6 | Average

I. Average $= \left(\dfrac{\text{Sum of observations}}{\text{Number of observations}} \right)$

II. Suppose a man covers a certain distance at x kmph and an equal distance at y kmph. Then, the average speed during the whole journey is $\left(\dfrac{2xy}{x+y} \right)$ kmph. office 365 off

SOLVED EXAMPLES

Ex. 1. *Find the average of the following set of numbers: 354, 281, 623, 518, 447, 702, 876.* **(Bank Recruitment, 2009)**

Sol. Average of given numbers $= \left(\dfrac{354 + 281 + 623 + 518 + 447 + 702 + 876}{7} \right) = \dfrac{3801}{7} = 543.$

Ex. 2. *The body weight of six boys is recorded as 54 kg, 64 kg, 75 kg, 67 kg, 45 kg and 91 kg. What is the average body weight of all six boys?* **(Bank Recruitment, 2010)**

Sol. Average body weight $= \left(\dfrac{54 + 64 + 75 + 67 + 45 + 91}{6} \right)$ kg $= \left(\dfrac{396}{6} \right)$ kg $= 66$ kg.

Ex. 3. *There are six numbers 30, 72, 53, 68, x and 87, out of which x is unknown. The average of the numbers is 60. What is the value of x?* **(Bank Recruitment, 2010)**

Sol. Average of given numbers $= \left(\dfrac{30 + 72 + 53 + 68 + x + 87}{6} \right) = \left(\dfrac{310 + x}{6} \right).$

$\therefore \quad \dfrac{310 + x}{6} = 60 \Rightarrow 310 + x = 360 \Rightarrow x = 50.$

Hence, $x = 50$.

Ex. 4. *Find the average of all prime numbers between 30 and 50.*

Sol. There are five prime numbers between 30 and 50.

They are 31, 37, 41, 43 and 47.

$\therefore$ Required average $= \left(\dfrac{31 + 37 + 41 + 43 + 47}{5} \right) = \dfrac{199}{5} = 39.8.$

Ex. 5. *Find the average of first 40 natural numbers.*

Sol. Sum of first n natural numbers $= \dfrac{n(n+1)}{2}.$

So, sum of first 40 natural numbers $= \dfrac{40 \times 41}{2} = 820.$

$\therefore$ Required average $= \dfrac{820}{40} = 20.5.$

Ex. 6. *Find the average of first 20 multiples of 7.*

Sol. Required average $= \dfrac{7(1 + 2 + 3 + ... + 20)}{20} = \left(\dfrac{7 \times 20 \times 21}{20 \times 2} \right) = \left(\dfrac{147}{2} \right) = 73.5.$

Ex. 7. *A man bought 5 shirts at ₹ 450 each, 4 trousers at ₹ 750 each and 12 pairs of shoes at ₹ 750 each. What is the average expenditure per article?* **(R.R.B., 2006)**

Sol. Total expenditure $=$ ₹ (5 × 450 + 4 × 750 + 12 × 750) $=$ ₹ (2250 + 3000 + 9000) $=$ ₹ 14250.

Number of articles = (5 + 4 + 12) = 21.

∴ Average expenditure = ₹ $\left(\dfrac{14250}{21}\right)$ = ₹ $\dfrac{4750}{7}$ = ₹ 678.57.

Ex. 8. *13 chairs and 5 tables were bought for ₹ 8280. If the average cost of a table be ₹ 1227, what is the average cost of a chair?* **(S.S.C., 2005)**

Sol. Total cost of 5 tables = ₹ (1227 × 5) = ₹ 6135.

Total cost of 13 chairs = ₹ (8280 − 6135) = ₹ 2145.

∴ Average cost of a chair = ₹ $\left(\dfrac{2145}{13}\right)$ = ₹ 165.

Ex. 9. *The average of five consecutive numbers A, B, C, D and E is 48. What is the product of A and E?*

(Bank Recruitment, 2008)

Sol. Let the numbers A, B, C, D and E be x, $(x + 1)$, $(x + 2)$, $(x + 3)$ and $(x + 4)$ respectively. Then,

$\dfrac{x + (x+1) + (x+2) + (x+3) + (x+4)}{5} = 48 \Rightarrow 5x + 10 = 240 \Rightarrow 5x = 230 \Rightarrow x = 46.$

So, A = x = 46 and E = $(x + 4)$ = 50.

∴ Required product = 46 × 50 = 2300.

Ex. 10. *The average monthly expenditure of a family was ₹ 2200 during the first 3 months; ₹ 2250 during the next 4 months and ₹ 3120 during the last 5 months of a year. If the total savings during the year were ₹ 1260, find the average monthly income of the family.* **(M.A.T., 2006)**

Sol. Total yearly expenditure = ₹ (2200 × 3 + 2250 × 4 + 3120 × 5)

= ₹ (6600 + 9000 + 15600) = ₹ 31200.

Total yearly savings = ₹ 1260.

Total yearly income = ₹ (31200 + 1260) = ₹ 32460.

∴ Average monthly income = ₹ $\left(\dfrac{32460}{12}\right)$ = ₹ 2705.

Ex. 11. *Six persons went to a hotel for taking their meals. Five of them spent ₹ 32 each on their meals while the sixth person spent ₹ 80 more than the average expenditure of all the six. What was the total money spent by all the persons?* **(C.P.O., 2006)**

Sol. Let the average expenditure of all the six be ₹ x.

Then, 32 × 5 + $(x + 80)$ = 6x ⇒ 240 + x = 6x ⇒ 5x = 240 ⇒ x = 48.

∴ Total money spent = 6x = ₹ (6 × 48) = ₹ 288.

Ex. 12. *The average age of a man and his son is 40 years. The ratio of their ages is 11 : 5 respectively. What is the son's age?* **(Bank Recruitment, 2009)**

Sol. Let the ages of the man and his son be 11x and 5x years respectively.

Then, average age = $\left(\dfrac{11x + 5x}{2}\right)$ years = 8x years.   ∴ 8x = 40 ⇒ x = 5.

Hence, son's age = 5x = 25 years.

Ex. 13. *Of the three numbers, second is twice the first and is also thrice the third. If the average of three numbers is 44, what is the largest number?* **(M.B.A., 2007)**

Sol. Let the third number be x. Then, second number = 3x.

First number = $\dfrac{3x}{2}$.

∴ $x + 3x + \dfrac{3x}{2} = 44 \times 3 \Rightarrow \dfrac{11x}{2} = 132 \Rightarrow x = \left(\dfrac{132 \times 2}{11}\right) = 24.$

Hence, largest number = 3x = (3 × 24) = 72.

Ex. 14. *The average of five numbers is 58. 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?* **(Bank P.O., 2009)**

Sol. Third number = (Sum of 5 numbers) – (Sum of 4 numbers)

= (58 × 5) – [(48.5 × 2) + (53.5 × 2)]

= 290 – (97 + 107) = 290 – 204 = 86.

Ex. 15. *The average of marks of 13 papers is 40. The average of marks of the first 7 papers is 42 and that of the last 7 papers is 35. What are the marks of the seventh paper?* **(C.P.F., 2007)**

Sol. Marks in the seventh paper = (42 × 7 + 35 × 7 – 40 × 13)

= (294 + 245 – 520) = 539 – 520 = 19.

Ex. 16. *The average age of A and B is 20 years. If A is replaced by C, the average age becomes 19 years and if B is replaced by C, the average age becomes 21 years. Find the ages of A, B and C.* **(S.S.C., 2006)**

Sol. Clearly, average age of A and B = 20 years;

average age of B and C = 19 years;

average age of A and C = 21 years.

Sum of ages of A and B = (20 × 2) years = 40 years ...(*i*)

Sum of ages of B and C = (19 × 2) years = 38 years ...(*ii*)

Sum of ages of A and C = (21 × 2) years = 42 years ...(*iii*)

Adding (*i*), (*ii*) and (*iii*), we get:

2 (Sum of ages of A, B and C) = 120 years

$\Rightarrow$ (Sum of ages of A, B and C) = 60 years ...(*iv*)

Subtracting (*i*) from (*iv*), we get: C's age = (60 – 40) yrs = 20 years

Subtracting (*ii*) from (*iv*), we get: A's age = (60 – 38) yrs = 22 years

Subtracting (*iii*) from (*iv*), we get: B's age = (60 – 42) yrs = 18 years

Ex. 17. *In a class there are 50 students. Their average weight is 45 kg. When a student leaves the class, the average is reduced by 100 g. Find the weight of the student who left the class.* **(R.R.B., 2006)**

Sol. Total weight of 50 students = (45 × 50) kg = 2250 kg.

Average weight of 49 students = (45 kg – 100 g) = 44.9 kg.

Total weight of 49 students = (44.9 × 49) kg = 2200.1 kg.

∴ Weight of the student who left the class = (2250 – 2200.1) kg = 49.9 kg.

Ex. 18. *The average age of a class of 39 students is 15 years. If the age of the teacher be included, then the average increases by 3 months. Find the age of the teacher.*

Sol. Total age of 39 persons = (39 × 15) years = 585 years.

Average age of 40 persons = 15 years 3 months = $\frac{61}{4}$ years.

Total age of 40 persons = $\left(\frac{61}{4} \times 40\right)$ years = 610 years.

∴ Age of the teacher = (610 – 585) years = 25 years.

Ex. 19. *The average of 11 players of a cricket team is increased by 2 months when two of them aged 18 years and 20 years are replaced by two new players. Find the average age of the new players.* **(S.S.C., 2007)**

Sol. Total age increased = (2 × 11) months = 22 months = 1 years 10 months.

Sum of ages of two new players = (18 years + 20 years + 1 years 10 months)

= 39 yrs 10 months.

∴ Required average = $\left(\frac{39 \text{ years } 10 \text{ months}}{2}\right)$ = 19 years 11 months.

Ex. 20. *The average age of a class was 15 years. When 5 boys whose average age was 12 years 6 months were admitted in the class, the average was reduced by 6 months. How many students were there in the class originally?* **(P.C.S., 2008)**

Sol. Let the original number of students in the class be *x*. Then,

$15x + 12\frac{1}{2} \times 5 = 14\frac{1}{2}(x+5) \Rightarrow 15x + \frac{25}{2} \times 5 = \frac{29}{2}x + \frac{29}{2} \times 5 \Rightarrow \frac{x}{2} = 10 \Rightarrow x = 20.$

Hence, required number of students = 20.

Ex. 21. *A batsman makes a score of 87 runs in the 17th inning and thus increases his average by 3. Find his average after 17th inning.*

Sol. Let the average after 17th inning = x.

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

∴ 16 $(x - 3) + 87 = 17x$ or $x = (87 - 48) = 39$.

Ex. 22. *The batting average for 40 innings of a cricket player is 50 runs. His highest score in an innings exceeds his lowest score by 172 runs. If these two innings are excluded, the average score of the remaining 38 innings is 48 runs. Find his highest score in an innings.* **(S.S.C., 2006)**

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

∴ $x + (x - 172) = 50 \times 40 - 48 \times 38 \Rightarrow 2x - 172 = 2000 - 1824 = 176$

$\Rightarrow 2x = 348 \Rightarrow x = 174$.

Hence, highest score in an innings = 174.

Ex. 23. *10 years ago, the average age of a family of 4 members was 24 years. Since then, two children having been born, still the average age of the family is the same today. If the two children differ in age by 2 years, find the present age of the younger child.* **(S.S.C., 2007)**

Sol. Total age of 4 members, 10 years ago = (24×4) years = 96 years.

