60$, $B + C = 64$, $A + C = 68$

∴ $C − A = 4$, $C + A = 68$

⟹ $C = 36$, $A = 32$, $B = 28$.

45. **(a)** Income in the eighth month

= (8 × 3160 + 5 × 4120) − (12 × 3400)

= (25280 + 20600 − 40800)

= ₹5080.

46. **(c)** Age of mother + father = 22 × 8 − 8 × 6

= 176 − 48

= 128

father − mother = 8

∴ Age of mother = $\frac{128 - 8}{2}$ = 60 years.

47. **(a)** Sales amount of grocer in the sixth month

= 6 × 6500 − (6435 + 6927 + 6855 + 7230 + 6562)

= 39000 − 34009

= ₹4991.

48. **(c)** Sum of weights of A, B and C = 84 × 3 Kg

= 252 Kg

Weight of D = 4 × 80 − 252

= 320 − 252

= 68 Kg

Weight of E = 68 + 3

= 71 Kg

A + B + C + D = 320

B + C + D + E = 79 × 4

= 316

⟹ A − E = 4 Kg

∴ A = 4 + E = 4 + 71 = 75 Kg.

49. **(c)** $\frac{E + S + M + H}{4} − \frac{E + H + G + M}{4} = 15$

or, $E + S + M + H − E − H − G − M = 60$

∴ $S − G = 60$.

50. **(d)** Correct average = $\frac{35 × 72 + (86 - 36)}{35}$

≈ 72 + 1.43

= 73.43.

51. **(b)** Let, the four consecutive even numbers be $2x$, $2x + 2$, $2x + 4$ and $2x + 6$, respectively.

The required difference = $2x + 6 − 2x = 6$.

52. **(d)** Let, the three numbers be x, y and z.

or, $\frac{x + y}{2} − \frac{y + z}{2} = 15$

or, $\frac{x + y - y - z}{2} = 15$ or, $x − z = 30$.

53. **(b)** Total of 25 results = 25 × 18 = 450

Total of first 12 results = 12 × 14 = 168

Total of last 12 results = 12 × 17 = 204

∴ The 13th result = 450 − 168 − 204

= 78.

54. **(d)** The total age of 7 person = 30 × 7 = 210 years.

Total age of 5 persons = 31 × 5 = 155 years.

∴ The total age of 2 persons = (210 − 155) years

= 55 years.

∴ The average age of two persons = $\frac{55}{2}$ = 27.5 years.

55. **(d)** We are to determine the average weight of P, T, R, F and H.

Obviously, this cannot be determined as we do not know the weight of H.

56. **(d)** Let, the number of boys $= x$

and the number of girls $= y$

Now, $y - 2 = x$ and $x + y = 52$

$y - 2 + y = 52$

$2y = 54$

$\therefore \quad y = 27$

$\therefore \quad x = 25$

Let, the average weight of the girls be 'a'.

Then, $\dfrac{(25 \times 42) + (27 \times a)}{52} = 40$

or, $27 \times a = (52 \times 40) - (25 \times 42)$

or, $27 \times a = 2080 - 1050$

$\therefore \quad a = \dfrac{1030}{27} = 38.148 \approx 38$ Kg.

57. **(c)** Let, the smallest number be x, then

$\dfrac{x}{3} + 12 = x + 2$

$\Rightarrow \quad \dfrac{x + 36}{3} = x + 2$

$\Rightarrow \quad x + 36 = 3(x + 2)$

$\Rightarrow \quad x + 36 = 3x + 6$

$\Rightarrow \quad 3x - x = 36 - 6$

$\Rightarrow \quad 2x = 30$

$\Rightarrow \quad x = 15$

Hence, the third number $= 15 + 4 = 19$.

58. **(c)** Let, the number be x, then
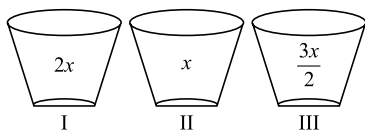
$x = \dfrac{240 - x}{4}$

$\Rightarrow \quad 4x = 240 - x$

$\Rightarrow \quad 4x + x = 240$

$\Rightarrow \quad 5x = 240$

$\Rightarrow \quad x = \dfrac{240}{5} = 48$.

59. **(d)**

Let, the number of fruits in the second basket be x.

Therefore, the number of fruits in the first basket $= 2x$.