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

Total age of 6 members now = (24×6) years = 144 years.

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

Let the age of the younger child be x years.

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

So, $x + x + 2 = 8 \Rightarrow 2x = 6 \Rightarrow x = 3$.

∴ Age of the younger child = 3 years.

Ex. 24. *Distance between two stations A and B is 778 km. A train covers the journey from A to B at 84 km per hour and returns back to A with a uniform speed of 56 km per hour. Find the average speed of the train during the whole journey.*

Sol. Required average speed = $\left(\dfrac{2xy}{x + y} \right)$ km/hr = $\dfrac{2 \times 84 \times 56}{(84 + 56)}$ km/hr

$$= \left(\dfrac{2 \times 84 \times 56}{140} \right) \text{km/hr} = 67.2 \text{ km/hr}.$$

Ex. 25. *The average salary of workers of a factory is ₹ 6000, while the average salary of 150 technicians is ₹ 12000 and that of non-technicians is ₹ 3750. Find the total number of workers in the factory.*

Sol. Let the total number of workers be x. Then,

$6000x = (12000 \times 150) + 3750 (x - 150) \Rightarrow 2250x = 1237500 \Rightarrow x = 550$.

Hence, total number of workers in the factory = 550.

Ex. 26. *The average score of girls in class X examination in a school is 73 and that of boys is 71. The average score in class X of that school is 71.8. Find the percentage of the number of girls and boys in class X of the school.* **(Campus Recruitment, 2006, 2009; M.A.T., 2003, 06; S.S.C., 2008)**

Sol. Let the number of boys in the class be x and the number of girls be y.

Then, $71x + 73y = 71.8 (x + y) \Rightarrow 0.8 \ x = 1.2 \ y \Rightarrow x = \dfrac{3}{2} y$.

Percentage of boys = $\left[\dfrac{x}{(x + y)} \times 100 \right]\% = \left[\dfrac{\dfrac{3}{2} y}{\left(\dfrac{3}{2} y + y \right)} \times 100 \right]\%$

$$= \left(\dfrac{3y}{2} \times \dfrac{2}{5y} \times 100 \right)\% = 60\%.$$

Percentage of girls = $(100 - 60)\% = 40\%$.

EXERCISE
(OBJECTIVE TYPE QUESTIONS)

Directions: *Mark (✓) against the correct answer*:

1. The body weight of seven students of a class is recorded as 54 kg, 78 kg, 43 kg, 82 kg, 67 kg, 42 kg and 75 kg. What is the average body weight of all the seven students? **(Bank Recruitment, 2010)**
  (*a*) 63 kg (*b*) 69 kg
  (*c*) 71 kg (*d*) 73 kg
  (*e*) None of these

2. Find the average of the following sets of scores: 385, 441, 876, 221, 536, 46, 291, 428

  (Bank Recruitment, 2009)
  (*a*) 221 (*b*) 403
  (*c*) 428 (*d*) 536
  (*e*) None of these

3. The monthly incomes of five persons are ₹ 1132, ₹ 1140, ₹ 1144, ₹ 1136 and ₹ 1148 respectively. What is their arithmetic mean? **(P.C.S., 2009)**
  (*a*) ₹ 1100 (*b*) ₹ 1120
  (*c*) ₹ 1132 (*d*) ₹ 1140

4. Among five people with monthly income (in ₹) 15000, 26000, 16000, 19000 and 50000, how many will have income less than the mean income of five people?

  (P.C.S., 2006)
  (*a*) 1 (*b*) 2
  (*c*) 3 (*d*) 4

5. The arithmetic mean of 15 numbers is 41.4. Then the sum of these numbers is **(P.C.S., 2010)**
  (*a*) 414 (*b*) 420
  (*c*) 620 (*d*) 621

6. If $25a + 25b = 115$, what is the average of a and b? **(Bank P.O., 2009)**
  (*a*) 2.5 (*b*) 3.4
  (*c*) 4.5 (*d*) 4.6
  (*e*) None of these

7. The following table shows the number of working hours and the number of employees employed in a small scale industry.

No. of working hours	No. of employees
3 – 5	7
5 – 7	10
7 – 9	18
9 – 11	57
11 – 13	14
13 – 15	8

The average number of working hours of an employee is
  (*a*) 8.5 (*b*) 9.5
  (*c*) 10.5 (*d*) None of these

8. If the arithmetic mean of 0, 5, 4, 3 is a, that of – 1, 0, 1, 5, 4, 3 is b and that of 5, 4, 3 is c, then the relation between a, b and c is **(Hotel Management, 2007)**
  (*a*) $a = b = c$ (*b*) $a : b : c = 3 : 2 : 4$
  (*c*) $4a = 5b = c$ (*d*) $a + b + c = 12$

9. Kunal bought 65 books for ₹ 1050 from one shop and 50 books for ₹ 1020 from another. What is the average price he paid per book? **(Bank P.O., 2008)**
  (*a*) ₹ 18 (*b*) ₹ 18.20
  (*c*) ₹ 24 (*d*) ₹ 36.40
  (*e*) None of these

10. The average of the reciprocals of x and y is
  (Campus Recruitment, 2010)
  (*a*) $\dfrac{(x + y)}{(x - y)}$ (*b*) $\dfrac{(x + y)}{2xy}$
  (*c*) $\dfrac{2(x + y)}{xy}$ (*d*) $\dfrac{2xy}{(x + y)}$

11. The average of two numbers is XY. If one number is X, the other is **(R.R.B., 2006)**
  (*a*) $\dfrac{Y}{2}$ (*b*) Y
  (*c*) $2XY - X$ (*d*) $X(Y - 1)$

12. There are five boxes in a cargo hold. The weight of the first box is 200 kg and the weight of the second box is 20% more than the weight of the third box, whose weight is 25% more than the first box's weight. The fourth box at 350 kg is 30% lighter than the fifth box. The difference in the average weight of the four heaviest boxes and the four lightest boxes is **(M.A.T., 2005)**
  (*a*) 37.5 kg (*b*) 51.5 kg
  (*c*) 75 kg (*d*) 112.5 kg

13. In Arun's opinion, his weight is greater than 65 kg but less than 72 kg. His brother does not agree with Arun and he thinks that Arun's weight is greater than 60 kg but less than 70 kg. His mother's view is that his weight cannot be greater than 68 kg. If all of them are correct in their estimation, what is the average of different probable weights of Arun?
  (*a*) 67 kg (*b*) 68 kg
  (*c*) 69 kg (*d*) Data inadequate
  (*e*) None of these

14. The average of 20 numbers is zero. Of them, at the most, how many may be greater than zero ?
  (Hotel Management, 2002)
  (*a*) 0 (*b*) 1
  (*c*) 10 (*d*) 19

15. The mean of the first ten even natural numbers is

(*a*) 9   (*b*) 10

(*c*) 11   (*d*) 12

16. The arithmetic mean of first 11 natural numbers is   **(P.C.S. 2009)**

(*a*) 5   (*b*) 5.5

(*c*) 6.0   (*d*) 6.5

17. Find the average of all the numbers between 6 and 34 which are divisible by 5.

(*a*) 18   (*b*) 20

(*c*) 24   (*d*) 30

18. The average of the first five multiples of 3 is

(*a*) 3   (*b*) 9

(*c*) 12   (*d*) 15

19. The average of the first nine prime numbers is

(*a*) 9   (*b*) 11

(*c*) $11\dfrac{1}{9}$ (*d*) $11\dfrac{2}{9}$

20. A student was asked to find the arithmetic mean of the numbers 3, 11, 7, 9, 15, 13, 8, 19, 17, 21, 14 and *x*. He found the mean to be 12. What should be the number in place of *x*?

(*a*) 3   (*b*) 7

(*c*) 17   (*d*) 31

21. The average of 2, 7, 6 and *x* is 5 and the average of 18, 1, 6, *x* and *y* is 10. What is the value of *y* ?

(*a*) 5   (*b*) 10

(*c*) 20   (*d*) 30

22. 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?   **(Bank P.O., 2010)**

(*a*) 40   (*b*) 60

(*c*) 120   (*d*) Cannot be determined

(*e*) None of these

23. The average of the first 100 positive integers is

(*a*) 49.5   (*b*) 50.5

(*c*) 51   (*d*) 100

24. The average of odd numbers up to 100 is **(S.S.C., 2010)**

(*a*) 49   (*b*) 49.5

(*c*) 50   (*d*) 50.5

25. 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?   **(S.S.C., 2010)**

(*a*) 10 years   (*b*) 10.5 years

(*c*) 11 years   (*d*) 12 years

26. The average of X_1, X_2 and X_3 is 14. Twice the sum of X_2 and X_3 is 30. What is the value of X_1?

(*a*) 12   (*b*) 16

(*c*) 20   (*d*) 27

27. The average of x_1, x_2, x_3 and x_4 is 16. Half the sum of x_2, x_3, x_4 is 23. What is the value of x_1?

(*a*) 17   (*b*) 18

(*c*) 19   (*d*) 20

28. If the mean of 5 observations *x*, *x* + 2, *x* + 4, *x* + 6 and *x* + 8 is 11, then the mean of the last three observations is

(*a*) 11   (*b*) 13

(*c*) 15   (*d*) 17

29. If the mean of *a*, *b*, *c* is M and $ab + bc + ca = 0$, then the mean of a^2, b^2, c^2 is

(*a*) M^2 (*b*) $3M^2$

(*c*) $6M^2$ (*d*) $9M^2$

30. The average of the two-digit numbers, which remain the same when the digits interchange their positions, is

(*a*) 33   (*b*) 44

(*c*) 55   (*d*) 66

31. Company *C* sells a line of 25 products with an average retail price of ₹ 1200. If none of these products sells for less than ₹ 420 and exactly 10 of the products sell for less than ₹ 1000, then what is the greatest possible selling price of the most expensive product?   **(M.A.T., 2006)**

(*a*) ₹ 2600   (*b*) ₹ 3900

(*c*) ₹ 7800   (*d*) ₹ 11800

32. The average sale of a car dealership was 15 cars per week. After a promotional scheme the average sale increased to 21 cars per week. The percentage increase in the sale of cars was   **(M.A.T., 2010)**

(*a*) 39.33%   (*b*) 40%

(*c*) $42\dfrac{6}{7}\%$ (*d*) 140%

33. The mean of 1^2, 2^2, 3^2, 4^2, 5^2, 6^2, 7^2 is

(*a*) 10   (*b*) 20

(*c*) 30   (*d*) 40

34. If *a*, *b*, *c*, *d*, *e* are five consecutive odd numbers, their average is

(*a*) 5 (*a* + 4)   (*b*) $\dfrac{abcde}{5}$

(*c*) 5 (*a* + *b* + *c* + *d* + *e*)   (*d*) None of these

35. The average of a non-zero number and its square is 5 times the number. The number is

(*a*) 9   (*b*) 17

(*c*) 29   (*d*) 295

36. Total of Arun's marks in Sanskrit and Mathematics together are 80 more than his marks in Science. His average marks in the three subjects are 100. What are his marks in Science?

(*a*) 80   (*b*) 110

(*c*) 120   (*d*) Data inadequate

(*e*) None of these

37. The arithmetic mean of the series $1, 2, 4, 8, 16,..., 2^n$ is

(*a*) $\dfrac{2^n - 1}{n + 1}$ (*b*) $\dfrac{2^n + 1}{n}$

(*c*) $\dfrac{2^n - 1}{n}$ (*d*) $\dfrac{2^{n+1} - 1}{n + 1}$

38. The average of two numbers is 6.5 and square root of their product is 6. What are the numbers? **(S.S.C., 2006)**

(*a*) 11 and 2   (*b*) 8 and 5

(*c*) 9 and 4   (*d*) 10 and 3

39. Of four numbers whose average is 60, the first is one-fourth of the sum of the last three. The first number is **(S.S.C., 2006)**

(*a*) 15   (*b*) 42

(*c*) 45   (*d*) 48

40. The average of 4 positive integers is 59. The highest integer is 83 and the lowest integer is 29. The difference between the remaining two integers is 28. Which of the following integers is higher of the remaining two integers? **(Bank Recruitment, 2008)**

(*a*) 39   (*b*) 48

(*c*) 76   (*d*) Cannot be determined

(*e*) None of these

41. The average of 7 consecutive numbers is 20. The largest of these numbers is

(*a*) 20   (*b*) 22

(*c*) 23   (*d*) 24

42. The average of five consecutive odd numbers is 95. What is the fourth number in the descending order? **(Bank Recruitment, 2009)**

(*a*) 91   (*b*) 95

(*c*) 97   (*d*) 99

(*e*) None of these

43. *A*, *B*, *C* and *D* are four consecutive even numbers respectively and their average is 65. What is the product of *A* and *D*? **(Bank P.O., 2007)**

(*a*) 3968   (*b*) 4092

(*c*) 4216   (*d*) 4352

(*e*) None of these

44. The sum of the three consecutive even numbers is 44 more than the average of these numbers. Which of the following is the third largest of these numbers? **(Bank P.O., 2008)**

(*a*) 16   (*b*) 18

(*c*) 24   (*d*) Cannot be determined

(*e*) None of these

45. The average marks of a student in 4 subjects is 75. If the student obtained 80 marks in the fifth subject, then the new average is **(P.C.S., 2008)**

(*a*) 72.5   (*b*) 76

(*c*) 77   (*d*) 77.5

46. The average age of the boys in a class is 16 years and that of the girls is 15 years. The average age for the whole class is

(*a*) 15 years

(*b*) 15.5 years

(*c*) 16 years

(*d*) Cannot be computed with the given information

47. The average annual income (in ₹) of certain agricultural workers is *S* and that of other workers is *T*. The number of agricultural workers is 11 times that of other workers. Then the average monthly income (in ₹) of all the workers is **(S.S.C. 2004)**

(*a*) $\dfrac{S + T}{2}$ (*b*) $\dfrac{S + 11T}{2}$

(*c*) $\dfrac{1}{11S} + T$ (*d*) $\dfrac{11S + T}{12}$

48. A family consists of grandparents, parents and three grandchildren. The average age of the grandparents is 67 years, that of the parents is 35 years and that of the grandchildren is 6 years. What is the average age of the family?

(*a*) $28\dfrac{4}{7}$ years   (*b*) $31\dfrac{5}{7}$ years

(*c*) $32\dfrac{1}{7}$ years   (*d*) None of these

49. A library has an average of 510 visitors on Sundays and 240 on other days. The average number of visitors per day in a month of 30 days beginning with a Sunday is

(*a*) 250   (*b*) 276

(*c*) 280   (*d*) 285

50. In a class there are 32 boys and 28 girls. The average age of the boys in the class is 14 years and the average age of the girls in the class is 13 years. What is the average age of the whole class (rounded to two digits after decimal)? **(NABARD, 2009)**

(*a*) 12.51   (*b*) 13.42

(*c*) 13.50   (*d*) 13.53

(*e*) None of these

51. The average weight of 16 boys in a class is 50.25 kgs and that of the remaining 8 boys is 45.15 kgs. Find the average weight of all the boys in the class.
(a) 47.55 kgs   (b) 48 kgs
(c) 48.55 kgs   (d) 49.25 kgs

52. The mean of 5 observations is 60, the mean of 10 observations is 30 and the mean of 15 observations is 20. The mean of all the 30 observations is
(P.C.S., 2009)
(a) 20   (b) 25
(c) 30   (d) 40

53. The average expenditure of a man for the first five months of a year is ₹ 5000 and for the next seven months it is ₹ 5400. He saves ₹ 2300 during the year. His average monthly income is   **(C.P.O., 2007)**
(a) ₹ 5425   (b) ₹ 5446
(c) ₹ 5500   (d) ₹ 5600

54. A school has 4 sections of Chemistry in Class X having 40, 35, 45 and 42 students. The mean marks obtained in Chemistry test are 50, 60, 55 and 45 respectively for the 4 sections. Determine the overall average of marks per student.   **(M.A.T., 2006)**
(a) 50.25   (b) 51.25
(c) 52.25   (d) 53.25

55. If the average of m numbers is n^2 and that of n numbers is m^2, then the average of $(m + n)$ numbers is   **(S.S.C., 2008)**
(a) $m - n$ (b) mn
(c) $m + n$ (d) $\dfrac{m}{n}$

56. The average of five consecutive numbers is x. If the next two numbers are also included, how shall the average vary?   **(M.A.T., 2005, C.P.O., 2006, C.P.F. 2008)**
(a) It shall increase by 1
(b) It shall remain the same
(c) It shall increase by 1.4
(d) It shall increase by 2

57. A person purchases 1 kg of tomatoes from each of the 4 places at the rate of 1 kg, 2 kg, 3 kg, 4 kg per rupee respectively. On an average, he has purchased x kg of tomatoes per rupee. Then the value of x is   **(M.A.T., 2006)**
(a) 1.92   (b) 2
(c) 2.5   (d) None of these

58. In a certain factory there are five workers A, B, C, D and E. A can complete a work in 4 minutes, B in 5 minutes, C in 6 minutes, D in 10 minutes and E in 12 minutes. The average number of units of work completed per worker per minute will be **(P.C.S., 2009)**
(a) 0.16   (b) 0.172
(c) 0.80   (d) 0.87

59. A car owner buys petrol at ₹ 17, ₹ 19 and ₹ 20 per litre for three consecutive years. Compute the average cost per litre, if he spends ₹ 6460 per year.
(a) ₹ 18.49   (b) ₹ 18.58
(c) ₹ 19.2   (d) ₹ 21.66

60. The average of six numbers is x and the average of three of these is y. If the average of the remaining three is z, then
(a) $x = y + z$ (b) $2x = y + z$
(c) $x = 2y + 2z$ (d) None of these

61. Out of 9 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

62. There were 35 students in a hostel. If the number of the students is increased by 7, then the expenses of the mess increase by ₹ 42 per day, while the average expenditure per head diminishes by ₹ 1. The original expenditure of the mess per day was
(S.S.C., 2005)
(a) ₹ 400   (b) ₹ 420
(c) ₹ 432   (d) ₹ 442

63. The average price of three items of furniture is ₹ 15000. If their prices are in the ratio 3 : 5 : 7, the price of the cheapest item is
(a) ₹ 9000   (b) ₹ 15000
(c) ₹ 18000   (d) ₹ 21000

64. Of the four numbers, the first is twice the second, the second is one-third of the third and the third is 5 times the fourth. The average of the numbers is 24.75. The largest of these numbers is
(a) 9   (b) 25
(c) 30   (d) None of these

65. 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   **(S.S.C., 2005)**
(a) 12   (b) 20
(c) 24   (d) 48

66. Of the three numbers, the first is twice the second and the second is twice the third. The average of the reciprocal of the numbers is $\dfrac{7}{72}$. The numbers are :
(a) 16, 8, 4   (b) 20, 10, 5
(c) 24, 12, 6   (d) 36, 18, 9

67. 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

ANSWERS

1. (a)	**2.** (b)	**3.** (d)	**4.** (c)	**5.** (d)	**6.** (e)	**7.** (b)	**8.** (b)	**9.** (a)	**10.** (b)
11. (c)	**12.** (c)	**13.** (a)	**14.** (d)	**15.** (c)	**16.** (c)	**17.** (b)	**18.** (b)	**19.** (c)	**20.** (b)
21. (c)	**22.** (b)	**23.** (b)	**24.** (c)	**25.** (c)	**26.** (d)	**27.** (b)	**28.** (b)	**29.** (b)	**30.** (c)
31. (d)	**32.** (b)	**33.** (b)	**34.** (d)	**35.** (a)	**36.** (b)	**37.** (d)	**38.** (c)	**39.** (d)	**40.** (c)
41. (c)	**42.** (e)	**43.** (c)	**44.** (c)	**45.** (b)	**46.** (d)	**47.** (d)	**48.** (b)	**49.** (d)	**50.** (d)
51. (c)	**52.** (c)	**53.** (a)	**54.** (c)	**55.** (b)	**56.** (a)	**57.** (a)	**58.** (a)	**59.** (b)	**60.** (b)
61. (c)	**62.** (b)	**63.** (a)	**64.** (d)	**65.** (d)	**66.** (c)	**67.** (e)	**68.** (c)	**69.** (b)	**70.** (c)
71. (d)	**72.** (c)	**73.** (c)	**74.** (b)	**75.** (b)	**76.** (c)	**77.** (d)	**78.** (c)	**79.** (c)	**80.** (c)
81. (d)	**82.** (a)	**83.** (a)	**84.** (a)	**85.** (c)	**86.** (a)	**87.** (a)	**88.** (d)	**89.** (b)	**90.** (e)
91. (c)	**92.** (a)	**93.** (c)	**94.** (b)	**95.** (d)	**96.** (d)	**97.** (e)	**98.** (c)	**99.** (c)	**100.** (b)
101. (c)	**102.** (d)	**103.** (c)	**104.** (e)	**105.** (a)	**106.** (d)	**107.** (c)	**108.** (d)	**109.** (b)	**110.** (c)
111. (a)	**112.** (d)	**113.** (b)	**114.** (c)	**115.** (c)	**116.** (a)	**117.** (b)	**118.** (d)	**119.** (c)	**120.** (c)
121. (a)	**122.** (b)	**123.** (c)	**124.** (d)	**125.** (a)	**126.** (a)	**127.** (c)	**128.** (d)	**129.** (c)	**130.** (c)
131. (c)	**132.** (a)	**133.** (d)	**134.** (b)	**135.** (b)	**136.** (c)	**137.** (c)	**138.** (b)	**139.** (d)	**140.** (d)
141. (c)	**142.** (d)	**143.** (b)	**144.** (b)	**145.** (b)	**146.** (c)	**147.** (d)	**148.** (b)	**149.** (a)	**150.** (b)
151. (c)	**152.** (b)	**153.** (a)	**154.** (c)	**155.** (c)	**156.** (a)	**157.** (a)	**158.** (b)	**159.** (a)	**160.** (d)
161. (a)	**162.** (b)	**163.** (d)	**164.**	**165.**	**166.** (a)	**167.** (c)	**168.** (c)	**169.** (c)	**170.** (c)
171. (c)	**172.** (b)	**173.** (a)	**174.** (d)	**175.** (c)	**176.** (a)	**177.** (d)			

SOLUTIONS

1. Average body weight

$$= \left(\frac{54 + 78 + 43 + 82 + 67 + 42 + 75}{7} \right) kg$$

$$= \left(\frac{441}{7} \right) kg = 63 \ kg.$$

2. Average $= \left(\dfrac{385 + 441 + 876 + 221 + 536 + 46 + 291 + 428}{8} \right)$

$$= \left(\frac{3224}{8} \right) = 403.$$

3. Arithmetic mean $= ₹ \left(\dfrac{1132 + 1140 + 1144 + 1136 + 1148}{5} \right)$

$$= ₹ \left(\frac{5700}{5} \right) = ₹ \ 1140.$$

4. Mean income $= ₹ \left(\dfrac{15000 + 26000 + 16000 + 19000 + 50000}{5} \right)$

$$= ₹ \left(\frac{126000}{5} \right) = ₹ \ 25200.$$

Clearly, three people have monthly incomes below the mean income.