So, the number of fruits in the third basket

$= 2x \times \dfrac{3}{4} = \dfrac{3}{2}x$

$2x + x + \dfrac{3}{2}x = 30 \times 3$

$\Rightarrow \quad \dfrac{4x + 2x + 3x}{2} = 90$

$\dfrac{9x}{2} = 90$

$9x = 180$

$x = \dfrac{180}{9} = 20$

Hence, the number of fruits in the first basket $= 2x = 2 \times 20 = 40$

60. **(a)** Average $= \dfrac{(45 \times 36) + 32 - 34 + 45 - 40}{45}$

$= \dfrac{1620 + 3}{45} = 36.07$ kg

61. **(b)** Cost of 8 Kg of apples + 8 dozens of mangoes + 8 Kg of oranges

$\dfrac{450}{5} \times 8 + \dfrac{4320}{12} \times 8 + \dfrac{240}{4} \times 8$

$720 + 2880 + 480 = ₹4080$

62. **(d)** Annual salary of Suresh = ₹108000

$\therefore \quad$ Monthly salary $= \dfrac{₹108000}{12}$

$= ₹9000$

Nandini's monthly salary = ₹18000

According to question,

Kaushal's monthly salary $\times \dfrac{12}{100}$

= Nandini's monthly salary $\times \dfrac{16}{100}$

$K \times \dfrac{12}{100} = ₹18000 \times \dfrac{16}{100}$

$K \times \dfrac{12}{100} = ₹2880$

$K = ₹\dfrac{2880 \times 100}{12}$

$K = ₹24000$

63. **(a)** $x : 336 = 400 : 192$

$x \times 190 = 336 \times 400$

$x = \dfrac{336 \times 400}{192}$

$x = 700$ marks

64. **(b)** Difference of marks $= 72 + 61 - 48 - 65 = 20$.

Correct average marks $= 68 + \dfrac{20}{20} = 68 + 1 = 69$.

65. **(b)** Total age of the family of five members

$= 24 \times 5 = 120$

Total age of the family of 5 members before 8 years

$= 120 - 5 \times 8$

$= 120 - 40 = 80$

So, the required average age $= \dfrac{80}{5} = 16$ years.

66. (b) Age of the son = $3 \times 27 - 2 \times 35$
$$= 81 - 70 = 11 \text{ years}$$

67. (d) $\because$ Total marks of 24 students = 24×56
$$= 1344$$
New total marks of 24 students
$$= 1344 - 44 - 45 - 61 + 48 + 59 + 67 = 1368.$$
Hence, the required average = $\dfrac{1368}{24} = 57$.

68. (d) The average of first two numbers = 48.5
The average of last two number = 53.5
Sum of five numbers = 290
The third number = x
$\therefore$ $2 \times (48.5) + x + 2 \times (53.5) = 290$
$97 + x + 107 = 290$
$x = 290 - 204$
$x = 86$

69. (c) The required average = $\dfrac{1 + 2 + \cdots 100}{100}$
$$= \dfrac{100 \times 101}{2 \times 100} = 50.5$$

70. (d) Let, the contribution of the sixth man is ₹x, then
$$\dfrac{5 \times 35 + x}{6} = x - 35$$
$\Rightarrow$ $175 + x = 6x - 210$
Z $5x = 385$
$\therefore$ $x = 77$
$\therefore$ Total contribution = ₹$(175 + 77)$
$$= ₹252$$

71. (b) The average of Set A = $\dfrac{376}{8} = 47$.
Minimum number of second set = $47 + 15 = 62$
Hence, the required sum = $62 + 63 + 64 + 65 + 66 = 320$

72. (d) $\dfrac{(35 \times 160) - 144 + 104}{35} = \dfrac{5600 - 144 + 104}{35}$
$$= \dfrac{5560}{35} = 158.85 \text{ cm}$$
Short-cut: $160 - \dfrac{144 - 104}{35} = 158.85$

73. (a) Required average
$$= \dfrac{8 \times 3 + 20 \times 2 + 26 \times m + 29 \times 1}{3 + 2 + m + 1}$$
$\Rightarrow$ $17 = \dfrac{24 + 40 + 26m + 29}{6 + m}$
$\Rightarrow$ $17(6 + m) = 93 + 26m$
$\Rightarrow$ $102 + 17m = 93 + 26m$
$\Rightarrow$ $26m - 17m = 102 - 93$
$\Rightarrow$ $9m = 9$ $\Rightarrow$ $m = 1$

74. (b) Total annual expenditure of the family
$$= ₹(4 \times 2570 + 3 \times 2490 + 5 \times 3030)$$
$$= ₹(10{,}280 + 7470 + 15{,}150) = ₹32{,}900$$
Total income
$$= ₹(32{,}900 + 5320) = ₹38{,}220$$
$\therefore$ Required average monthly income
$$= ₹\dfrac{38220}{12} = ₹3185$$