5. Sum of numbers $= (41.4 \times 15) = 621.$

6. $25a + 25b = 115 \Rightarrow 25 \ (a + b) = 115$

$$\Rightarrow a + b = \frac{115}{25} = \frac{23}{5}.$$

$$\therefore \text{ Average of } a \text{ and } b = \frac{a+b}{2} = \frac{23}{5} \times \frac{1}{2} = \frac{23}{10} = 2.3.$$

7. We have:

Mean working hours	4	6	8	10	12	14
No. of employees	7	10	18	57	14	8

Sum of working hours of all the employees
$= (4 \times 7 + 6 \times 10 + 8 \times 18 + 10 \times 57 + 12 \times 14 + 14 \times 8)$
$= (28 + 60 + 144 + 570 + 168 + 112) = 1082.$

Total number of employees
$= (7 + 10 + 18 + 57 + 14 + 8) = 114.$

$\therefore$ Average number of working hours

$$= \left(\frac{1082}{114} \right) = 9.49 \ \approx 9.5.$$

8. We have: $a = \dfrac{0 + 5 + 4 + 3}{4} = 3$; $b = \dfrac{-1 + 0 + 1 + 5 + 4 + 3}{6} = 2$;

$$c = \frac{5 + 4 + 3}{3} = 4.$$

$\therefore \ a : b : c = 3 : 2 : 4.$

9. Total money paid for 115 books $= ₹ \ (1050 + 1020) = ₹ \ 2070.$

$\therefore$ Average price paid per book $= ₹ \left(\dfrac{2070}{115} \right) = ₹ \ 18.$

10. Required average $= \dfrac{\left(\dfrac{1}{x} + \dfrac{1}{y} \right)}{2} = \dfrac{x + y}{2xy}.$

11. Sum of numbers $= 2XY.$

$\therefore$ Other number $= 2XY - X.$

84. In the first 10 overs of a cricket game, the run rate was only 3.2. What should be the run rate in the remaining 40 overs to reach the target of 282 runs?
(a) 6.25   (b) 6.5
(c) 6.75   (d) 7

85. In a one-day cricket match the captain of one of the teams scored 30 runs more than the average runs scored by the remaining 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) 50   (b) 60
(c) 70   (d) Cannot be determined
(e) None of these

86. In a group of 120 people, one-fifth are men, one-fourth are women and the rest children. The average age of women is five-sixth of the average age of men. Average age of children is one-fourth of the average age of men. If average age of men is 60 years, what is the average age of the group?
(a) 32.75   (b) 38.45
(c) 45.25   (d) 50.5

87. Visitors to a show were charged ₹ 15 each on the first day, ₹ 7.50 each on the second day and ₹ 2.50 each on the third day. The attendance on the three days was in the ratio 2 : 5 : 13. The average charge per person for the whole show was
(a) ₹ 5   (b) ₹ 6.33
(c) ₹ 7.50   (d) ₹ 9

88. In an examination, a pupil's average marks was 63 per paper. If he had obtained 20 more marks for his Geography paper and 2 more marks for his History paper, his average per paper would have been 65. How many papers were there in the examination? **(M.A.T., 2007)**
(a) 8   (b) 9
(c) 10   (d) 11

89. The average age of all the students of a class is 18 years. The average age of boys of the class is 20 years and that of the girls is 15 years. If the number of girls in the class is 20, then find the number of boys in the class. **(M.A.T., 2008)**
(a) 15   (b) 30
(c) 45   (d) 50

90. There are 3 groups of students, each containing 25, 50 and 25 students respectively. The mean marks obtained by the first two groups are 60 and 55. The combined mean of all the three groups is 58. What is the mean of the marks scored by the third group?
(a) 52   (b) 57
(c) 58   (d) 60
(e) 62

91. A student obtained 60, 75 and 85 marks respectively in three monthly examinations in Physics and 95 marks in the final examination. The three monthly examinations are of equal weightage whereas the final examination is weighted twice as much as a monthly examination. His average marks in Physics are
(a) 78.75   (b) 79
(c) 82   (d) 85

92. A student obtained the following marks in percentages in his semester examination English 50, Maths 65, Statistics 70, Economics 58 and Accountancy 63. The weights of these subjects are 2, 2, 1, 1 and 1 respectively. What is the weighted arithmetic mean?
(a) 60   (b) 61
(c) 62   (d) 63

93. The average of 8 numbers is 20. The average of first two numbers is $15\frac{1}{2}$ and that of the next three is $21\frac{1}{3}$. If the sixth number be less than the seventh and eighth numbers by 4 and 7 respectively, then the eighth number is: **(S.S.C. 2004)**
(a) 18   (b) 22
(c) 25   (d) 27

94. If the arithmetic mean of seventy-five numbers is calculated, it is 35. If each number is increased by 5, then mean of new numbers is :
(a) 30   (b) 40
(c) 70   (d) 90

95. The average of ten numbers is 7. If each number is multiplied by 12, then the average of the new set of numbers is :
(a) 7   (b) 19
(c) 82   (d) 84

96. Average of ten positive numbers is $\bar{x}$. If each number is increased by 10%, then $\bar{x}$
(a) remains unchanged   (b) may decrease
(c) may increase   (d) is increased by 10%

97. The average height of 35 girls in a class was calculated as 160 cm. It was later found that the height of one of the girls in the class was wrongly written as 144 cm, whereas her actual height was 104 cm. What is the actual average height of the girls in the class? (rounded off to 2 digits after decimal) **(Bank P.O., 2010)**
(a) 158.54 cm   (b) 158.74 cm
(c) 159.56 cm   (d) 159.86 cm
(e) None of these

98. The mean of 25 observations was found to be 78.4. But later on it was found that 96 was misread as 69. The correct mean is **(M.A.T., 2007)**

(*a*) 76.54　　　　　　　(*b*) 78.4

(*c*) 79.48　　　　　　　(*d*) 81.32

99. 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? **(Bank P.O., 2009)**

(*a*) 66　　　　　　　　(*b*) 68.5

(*c*) 69　　　　　　　　(*d*) 69.5

(*e*) 70

100. The average of 10 numbers is 40.2. Later it is found that two numbers have been wrongly added. The first is 18 greater than the actual number and the second number added is 13 instead of 33. Find the correct average.

(*a*) 40.2　　　　　　　(*b*) 40.4

(*c*) 40.6　　　　　　　(*d*) 40.8

101. A pupil's marks were wrongly entered as 83 instead of 63. Due to that the average marks for the class got increased by half. The number of pupils in the class is

(*a*) 10　　　　　　　　(*b*) 20

(*c*) 40　　　　　　　　(*d*) 73

102. While calculating the average of a batsman as 36 in 100 matches that he played, one of the scores 90 was incorrectly noted as 40. The percentage error is **(M.A.T., 2010)**

(*a*) 0.5%　　　　　　　(*b*) 1.21%

(*c*) 1.34%　　　　　　(*d*) 1.36%

103. The average age of seven boys sitting in a row facing North is 26 years. If the average age of the first three boys is 19 years and the average age of the last three boys is 32 years, what is the age of the boy who is sitting in the middle of the row? **(Bank P.O., 2010)**

(*a*) 24 years　　　　　(*b*) 28 years

(*c*) 29 years　　　　　(*d*) 31 years

(*e*) None of these

104. The average of five numbers 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? **(Bank P.O., 2008)**

(*a*) 52　　　　　　　　(*b*) 108

(*c*) 321　　　　　　　(*d*) Cannot be determined

(*e*) None of these

105. The average marks obtained by 22 candidates in an examination are 45. The average marks of the first ten are 55 and that of the last eleven are 40. The number of marks obtained by the 11th candidate is **(S.S.C., 2006)**

(*a*) 0　　　　　　　　(*b*) 45

(*c*) 47.5　　　　　　　(*d*) 50

106. The average of 11 numbers is 10.9. If the average of the first six numbers is 10.5 and that of the last six numbers is 11.4, then the middle number is :

(*a*) 11　　　　　　　　(*b*) 11.3

(*c*) 11.4　　　　　　　(*d*) 11.5

107. The average temperature for the first four days of a week is 40.2° C and that of the last four days is 41.3° C. If the average temperature for the whole week is 40.6° C, then the temperature on the fourth day is **(M.A.T. 2005)**

(*a*) 40.8°C　　　　　　(*b*) 41.3°C

(*c*) 41.8°C　　　　　　(*d*) 38.5°C

108. The average weight of three boys *A*, *B* and *C* is $54\frac{1}{3}$ kg, while the average weight of three boys *B*, *D* and *E* is 53 kg. What is the average weight of *A*, *B*, *C*, *D* and *E* ?

(*a*) 52.4 kg　　　　　　(*b*) 53.2 kg

(*c*) 53.8 kg　　　　　　(*d*) Data inadequate

(*e*) None of these

109. The average of the ages of Sumit, Krishna and Rishabh is 43 and the average of the ages of Sumit, Rishabh and Rohit is 49. If Rohit is 54 years old, what is Krishna's age? **(S.B.I.P.O., 2008)**

(*a*) 24 years　　　　　(*b*) 36 years

(*c*) 45 years　　　　　(*d*) Cannot be determined

(*e*) None of these

110. The mean temperature of Monday to Wednesday was 37°C and of Tuesday to Thursday was 34°C. If the temperature on Thursday was $\frac{4}{5}$ that of Monday, the temperature on Thursday was **(M.B.A. 2006, L.I.C.A.A.O. 2007, P.C.S., 2008)**

(*a*) 34°C　　　　　　　(*b*) 35.5°C

(*c*) 36°C　　　　　　　(*d*) 36.5°C

111. The average temperature of the town in the first four days of a month was 58 degrees. The average for the second, third, fourth and fifth days was 60 degrees. If the temperatures of the first and fifth days were in the ratio 7 : 8, then what is the temperature on the fifth day? **(N.M.A.T., 2003)**

(*a*) 64 degrees　　　　(*b*) 62 degrees

(*c*) 56 degrees　　　　(*d*) None of these

112. The average weight of *A*, *B* and *C* is 45 kg. If the average weight of *A* and *B* be 40 kg and that of *B* and *C* be 43 kg, then the weight of B is: **(S.S.C.,2004)**

(*a*) 17 kg　　　　　　(*b*) 20 kg

(*c*) 26 kg　　　　　　(*d*) 31 kg

113. The average monthly income of P and Q is ₹ 5050. The average monthly income of Q and R is ₹ 6250 and the average monthly income of P and R is ₹ 5200. The monthly income of P is **(R.R.B., 2004)**

(a) ₹ 3500   (b) ₹ 4000

(c) ₹ 4050   (d) ₹ 5000

114. Average age of ten persons learning yoga is 32 years. When the age of their instructor is added, the average age becomes 34 years. The age of their instructor is **(CLAT, 2010)**

(a) 46 years   (b) 52 years

(c) 54 years   (d) 56 years

115. The average monthly income of a family of four earning members was ₹ 15130. One of the daughters in the family got married and left home, so the average monthly income of the family came down to ₹ 14660. What is the monthly income of the married daughter? **(Bank P.O., 2009)**

(a) ₹ 12000   (b) ₹ 15350

(c) ₹ 16540   (d) Cannot be determined

(e) None of these

116. The average weight of a class of 24 students is 35 kg. If the weight of the teacher be included, the average rises by 400 g. The weight of the teacher is

(a) 45 kg   (b) 50 kg

(c) 53 kg   (d) 55 kg

117. The average age of the mother and her six children is 12 years which is reduced by 5 years if the age of the mother is excluded. How old is the mother?

(a) 40 years   (b) 42 years

(c) 48 years   (d) 50 years

118. The average weight of 8 men is increased by 1.5 kg when one of the men, who weighs 65 kg is replaced by a new man. The weight of the new man is **(R.R.B. 2006)**

(a) 70 kg   (b) 74 kg

(c) 76 kg   (d) 77 kg

119. There were 24 students in a class. One of them, who was 18 years old, left the class and his place was filled up by a newcomer. If the average of the class thereby, was lowered by one month, the age of the newcomer is **(S.S.C. 2007)**

(a) 14 years   (b) 15 years

(c) 16 years   (d) 17 years

120. The average weight of 45 students in a class is 52 kg. Five of them whose average weight is 48 kg leave the class and other 5 students whose average weight is 54 kg join the class. What is the new average weight (in kg) of the class?

(a) $52\frac{1}{3}$ (b) $52\frac{1}{2}$

(c) $52\frac{2}{3}$ (d) None of these

121. The average height of 25 boys is 1.4 m. When 5 boys leave the group, then the average height increases by 0.15 m. What is the average height of the 5 boys who leave ?

(a) 0.8 m   (b) 0.9 m

(c) 0.95 m   (d) 1.05 m

122. The average of 11 players of a cricket team is decreased by 2 months when two of them aged 17 years and 20 years are replaced by two new players. The average age of the new players is **(S.S.C. 2005)**

(a) 17 years 1 month   (b) 17 years 7 months

(c) 17 years 11 months   (d) 18 years 3 months

123. The average age of an adult class is 40 years. 12 new students with an average age of 32 years join the class, thereby decreasing the average by 4 years. The original strength of the class was

(Campus Rec. 2011; M.B.A. 2006; M.A.T. 2007)

(a) 10   (b) 11

(c) 12   (d) 15

124. In a class with a certain number of students, if one student weighing 50 kg is added then the average weight of the class increases by 1 kg. If one more student weighing 50 kg is added, then the average weight of the class increases by 1.5 kg over the original average. What is the original average weight (in kg) of the class?

(a) 2   (b) 4

(c) 46   (d) 47

125. When 15 is included in a list of natural numbers, their mean is increased by 2. When 1 is included in this new list, the mean of the numbers in the new list is decreased by 1. How many numbers were there in the original list? **(A.A.O. Exam, 2010)**

(a) 4   (b) 5

(c) 6   (d) 8

126. The captain of a cricket team of 11 members is 26 years old and the wicket keeper is 3 years older. If the ages of these two are excluded, the average age of the remaining players is one year less than the average age of the whole team. What is the average age of the team?

(a) 23 years   (b) 24 years

(c) 25 years   (d) None of these

127. A batsman makes a score of 84 runs in the 21st inning and thus increases his average by 2 runs. His average after 21st inning is **(P.C.S., 2009)**

(a) 24   (b) 34

(c) 44   (d) 54

128. A cricketer whose bowling average is 12.4 runs per wicket takes 5 wickets for 26 runs and thereby decreases his average by 0.4. The number of wickets taken by him till the last match was

(a) 64   (b) 72

(c) 80   (d) 85

129. A team of 8 persons joins in a shooting competition. The best marksman scored 85 points. If he had scored 92 points, the average score for the team would have been 84. The number of points, the team scored was

(*a*) 588   (*b*) 645
(*c*) 665   (*d*) 672

130. A motorist travels to a place 150 km away at an average speed of 50 km / hr and returns at 30 km / hr. His average speed for the whole journey in km / hr is   **(L.I.C.A.D.O., 2008)**

(*a*) 35   (*b*) 37
(*c*) 37.5   (*d*) 40

131. The average weight of 3 men *A*, *B* and *C* is 84 kg. Another man *D* joins the group and the average now becomes 80 kg. If another man *E*, whose weight is 3 kg more than that of *D*, replaces A, then the 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

132. The average age of a husband and his wife was 23 years at the time of their marriage. After five years they have a one-year old child. The average age of the family now is

(*a*) 19 years   (*b*) 23 years
(*c*) 28.5 years   (*d*) 29.3 years

133. Four years ago, the average age of *A* and *B* was 18 years. At present the average age of *A*, *B* and *C* is 24 years. What would be the age of *C* after 8 years?   **(R.R.B., 2006)**

(*a*) 25 years   (*b*) 28 years
(*c*) 32 years   (*d*) 36 years

134. Five years ago the average age of *A*, *B*, *C*, *D* was 45 years. By including *X* the present average of all the five is 49 years. Then the present age of *X* is   **(P.C.S., 2009)**

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

135. The average age of husband, wife and their child 3 years ago was 27 years and that of wife and the child 5 years ago was 20 years. The present age of the husband is

(*a*) 35 years   (*b*) 40 years
(*c*) 50 years   (*d*) None of these

136. The average age of a husband and wife at the time of their marriage was 25 years. A son was born to them two years after their marriage. The present average age of all three of them is 24 years. How many years is it since the couple got married?

(*a*) 5 years   (*b*) 6 years
(*c*) 8 years   (*d*) 9 years

137. When the average age of a couple and their son was 42 years, the son married and got a child after one year. When the child was 5 years old, the average age of the family became 36 years. What was the age of daughter-in-law at the time of their marriage?   **(S.S.C., 2006)**

(*a*) 23 years   (*b*) 24 years
(*c*) 25 years   (*d*) 26 years

138. Four years ago, the average age of a family of four persons was 18 years. During this period, a baby was born. Today if the average age of the family is still 18 years, the age of the baby is   **(P.C.S., 2009)**

(*a*) 1.2 years   (*b*) 2 years
(*c*) 2.5 years   (*d*) 3 years

139. After replacing an old member by a new member, it was found that the average age of five members of a club is the same as it was 3 years ago. What is the difference between the ages of the replaced and the new member?

(*a*) 2 years   (*b*) 4 years
(*c*) 8 years   (*d*) 15 years

140. The average age of 3 children in a family is 20% of the average age of the father and the eldest child. The total age of the mother and the youngest child is 39 years. If the father's age is 26 years, what is the age of the second child?   **(M.A.T., 2009)**

(*a*) 15 years   (*b*) 18 years
(*c*) 20 years   (*d*) Cannot be determined

141. The average age of a group of persons going for picnic is 16 years. Twenty new persons with an average age of 15 years join the group on the spot due to which their average age becomes 15.5 years. The number of persons initially going for picnic is

(*a*) 5   (*b*) 10
(*c*) 20   (*d*) 30

142. Ten years ago, the ages of the members of a joint family of eight people added up to 231 years. Three years later, one member died at the age of 60 years and a child was born during the same year. After another three years, one more member died, again at 60, and a child was born during the same year. The current average of this eight-member joint family is nearest to   **(C.A.T., 2007)**

(*a*) 21 years   (*b*) 22 years
(*c*) 23 years   (*d*) 24 years
(*e*) 25 years

143. Mr. Joe's family consists of six people–himself, his wife and their four children. It is known that the

average age of the family immediately after the birth of the first, second, third and fourth child was 16, 15, 16 and 15 years respectively. Find the age of Mr. Joe's eldest son if the present average age of the entire family is 16 years.

(*a*) 8 years   (*b*) 12 years

(*c*) 15 years   (*d*) 16 years

144. Total expenses of a boarding house are partly fixed and partly varying linearly with the number of boarders. The average expense per boarder is ₹ 700 when there are 25 boarders and ₹ 600 when there are 50 boarders. What is the average expense per boarder when there are 100 boarders?

(*a*) ₹ 540   (*b*) ₹ 550

(*c*) ₹ 570   (*d*) ₹ 580

145. A certain factory employed 600 men and 400 women and the average wage was ₹ 25.50 per day. If a woman got ₹ 5 less than a man, then what are their daily wages?

(*a*) Man : ₹ 25; Woman : ₹ 20

(*b*) Man : ₹ 27.50, Woman : ₹ 22.50

(*c*) Man : ₹ 30, Woman : ₹ 25

(*d*) Man : ₹ 32.50, Woman : ₹ 27.50

146. The arithmetic mean of the scores of a group of students in a test was 52. The brightest 20% of them secured a mean score of 80 and the dullest 25% a mean score of 31. The mean score of remaining 55% is

(*a*) 45   (*b*) 50

(*c*) 51.4 approx.   (*d*) 54.6 approx.

147. A coaching institute has students in 3 batches - *X*, *Y* and *Z*. In a certain examination, the average marks obtained by these batches are 72, 60 and 50 respectively. The average marks of batches *X* and *Y* taken together is 69. If the ratio of the number of students in batches *Y* and *Z* is 6 : 7, what is the average score of all the three batches put together?

(*a*) 59   (*b*) 61.6

(*c*) 63.5   (*d*) 64.7

(*e*) 65

148. 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

                       (M.A.T., 2005)

(*a*) 20   (*b*) 21

(*c*) 22   (*d*) 23

149. 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 9 months, then the number of girls in the school is:

(*a*) 150   (*b*) 250

(*c*) 350   (*d*) 450

150. The average score of a class of boys and girls in an examination is *A*. The ratio of boys and girls in the class is 3 : 1. If the average score of the boys is *A* + 1, the average score of the girls is   (S.S.C., 2006)

(*a*) $A - 1$ (*b*) $A - 3$

(*c*) $A + 1$ (*d*) $A + 3$

151. In an engineering college the average salary of all engineering graduates from Mechanical trade is ₹ 2.45 lacs per annum and that of the engineering graduates from Electronics trade is ₹ 3.56 lacs per annum. The average salary of all Mechanical and Electronics graduates is ₹ 3.12 lacs per annum. Find the least number of Electronics graduates passing out from this institute.   (M.A.T., 2007)

(*a*) 43   (*b*) 59

(*c*) 67   (*d*) Cannot be determined

152. 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 the number of boys to the number of girls in the class is   (M.A.T., 2007; M.B.A., 2010)

(*a*) 1 : 2   (*b*) 2 : 3

(*c*) 3 : 4   (*d*) 3 : 5

153. The mean monthly salary paid to graduating MBA class of a management institute is ₹ 16000. The mean monthly salary paid to students with work experience is ₹ 18000. The corresponding figure for the students without any work experience is ₹ 12000. Determine the percentage of students with work experience and those without any work experience in the class.

                       (JMET, 2008)

(*a*) 66.67%, 33.33%   (*b*) 33.33%, 66.67%

(*c*) 75%, 25%   (*d*) 25%, 75%

154. My Scooty gives an average of 40 kmpl of petrol. But after recent filling at the new petrol pump, its average dropped to 38 kmpl. I investigated and found out that it was due to adulterated petrol. Petrol pumps add kerosene, which is $\frac{2}{3}$ cheaper than petrol, to increase their profits. Kerosene generates excessive smoke and knocking and gives an average of 18 km per 900 ml. If I paid ₹ 30 for a litre of petrol, what was the additional amount the pump-owner was making?   (M.A.T., 2007)

(*a*) ₹ 1.75   (*b*) ₹ 1.80

(*c*) ₹ 2   (*d*) ₹ 2.30

155. Average score of a class of 60 students, in an exam, was 43. Average score of the students who had passed is 52 and the average score of students who had failed is 16. How many failed the exam?