75. (c) Total expenditure of the man in a year
$$= ₹(4 \times 1800 + 8 \times 2000)$$
$$= ₹(7200 + 16{,}000) = ₹23{,}200$$
Total annual income
$$= ₹(23{,}200 + 5600)$$
$$= ₹28{,}800$$
$\therefore$ Average monthly income = ₹$\dfrac{28800}{12}$
$$= ₹2400$$

76. (b) Required mean
$$= \dfrac{1 \times 1 + 2 \times 2 + 3 \times 3 + 4 \times 4 + 5 \times 5 + 6 \times 6 + 7 \times 7}{1 + 2 + 3 + 4 + 5 + 6 + 7}$$
$$= \dfrac{1 + 4 + 9 + 16 + 25 + 36 + 49}{28}$$
$$= \dfrac{140}{28} = 5$$

77. (d) Required number = sum of six numbers − sum of five numbers
$$= 6 \times 20 - 15 \times 5 = 120 - 75 = 45$$

78. (b) Let, the numbers be a, b, c and d, respectively.
Now, according to the question,
$$\dfrac{a + b + c}{3} = 2d$$
$\Rightarrow$ $a + b + c = 6d$ $\cdots(1)$
Again, from the question,
$$\dfrac{a + b + c + d}{4} = 12$$
$\Rightarrow$ $a + b + c + d = 48$ $\cdots(2)$
Now, put the value of $a + b + c$ from (1) in (2), we have
$6d + d = 48$ $\Leftrightarrow 7d = 48$
$\Rightarrow$ $d = \dfrac{48}{7}$

79. (b) Let, the numbers be x, $x + 2$, …, $x + 10$
$\therefore$ Required difference = $x + 10 - x = 10$

80. (b) On adding 6, arithmetic mean = $24 + 6 = 30$
On multiplying by 2.5, arithmetic mean
$$= 30 \times 2.5 = 75$$

81. (c) Let, Sachin's new average be x runs.
$\therefore$ Total runs in 11 innings = $11(x - 5)$
Now, according to the questions,

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$11(x - 5) + 120 = 12x$

$\Rightarrow \quad 12x - 11x = 65 \quad \Leftrightarrow \quad x = 65$ runs

82. **(d)** Sixth result $= 6 \times 49 + 6 \times 52 - 11 \times 50 = 294 + 312 - 550 = 56$

83. **(b)** Required average weight $= \dfrac{42 \times 25 + 28 \times 40}{42 + 28}$

$= \dfrac{1025 + 1120}{70} = \dfrac{2170}{70} = 31\,\text{Kg}$

84. **(c)** Male employees $= x$

Female employees $= y$

Now, according to the question,

$(x + y)\,12000 = x \times 15000 + y \times 8000$

$\Rightarrow \quad (x + y) \times 12 = 15x + 8y$

$\Rightarrow \quad 12x + 12y = 15x + 8y$

$\Rightarrow \quad 3x = 4y \quad \Rightarrow \quad \dfrac{x}{y} = \dfrac{4}{3}$

85. **(a)** Third number $=$ average of the five consecutive

numbers $= \dfrac{a}{5}$

First number of next sequence $= \dfrac{a}{5} + 3$

Now, according to the question,

$\therefore \dfrac{a}{5} + 3 + \dfrac{a}{5} + 4 + \dfrac{a}{5} + 5 + \dfrac{a}{5} + 6 + \dfrac{a}{5} + 7 = b$

$\Rightarrow a + 25 = b$

$\Rightarrow 25 = b - a$

$\therefore \quad \dfrac{b - a}{100} = \dfrac{25}{100} = \dfrac{1}{4}$

86. **(b)** (P + Q)'s present age $= 40 + 20 = 60$ years

(P + Q + R)'s present age $= 90$ years

R's present age $= (90 - 60) = 30$ years

R's age after 10 years $= (30 + 10) = 40$ years

87. **(a)** $43 \le$ Average ≤ 44

$\Rightarrow 43 \le \dfrac{345 + x}{9} \le 44$

$\Rightarrow 387 \le 345 + x \le 396$

$\Rightarrow 387 - 345 \le x \le 396 - 345$

$\Rightarrow 42 \le x \le 51$

88. **(c)** Weight of first member $= x$ Kg

Weight of second member $= (x + 2)$Kg

Weight of third member $= (x + 4)$Kg

Weight of fourth member $= (x + 6)$Kg

Weight of fifth member $= (x + 8)$Kg

$\therefore$ Difference $= x + 8 - x = 8$ Kg

> **Note:**
>
> Note that the difference of weights of two consecutive members is 2 Kg, because average weight is increased by 1 Kg each time.