[IBPS—RRB Officer's Gr. 'B' Exam, 2015]

(*a*) 25   (*b*) 20

(*c*) 15   (*d*) 18

156. The average of 11 results is 60. If the average of first six results is 58 and that of last six is 63, find the 6th result.   **[Indian Railway Gr. 'D' Exam, 2014]**

(*a*) 66   (*b*) 55

(*c*) 64   (*d*) 68

157. The average weight of 21 boys was recorded as 64 *kg*. If the weight of the teacher was added, the average increased by 1 *kg*. What was the teacher's weight?   **[Indian Railway Gr. 'D' Exam, 2014]**

(*a*) 86 kg   (*b*) 64 kg

(*c*) 72 kg   (*d*) 84 kg

158. The average of 12 numbers is 15 and the average of the first two is 14. What is the average of the rest?

[SSC—CHSL (10+2) Exam, 2015]

(*a*) 15   (*b*) $15\frac{1}{5}$

(*c*) 14   (*d*) $14\frac{1}{5}$

159. The average expenditure of a man for the first five months is ₹ 1200 and for the next seven months is ₹ 1300. If he saves ₹ 2900 in that year, his monthly average income is   **[SSC—CHSL (10+2) Exam, 2015]**

(*a*) ₹ 1500   (*b*) ₹ 1600

(*c*) ₹ 1700   (*d*) ₹ 1400

160. In a primary school the average weight of male students is 65.9 kg and the average weight of female students is 57 kg. If the average weight of all the students (both male and female) is 60.3 kg and the number of male students in the school is 66, what is the number of female students in the school?

[IBPS—Bank Spl. Officers (IT) Exam, 2015]

(*a*) 162   (*b*) 168

(*c*) 180   (*d*) 112

161. Out of 10 teachers of a school, one teacher retires and in place of him a new teacher 25 years old joins. As a result of it average age of the teachers reduces by 3 years. Age of the retired teacher (in years) is:

[SSC—CHSL (10+2) Exam, 2015]

(*a*) 55   (*b*) 60

(*c*) 58   (*d*) 56

162. Six numbers are arranged in decreasing order. The average of the first five numbers is 30 and the aver-

age of the last five numbers is 25. The difference of the first and the last numbers is

[SSC—CHSL (10+2) Exam, 2015]

(*a*) 20   (*b*) 25

(*c*) 5   (*d*) 30

163. The average weight of A, B and C is 40 kgs. Weight of C is 24 kgs more than A's weight and 3 *kgs* less than B's weight. What will be the average weight of A, B, C and D, if D weights 15 kgs less than C?

[United India Insurance (UIICL)
Assistant (Online) Exam, 2015]

(*a*) 42 kgs   (*b*) 40 kgs

(*c*) 36 kgs   (*d*) 38 kgs

Direction (*Question No. 164–165*): Each of the questions below consists of a question-statement and two statements I and II are given below it. You have to decide whether the data provided in the statements are sufficient to answer the question. Give answer.

(A) The data in statement I alone was sufficient to answer the question while II alone are not sufficient to answer the question.

(B) Data in statement II alone are sufficient to answer the question while data in statement I alone are not sufficient to answer the question.

(C) The data in statement I alone or in statement II alone are sufficient to answer the question.

(D) The data in both Statement I and II are not sufficient to answer the question.

(E) The data in both Statements I and II are sufficient to answer the question.

164. Whose body weight is second highest among the five boys Arun, Vinay, Suraj, Raju and Pratap?

[IDBI Bank Executive Officers Exam, 2015]

I. Average weight of Arun, Suraj and Vinay is 68 kg and average weight of Raju and Pratap is 72 kg. Also Suraj is 78 kg, Raju is 68 kg and Vinay is 46 kg.

II. Average weight of Arun, Suraj, Vinay and Raju is 68 kg and also Suraj is 78 kg, Raju is 68 kg and Vinay is 46 kg all of them have different weights.

165. What will be the total marks of Subodh in physics?

[IDBI Bank Executive Officers Exam, 2015]

I. The average marks of Subodh in History, Geography and Chemistry are 75.

II. His average marks in History, Geography and Physics are 78.

166. There are three positive numbers. One third of the average of all the three numbers is 8 less than the value of the highest number. The average of the

lowest and the second lowest number is 8. What is the highest number? **[IBPS—RRB Officer Exam, 2015]**

(*a*) 11 (*b*) 14

(*c*) 10 (*d*) 9

167. A shop of electronic goods is closed on Monday. The average daily sales for remaining six days of a week is ₹ 15,640/- and the average sale of Tuesday to Saturday is ₹ 14,124/-. The sales on Sunday is

[SSC—CHSL (10+2) Exam, 2015]

(*a*) ₹ 20,188/- (*b*) Data inadequate

(*c*) ₹ 23,220/- (*d*) ₹ 21,704/-

168. The mean high temperature of the first four days of a week is 25°C whereas the mean of the last four days is 25.5°C. If the mean of the whole week is 25.2°C, then the temperature of the 4th day is

[SSC—CHSL (10 + 2) Exam, 2015]

(*a*) 25.2°C (*b*) 25.5°C

(*c*) 25.6°C (*d*) 25°C

169. Find the average of 205, 302, 108, 403 and 202

[ESIC—UDC Exam, 2016]

(*a*) 450 (*b*) 1225

(*c*) 244 (*d*) 1220

170. The average monthly income of P and Q is ₹ 6,000; that of Q and R is ₹ 5,250; and, that P and R is ₹ 5,500. What is P's monthly income?

[ESIC—UDC Exam, 2016]

(*a*) ₹ 3,500 (*b*) ₹ 4,500

(*c*) ₹ 6,250 (*d*) ₹ 4,800

171. The average of 6 numbers is 7. The average of three numbers of them is 5. What will be the average of remaining numbers? **[ESIC—UDC Exam, 2016]**

(*a*) 15 (*b*) 30

(*c*) 9 (*d*) 42

172. The average weight of boys in a class is 30 kg and the average weight of girls in the same class is 20 kg. If the average weight of the whole class is 23.25 kg, what could be the possible strength of boys and girls respectively in the same class?

[SBI Jr. Associates (Pre.) Exam, 2016]

(*a*) 14 and 26 (*b*) 13 and 27

(*c*) 17 and 27 (*d*) None of these

173. Average of *a*, *b*, and *c* is 11; average of *c*, *d* and *e* is 17; average of *e* and *f* is 22 and average of *e* and *c* is 17. Find out the average of *a, b, c, d, e,* and *f*.

[DMRC—Train Operator (Station Controller) Exam, 2016]

(*a*) $15\dfrac{2}{3}$ (*b*) $18\dfrac{1}{2}$

(*c*) $16\dfrac{1}{2}$ (*d*) None of these

174. There are 4 consecutive odd numbers (x_1, x_2, x_3 and x_4) and three consecutive even numbers (y_1, y_2 and y_3). The average of the odd numbers is 6 less than the average of the even numbers. If the sum of the three even numbers is 16 less than the sum of the four odd numbers, what is the average of x_1, x_2, x_3 and x_4 ? **[CET—Maharashtra (MBA) Exam, 2016]**

(*a*) 30 (*b*) 38

(*c*) 32 (*d*) 34

175. A library has an average of 510 visitors on Sundays and 240 on other days. What is the average number of visitors per day in the month of June beginning with a Sunday? **[CLAT, 2016]**

(*a*) 276 (*b*) 280

(*c*) 285 (*d*) 250

176. The marks of six boys in a group are 48, 59, 87, 37, 78 and 57. What are the average marks of all six boys?

[DMRC—Customer Relationship Assistant (CRA) Exam, 2014]

(*a*) 61 (*b*) 65

(*c*) 69 (*d*) None of these

177. The average weight of a group of 75 girls was calculated as 47 kgs. It was later discovered that the weight of one of the girls was read as 45 kgs. Whereas her actual weight was 25 kgs. What is the actual average weight of the group of 75 girls? (Rounded off to two digits after decimal)

[DMRC—Customer Relationship Assistant (CRA) Exam, 2014]

(*a*) 34 (*b*) 36

(*c*) 30 (*d*) None of these

ANSWERS

1. (*a*)	**2.** (*b*)	**3.** (*d*)	**4.** (*c*)	**5.** (*d*)	**6.** (*e*)	**7.** (*b*)	**8.** (*b*)	**9.** (*a*)	**10.** (*b*)
11. (*c*)	**12.** (*c*)	**13.** (*a*)	**14.** (*d*)	**15.** (*c*)	**16.** (*c*)	**17.** (*b*)	**18.** (*b*)	**19.** (*c*)	**20.** (*b*)
21. (*c*)	**22.** (*b*)	**23.** (*b*)	**24.** (*c*)	**25.** (*c*)	**26.** (*d*)	**27.** (*b*)	**28.** (*b*)	**29.** (*b*)	**30.** (*c*)
31. (*d*)	**32.** (*b*)	**33.** (*b*)	**34.** (*d*)	**35.** (*a*)	**36.** (*b*)	**37.** (*d*)	**38.** (*c*)	**39.** (*d*)	**40.** (*c*)
41. (*c*)	**42.** (*e*)	**43.** (*c*)	**44.** (*c*)	**45.** (*b*)	**46.** (*d*)	**47.** (*d*)	**48.** (*b*)	**49.** (*d*)	**50.** (*d*)
51. (*c*)	**52.** (*c*)	**53.** (*a*)	**54.** (*c*)	**55.** (*b*)	**56.** (*a*)	**57.** (*a*)	**58.** (*a*)	**59.** (*b*)	**60.** (*b*)
61. (*c*)	**62.** (*b*)	**63.** (*a*)	**64.** (*d*)	**65.** (*d*)	**66.** (*c*)	**67.** (*e*)	**68.** (*c*)	**69.** (*b*)	**70.** (*c*)
71. (*d*)	**72.** (*c*)	**73.** (*c*)	**74.** (*b*)	**75.** (*b*)	**76.** (*c*)	**77.** (*d*)	**78.** (*c*)	**79.** (*c*)	**80.** (*c*)
81. (*d*)	**82.** (*a*)	**83.** (*a*)	**84.** (*a*)	**85.** (*c*)	**86.** (*a*)	**87.** (*a*)	**88.** (*d*)	**89.** (*b*)	**90.** (*e*)
91. (*c*)	**92.** (*a*)	**93.** (*c*)	**94.** (*b*)	**95.** (*d*)	**96.** (*d*)	**97.** (*e*)	**98.** (*c*)	**99.** (*c*)	**100.** (*b*)
101. (*c*)	**102.** (*d*)	**103.** (*c*)	**104.** (*e*)	**105.** (*a*)	**106.** (*d*)	**107.** (*c*)	**108.** (*d*)	**109.** (*b*)	**110.** (*c*)
111. (*a*)	**112.** (*d*)	**113.** (*b*)	**114.** (*c*)	**115.** (*c*)	**116.** (*a*)	**117.** (*b*)	**118.** (*d*)	**119.** (*c*)	**120.** (*c*)
121. (*a*)	**122.** (*b*)	**123.** (*c*)	**124.** (*d*)	**125.** (*a*)	**126.** (*a*)	**127.** (*c*)	**128.** (*d*)	**129.** (*c*)	**130.** (*c*)
131. (*c*)	**132.** (*a*)	**133.** (*d*)	**134.** (*b*)	**135.** (*b*)	**136.** (*c*)	**137.** (*c*)	**138.** (*b*)	**139.** (*d*)	**140.** (*d*)
141. (*c*)	**142.** (*d*)	**143.** (*b*)	**144.** (*b*)	**145.** (*b*)	**146.** (*c*)	**147.** (*d*)	**148.** (*b*)	**149.** (*a*)	**150.** (*b*)
151. (*c*)	**152.** (*b*)	**153.** (*a*)	**154.** (*c*)	**155.** (*c*)	**156.** (*a*)	**157.** (*a*)	**158.** (*b*)	**159.** (*a*)	**160.** (*d*)
161. (*a*)	**162.** (*b*)	**163.** (*d*)	**164.**	**165.**	**166.** (*a*)	**167.** (*c*)	**168.** (*c*)	**169.** (*c*)	**170.** (*c*)
171. (*c*)	**172.** (*b*)	**173.** (*a*)	**174.** (*d*)	**175.** (*c*)	**176.** (*a*)	**177.** (*c*)			

SOLUTIONS

1. Average body weight

$$= \left(\frac{54 + 78 + 43 + 82 + 67 + 42 + 75}{7} \right) \text{kg}$$

$$= \left(\frac{441}{7} \right) \text{kg} = 63 \text{ kg}.$$

2. Average $= \left(\dfrac{385 + 441 + 876 + 221 + 536 + 46 + 291 + 428}{8} \right)$

$$= \left(\frac{3224}{8} \right) = 403.$$

3. Arithmetic mean $= ₹ \left(\dfrac{1132 + 1140 + 1144 + 1136 + 1148}{5} \right)$

$$= ₹ \left(\frac{5700}{5} \right) = ₹ 1140.$$

4. Mean income $= ₹ \left(\dfrac{15000 + 26000 + 16000 + 19000 + 50000}{5} \right)$

$$= ₹ \left(\frac{126000}{5} \right) = ₹ 25200.$$

Clearly, three people have monthly incomes below the mean income.

5. Sum of numbers = (41.4 × 15) = 621.

6. $25a + 25b = 115 \Rightarrow 25 (a + b) = 115$

$$\Rightarrow a + b = \frac{115}{25} = \frac{23}{5}.$$

$\therefore$ Average of a and b = $\dfrac{a + b}{2} = \dfrac{23}{5} \times \dfrac{1}{2} = \dfrac{23}{10} = 2.3$.

7. We have:

Mean working hours	4	6	8	10	12	14
No. of employees	7	10	18	57	14	8

Sum of working hours of all the employees

= (4 × 7 + 6 × 10 + 8 × 18 + 10 × 57 + 12 × 14 + 14 × 8)

= (28 + 60 + 144 + 570 + 168 + 112) = 1082.

Total number of employees

= (7 + 10 + 18 + 57 + 14 + 8) = 114.

$\therefore$ Average number of working hours

$$= \left(\frac{1082}{114} \right) = 9.49 \approx 9.5.$$

8. We have: $a = \dfrac{0 + 5 + 4 + 3}{4} = 3$; $b = \dfrac{-1 + 0 + 1 + 5 + 4 + 3}{6} = 2$;

$$c = \frac{5 + 4 + 3}{3} = 4.$$

$\therefore a : b : c = 3 : 2 : 4$.

9. Total money paid for 115 books = ₹ (1050 + 1020) = ₹ 2070.

$\therefore$ Average price paid per book = $₹ \left(\dfrac{2070}{115} \right) = ₹ 18$.

10. Required average $= \dfrac{\left(\dfrac{1}{x} + \dfrac{1}{y} \right)}{2} = \dfrac{x + y}{2xy}$.

11. Sum of numbers = $2XY$.

$\therefore$ Other number = $2XY - X$.

12. Weight of first box = 200 kg.

Weight of third box = 125% of 200 kg = 250 kg.

Weight of second box = 120% of 250 kg = 300 kg.

Weight of fourth box = 350 kg.

Let the weight of fifth box be x kg.

Then, 70% of x = 350 kg $\Rightarrow x = \left(\dfrac{350 \times 100}{70}\right) = 500$ kg.

Average weight of four heaviest boxes

$$= \left(\dfrac{500 + 350 + 300 + 250}{4}\right) \text{kg} = 350 \text{ kg}.$$

Average weight of four lightest boxes

$$= \left(\dfrac{200 + 250 + 300 + 350}{4}\right) \text{kg} = 275 \text{ kg}.$$

$\therefore$ Required difference = (350 − 275) kg = 75 kg.

13. Let Arun's weight be X kg.

According to Arun, 65 < X < 72.

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

According to Arun's mother, $X \not> 68$ i.e. $X \le 68$.

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

$\therefore$ Required average $= \left(\dfrac{66 + 67 + 68}{3}\right) \text{kg} = \left(\dfrac{201}{3}\right) \text{kg} = 67$ kg.

14. Average of 20 numbers = 0.

$\therefore$ Sum of 20 numbers = $(0 \times 20) = 0$.

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

15. Required mean $= \left(\dfrac{2 + 4 + 6 + \cdots + 20}{10}\right) = \dfrac{2\,(1 + 2 + \cdots + 10)}{10}$

$$= \left(\dfrac{1}{5} \times \dfrac{10 \times 11}{2}\right) = 11.$$

$$\left[\because 1 + 2 + 3 + \cdots + n = \dfrac{n\,(n+1)}{2}\right]$$

16. Required mean $= \left(\dfrac{1 + 2 + \cdots + 11}{11}\right) = \left(\dfrac{1}{11} \times \dfrac{11 \times 12}{2}\right) = 6.$

$$\left[\because 1 + 2 + \cdots + n = \dfrac{n\,(n+1)}{2}\right]$$

17. Average $= \left(\dfrac{10 + 15 + 20 + 25 + 30}{5}\right) = \dfrac{100}{5} = 20.$

18. Average $= \dfrac{3\,(1 + 2 + 3 + 4 + 5)}{5} = \dfrac{45}{5} = 9.$

19. Average $= \left(\dfrac{2 + 3 + 5 + 7 + 11 + 13 + 17 + 19 + 23}{9}\right)$

$$= \dfrac{100}{9} = 11\dfrac{1}{9}.$$

20. Clearly, we have

$$\left(\dfrac{3 + 11 + 7 + 9 + 15 + 13 + 8 + 19 + 17 + 21 + 14 + x}{12}\right) = 12$$

or 137 + x = 144   or x = 144 − 137 = 7.

21. We have : $\left(\dfrac{2 + 7 + 6 + x}{4}\right) = 5$ or 15 + x = 20   or x = 5.

Also, $\left(\dfrac{18 + 1 + 6 + x + y}{5}\right) = 10$ or 25 + 5 + y = 50 or y = 20.

22. $P + C + M = C + 120 \Rightarrow P + M = 120.$

$\therefore$ Required average $= \dfrac{P + M}{2} = \dfrac{120}{2} = 60.$

23. Required average $= \left(\dfrac{1 + 2 + 3 + \cdots + 100}{100}\right)$

$$= \dfrac{1}{100} \times \dfrac{100 \times 101}{2} = 50.5.$$

24. Sum of odd numbers upto 100 = 1 + 3 + 5 + ... + 99

$$= \dfrac{50}{2}[2 + (50 - 1) \times 2] = 2500.$$

$$\begin{bmatrix} \because \text{Sum of } n \text{ terms of an A.P. with} \\ \text{first term } a \text{ and common diff. } d = \dfrac{n}{2}[2a + (n-1)\,d] \end{bmatrix}$$

$\therefore$ Required average $= \dfrac{2500}{50} = 50.$

25. Sum of ages of father and mother = (35×2) years

$$= 70 \text{ years}.$$

Sum of ages of father, mother and son = (27×3) years

$$= 81 \text{ years}.$$

$\therefore$ Son's age = (81 − 70) years = 11 years.

26. $X_1 + X_2 + X_3 = (14 \times 3) = 42.$

$2\,(X_2 + X_3) = 30 \Rightarrow X_2 + X_3 = 15.$

$\therefore$ $X_1 = (42 - 15) = 27.$

27. $x_1 + x_2 + x_3 + x_4 = 16 \times 4 = 64.$

$\dfrac{1}{2}(x_2 + x_3 + x_4) = 23 \Rightarrow x_2 + x_3 + x_4 = 46.$

$\therefore$ $x_1 = 64 - 46 = 18.$

28. We have : $\left[\dfrac{x + (x+2) + (x+4) + (x+6) + (x+8)}{5}\right] = 11$ or

$5x + 20 = 55$ or $x = 7.$

So, the numbers are 7, 9, 11, 13, 15.

$\therefore$ Required mean $= \left(\dfrac{11 + 13 + 15}{3}\right) = \dfrac{39}{3} = 13.$

29. We have : $\left(\dfrac{a + b + c}{3}\right) = \text{M}$ or $(a + b + c) = 3\text{M}.$

Now, $(a + b + c)^2 = (3\text{M})^2 = 9\text{M}^2$

$\Leftrightarrow$ $a^2 + b^2 + c^2 + 2\,(ab + bc + ca) = 9\text{M}^2$

$\Leftrightarrow$ $a^2 + b^2 + c^2 = 9\text{M}^2.$ $[\because (ab + bc + ca) = 0]$

$\therefore$ Required mean $= \left(\dfrac{a^2 + b^2 + c^2}{3}\right) = \dfrac{9\text{M}^2}{3} = 3\text{M}^2.$

30. Average $= \left(\dfrac{11 + 22 + 33 + 44 + 55 + 66 + 77 + 88 + 99}{9}\right)$

$$= \left[\dfrac{(11 + 99) + (22 + 88) + (33 + 77) + (44 + 66) + 55}{9}\right]$$

$$= \left(\dfrac{4 \times 110 + 55}{9}\right) = \dfrac{495}{9} = 55.$$

31. To find the greatest possible S.P. of the most expensive product, we need to consider the minimum S.P. of the remaining 24 products which is ₹ 420 each for 10 products and ₹ 1000 each for other 14 products.

Minimum S.P. of 24 products = ₹ (420 × 10 + 1000 × 14) = ₹ (4200 + 14000) = ₹ 18200.

Total S.P. of 25 products = ₹ (1200 × 25) = ₹ 30000.

∴ Greatest possible S.P. of the most expensive product = ₹ (30000 − 18200) = ₹ 11800.

32. Number of cars sold per week originally = 15 × 7 = 105.
Number of cars sold per week under scheme = 21 × 7 = 147.
Increase in sale = 147 − 105 = 42.

∴ Percentage increase = $\left(\dfrac{42}{105} \times 100\right)\% = 40\%$.

33. $1^2 + 2^2 + 3^2 + ... + n^2 = \dfrac{n\,(n+1)\,(2n+1)}{6}$.

∴ $1^2 + 2^2 + 3^2 + ... + 7^2 = \left(\dfrac{7 \times 8 \times 15}{6}\right) = 140$.

So, required average = $\left(\dfrac{140}{7}\right) = 20$.