89. **(c)** Expenditure of 9th person $= ₹x$

Now, according to the question,

$x - \dfrac{x + 8 \times 30}{9} = 20$

$\Rightarrow \quad \dfrac{9x - x - 240}{9} = 20$

$\Rightarrow \quad 8x - 240 = 180$

$\Rightarrow \quad 8x = 240 + 180 = 420$

$\Rightarrow \quad x = \dfrac{420}{8} = 52.5$

Total expenditure $= ₹(52.5 + 240) = ₹292.5$

90. **(b)** Number of girls $= x$

Number of boys $= 600 - x$

$\therefore \quad (600 - x) \times 12 + 11x$

$= 11\dfrac{3}{4} \times 600 = \dfrac{47}{4} \times 600$

$\Rightarrow \quad 7200 - 12x + 11x = 7050$

$\Rightarrow \quad x = 7200 - 7050 = 150$

91. **(b)** Required Average

$= \dfrac{100 \times 46 - 61 - 34 + 16 + 43}{90}$

$= \dfrac{4600 - 36}{90} = \dfrac{4564}{90} = 50.7$

92. **(b)** $M + T + W + \text{Th} = 4 \times 420.5 = 1682$ cm $\quad \cdots(1)$

$T + W + \text{Th} + F = 4 \times 440.5 = 1762$ cm $\quad \cdots(2)$

By equation (2)-equation (1), we have

$F - M = 1762 - 1682 = 80$

Let the rainfall for Monday and Friday be $20x$ and $21x$ cm respectively.

Now, according to the question,

$21x - 20x = 80$

$\Rightarrow \quad x = 80$

$\therefore$ Monday $\Rightarrow \quad 80 \times 20 = 1600$ cm

$\therefore$ Friday $\Rightarrow \quad 21 \times 80 = 1680$ cm

93. **(a)** $m + m + 1 + m + 2 + m + 3 + m + 4 = 5n$

$\Rightarrow \quad 5m + 10 = 5n$

$\Rightarrow \quad m + 2 = n \quad \Rightarrow \quad m = n - 2 \quad (1)$

Required average

$= \dfrac{m + 2 + m + 3 + m + 4 + m + 5 + m + 6 + m + 7}{6}$

$= \dfrac{6m + 27}{6}$

$= \dfrac{2m + 9}{2} = \dfrac{2(n - 2) + 9}{2} = \dfrac{2n + 5}{2}$

94. **(d)** Let the cricketer's highest score $= x$ runs

$\therefore$ Minimum score $= (x - 172)$ runs

$\therefore$ Total runs scored in 40 innings $= 40 \times 50 = 2000$ runs

Total runs scored in 38 innings $= 38 \times 48 = 1824$ runs

Now, according to the question,

$x + x - 172 = 2000 - 1824 = 176$

$\Rightarrow \quad 2x = 176 + 172 = 348$

$\therefore \quad x = \dfrac{348}{2} = 174$

95. (a) Let the third number be x.

$\Rightarrow$ Second number $= 2x$ and First number $= 4x$

Now, according to the question,

$4x + 2x + x = 154 \times 3$

$\Rightarrow \quad 7x = 462$

$\therefore \quad x = \dfrac{492}{7} = 66$

$\therefore$ First number $= 4x = 4 \times 66 = 264$

96. (d) Let the number of officers be x, then number of the rest officials $= 500 - x$

Now, according to the question,

$x \times 14000 + (500 - x)4000 = 5000 \times 500$

$\Rightarrow \quad x \times 14 + (500 - x)4 = 5 \times 500$

$\Rightarrow \quad 14x + 2000 - 4x = 2500$

$\Rightarrow \quad 10x = 2500 - 2000 = 500$

$\Rightarrow \quad x = \dfrac{500}{10} = 50$

97. (d) Difference $= (64 + 62 + 84) - (68 + 65 + 73)$

$= 210 - 206 = 4$

$\therefore$ Correct average $= 72 + \dfrac{4}{40} = 72.1$

98. (b) Let, the first number is x.

$\therefore$ Second number $= 3x$ and the third number $= \dfrac{3x}{4}$

Now, according to the question,

$x + 3x + \dfrac{3x}{4} = 3 \times 114$

$\Rightarrow \quad \dfrac{4x + 12x + 3x}{4} = 342$

$\Rightarrow \quad 19x = 342 \times 4$

$\therefore \quad x = \dfrac{342 \times 4}{19} = 72$

$\therefore$ Largest number $= 3x = 3 \times 72 = 216$

99. (a) Let, the average of runs was x till 11 innings.

$\therefore$ Total runs $= 11x$

$\Rightarrow$ Total run after 12th innings $= 11x + 63$

Again, after 12th innings average $= (x + 2)$

$\Rightarrow$ Total run $= 12(x + 2)$

Now, according to the question,

$12(x + 2) = 11x + 63$

$\therefore \quad x = 63 - 12 \times 2 = 39$

$\therefore$ The average of his score after 12th innings $= 39 + 2 = 41$

100. (b) According to the question,

$\dfrac{A + B}{2} = 20$

$\Rightarrow \quad A + B = 40$ ⋯(1)

$\dfrac{B + C}{2} = 19$

$\Rightarrow \quad B + C = 38$ ⋯(2)

$\dfrac{C + A}{2} = 21$

$\Rightarrow \quad C + A = 42$ ⋯(3)

Adding (1), (2) and (3), we get

$\therefore \quad 2A + 2B + 2C = 120$

$\Rightarrow \quad A + B + C = 60$ ⋯(4)

$\therefore \quad A = (A + B + C) - (B + C)$

$= 60 - 38 = 22$

101. (e) Let the partly fixed expenditure be x.

And that partly varying be y.

Then, $x + 24y = 615 \times 24$ ⋯(1)

Again, $x + 40y = 465 \times 40$ ⋯(2)

Solving equations (1) and (2), we get

$x + 24y = 615 \times 24$

$x + 40y = 465 \times 40$

$\underline{- \quad - \qquad\quad -}$

$16y = 18600 - 14760 = 3840$

$\Rightarrow \quad y = \dfrac{3840}{16} = 240$

Putting the value of y in equation (1), we get $x = 24(615 - 240) = 24 \times 375 = 9000$

Now, when there are 60 students

Average $= \dfrac{9000 + 240 \times 60}{60}$

$= \dfrac{9000 + 14400}{60} = \dfrac{23400}{60} = ₹390$

102. (e) Total marks $= 24 \times 56 = 1344$

Total of actual marks

$= 1344 - (44 + 45 + 61) + (48 + 59 + 67) = 1368$

Actual average $= \dfrac{1368}{24} = 57$

103. (d) Ritu's marks $= 875 \times \dfrac{56}{100} = 490$

Smita's Marks $= 875 \times \dfrac{92}{100} = 805$

Rina's marks $= 634$

Total marks $= 490 + 805 + 634 = 1929$

Average $= \dfrac{1929}{3} = 643$

104. (b) Sum of first two numbers = $30 \times 2 = 60$

Sum of last two numbers = $70 \times 2 = 140$

$\therefore$ Third number = $260 - 140 - 60 = 60$

105. (c) Since the numbers are consecutive, they should be equidistant from the average, i.e., 42.

Hence the numbers are 39, 41, 43, and 45.

Product of B and D = $41 \times 45 = 1845$

106. (b) Ajay's score = $63 + 30 = 93$

Rahul's score = $93 - 15 = 78$

Manish's + Suresh's score = $63 \times 3 - 78 = 189 - 78 = 111$

107. (a) Total ages of 80 boys = $15 \times 80 = 1200$ years

Total age of 16 boys = $15 \times 16 = 240$ years

Total age of 25 boys = $14 \times 25 = 350$ years

Average age of the remaining boys

$= \dfrac{1200 - (240 + 350)}{80 - (25 + 15)} = \dfrac{610}{40} = 15.25$ years.

109. (a) Ph + Ch + Ma = 120 + Ch

$\Rightarrow$ Ph + Ma = 120 $\Rightarrow$ $\left(\dfrac{\text{Ph} + \text{Ma}}{2} \right) = 60$

110. (b) Required average

$= \dfrac{68 \times 20 + (72 - 48) + (61 - 65)}{20} = 69$

111. (d) From I. There are 11 students in the class.

From II. The average age of students and class teacher is 14 years.

From III. The average age of class teacher is 3 years more than that of students.

Now, combining all three statements, we have

Average age of (students + teacher) = $14 \times 12 = 168$ years

Average age of 11 students = $14 - 3 = 11$ years

Total age of 11 students = $11 \times 11 = 121$ years

$\therefore$ Teacher's age = $168 - 121 = 47$ years.