34. Clearly, $b = a + 2$, $c = a + 4$, $d = a + 6$ and $e = a + 8$.

∴ Average = $\dfrac{a + (a+2) + (a+4) + (a+6) + (a+8)}{5}$

$= \left(\dfrac{5a+20}{5}\right) = (a+4)$.

35. Let the number be x. Then,

$\dfrac{x + x^2}{2} = 5x \Leftrightarrow x^2 - 9x = 0$

$\Leftrightarrow x\,(x - 9) = 0$
$\Leftrightarrow x = 0$ or $x = 9$.

So, the number is 9.

36. $S + M + Sc = 100 \times 3 = 300$ and $S + M = Sc + 80$
$\Rightarrow Sc + 80 + Sc = 300 \Rightarrow 2Sc = 220 \Rightarrow Sc = 110$.

37. The given series is a G.P. with first term, $a = 1$ and common ratio, $r = 2$. It has $(n + 1)$ terms.

∴ Sum of the terms of the series = $\dfrac{(2^{n+1} - 1)}{(2-1)} = 2^{n+1} - 1$.

Arithmetic mean = $\dfrac{2^{n+1} - 1}{n+1}$.

38. Let the two numbers be x and y.

Then, $x + y = 6.5 \times 2 = 13$ and $\sqrt{xy} = 6$ or $xy = 36$.
$(x - y)^2 = (x + y)^2 - 4xy = (13)^2 - 4 \times 36 = 169 - 144 = 25$
$\Rightarrow (x - y) = 5$.
Solving $x + y = 13$ and $x - y = 5$, we get: $x = 9$, $y = 4$.

39. Let the four numbers be a, b, c and d respectively.

Then, $a = \dfrac{1}{4}(b + c + d) \Rightarrow b + c + d = 4a$.

Also, $a + b + c + d = 60 \times 4 = 240$
$\Rightarrow a + 4a = 240 \Rightarrow 5a = 240 \Rightarrow a = 48$.
Hence, first number = 48.

40. Sum of four integers = 59 × 4 = 236.
Let the required integers be x and $x - 28$.
Then, $x + (x - 28) = 236 - (83 + 29) = 124$
$\Rightarrow 2x = 152 \Rightarrow x = 76$.
Hence, required integer = 76.

41. Let the numbers be x, $x + 1$, $x + 2$, $x + 3$, $x + 4$, $x + 5$ and $x + 6$.
Then,

$\dfrac{x + (x+1) + (x+2) + (x+3) + (x+4) + (x+5) + (x+6)}{7} = 20$

or $7x + 21 = 140$ or $7x = 119$ or $x = 17$.
∴ Largest number = $x + 6 = 23$.

42. Let the numbers be x, $x + 2$, $x + 4$, $x + 6$ and $x + 8$.

Then, $\dfrac{x + (x+2) + (x+4) + (x+6) + (x+8)}{5} = 95$ or $5x + 20$

$= 475$ or $5x = 455$ or $x = 91$.
So, the numbers are 91, 93, 95, 97 and 99.
Clearly, the fourth number in the descending order is 93.

43. Let x, $x + 2$, $x + 4$ and $x + 6$ represent numbers A, B, C and D respectively.

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

$\Rightarrow 4x + 12 = 260$
$\Rightarrow 4x = 248 \Rightarrow x = 62$.
So, $A = 62$, $B = 64$, $C = 66$, $D = 68$.
∴ $A \times D = 62 \times 68 = 4216$.

44. Let the numbers be x, $x + 2$ and $x + 4$.

Then, $(x + x + 2 + x + 4) - \dfrac{(x + x + 2 + x + 4)}{3} = 44$

$\Rightarrow (3x + 6) - \dfrac{(3x + 6)}{3} = 44$

$\Rightarrow 2\,(3x + 6) = 132$
$\Rightarrow 6x = 120 \Rightarrow x = 20$.
∴ Largest number = $x + 4 = 24$.

45. Sum of marks in 4 subjects = 75 × 4 = 300.
Sum of marks in 5 subjects = 300 + 80 = 380.

∴ New average = $\dfrac{380}{5} = 76$.

46. Clearly, to find the average, we ought to know the number of boys, girls or students in the class, neither of which has been given.

So, the data provided is inadequate.

47. Let the number of other workers be x. Then, number of agricultural workers = $11x$.

Total number of workers = $12x$.

∴ Average monthly income = $\dfrac{S \times 11x + T \times x}{12x} = \dfrac{11S + T}{12}$.

48. Required average = $\left(\dfrac{67 \times 2 + 35 \times 2 + 6 \times 3}{2 + 2 + 3}\right)$

$= \left(\dfrac{134 + 70 + 18}{7}\right) = \dfrac{222}{7} = 31\dfrac{5}{7}$ years.

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

$\therefore$ Required average $= \left(\dfrac{510 \times 5 + 240 \times 25}{30}\right) = \dfrac{8550}{30} = 285.$

50. Required average $= \left(\dfrac{32 \times 14 + 28 \times 13}{32 + 28}\right) = \left(\dfrac{448 + 364}{60}\right) = \dfrac{812}{60}$

$= 13.53.$

51. Required average $= \left(\dfrac{50.25 \times 16 + 45.15 \times 8}{16 + 8}\right)$

$= \left(\dfrac{804 + 361.20}{24}\right) = \dfrac{1165.20}{24} = 48.55.$

52. Required mean $= \left(\dfrac{60 \times 5 + 30 \times 10 + 20 \times 15}{5 + 10 + 15}\right)$

$= \left(\dfrac{300 + 300 + 300}{30}\right) = \dfrac{900}{30} = 30.$

53. Total yearly income $= ₹ (5000 \times 5 + 5400 \times 7 + 2300)$

$= ₹ (25000 + 37800 + 2300) = ₹ 65100.$

$\therefore$ Average monthly income $= ₹ \left(\dfrac{65100}{12}\right) = ₹ 5425.$

54. Average marks $= \left(\dfrac{50 \times 40 + 60 \times 35 + 55 \times 45 + 45 \times 42}{40 + 35 + 45 + 42}\right)$

$= \left(\dfrac{2000 + 2100 + 2475 + 1890}{162}\right)$

$= \left(\dfrac{8465}{162}\right) = 52.25.$

55. Sum of m numbers $= mn^2$. Sum of n numbers $= nm^2$.

Sum of $(m + n)$ numbers $= mn^2 + nm^2 = mn\,(m + n)$.

$\therefore$ Average of $(m + n)$ numbers $= \dfrac{mn\,(m + n)}{(m + n)} = mn.$

56. Let the five consecutive numbers be $z, z + 1, z + 2, z + 3$ and $z + 4$. Then,

$\dfrac{z + (z + 1) + (z + 2) + (z + 3) + (z + 4)}{5} = x$

$\Rightarrow \quad 5z + 10 = 5x$

$\Rightarrow \quad z = \dfrac{5x - 10}{5} = x - 2.$

So, the numbers are $x - 2, x - 1, x, x + 1, x + 2$.

$\therefore$ Required mean

$= \dfrac{(x - 2) + (x - 1) + x + (x + 1) + (x + 2) + (x + 3) + (x + 4)}{7}$

$= \dfrac{7x + 7}{7} = x + 1.$

57. Total quantity purchased $= 4$ kg.

Total money paid $= ₹ \left(1 + \dfrac{1}{2} + \dfrac{1}{3} + \dfrac{1}{4}\right) = ₹ \dfrac{25}{12}.$

$\therefore$ Required average $= \left(4 \times \dfrac{12}{25}\right)$ kg/rupee

$= \left(\dfrac{48}{25}\right)$ kg/rupee $= 1.92$ kg/rupee.

58. Number of units of work completed by the five workers in 1 minute:

$A \to \dfrac{1}{4}, B \to \dfrac{1}{5}, C \to \dfrac{1}{6}, D \to \dfrac{1}{10}, E \to \dfrac{1}{12}.$

$\therefore$ Required average $= \dfrac{\left(\dfrac{1}{4} + \dfrac{1}{5} + \dfrac{1}{6} + \dfrac{1}{10} + \dfrac{1}{12}\right)}{5} = \left(\dfrac{4}{5} \times \dfrac{1}{5}\right) = \dfrac{4}{25}$

$= 0.16.$

59. Total quantity of petrol consumed in 3 years

$= \left(\dfrac{6460}{17} + \dfrac{6460}{19} + \dfrac{6460}{20}\right)$ litres

$= (380 + 340 + 323)$ litres $= 1043$ litres.

Total amount spent $= ₹ (3 \times 6460) = ₹ 19380.$

$\therefore$ Average cost $= ₹ \left(\dfrac{19380}{1043}\right) = ₹ 18.58.$

60. Clearly, we have: $x = \left(\dfrac{3y + 3z}{6}\right)$ or $2x = y + z.$

61. Let the average expenditure be $₹\, x$. Then,

$9x = 8 \times 30 + (x + 20)$ or $9x = x + 260$ or $8x = 260$

or $x = 32.50.$

$\therefore$ Total money spent $= 9x = ₹ (9 \times 32.50) = ₹ 292.50.$

62. Let the original expenditure of the mess per day be $₹\, x$.

Then, new expenditure $= ₹ (x + 42).$

$\therefore \quad \dfrac{x}{35} - \dfrac{(x + 42)}{42} = 1$

$\Rightarrow \quad 6x - 5\,(x + 42) = 210$

$\Rightarrow \quad x - 210 = 210$

$\Rightarrow \quad x = 420.$

63. Let their prices be $3x, 5x$ and $7x$ respectively.

Then, $3x + 5x + 7x = 15000 \times 3$

$\Rightarrow \quad 15x = 45000$

$\Rightarrow \quad x = 3000.$

$\therefore$ Cost of cheapest item $= ₹ (3000 \times 3) = ₹ 9000.$

64. Let the fourth number be x.

Then, third number $= 5x$, second number $= \dfrac{5x}{3}$ and first

number $= \dfrac{10x}{3}.$

$x + 5x + \dfrac{5x}{3} + \dfrac{10x}{3} = (24.75 \times 4)$ or $11x = 99$ or $x = 9.$

So, the numbers are 9, 45, 15 and 30.

$\therefore$ Largest number $= 45.$

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

$\therefore 2x + x + 4x = 56 \times 3 \Rightarrow 7x = 168 \Rightarrow x = 24.$

$\therefore$ Required difference $= 4x - 2x = 2x = 48.$

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

$\therefore \quad \dfrac{1}{x} + \dfrac{1}{2x} + \dfrac{1}{4x} = \left(\dfrac{7}{72} \times 3\right)$ or $\dfrac{7}{4x} = \dfrac{7}{24}$ or $4x = 24$ or $x = 6.$

So, the numbers are 24, 12 and 6.

67. Let the numbers be x, y and z.

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

or $x - z = 30$.

68. Sum of 50 numbers = $38 \times 50 = 1900$.

Sum of remaining 48 numbers = $1900 - (45 + 55) = 1800$.

$\therefore$ Required average = $\left(\dfrac{1800}{48}\right) = 37.5$.

69. Excluded number = $(18 \times 5) - (16 \times 4) = 90 - 64 = 26$.

70. New observation = $(47 \times 7) - (45.5 \times 6) = 329 - 273 = 56$.

71. Sum of the ages of 24 students = $(15 \times 30) - (16 \times 6)$

$= 450 - 96 = 354$.

$\therefore$ Required average = $\left(\dfrac{354}{24}\right) = 14\dfrac{3}{4}$ yrs = 14 yrs 9 mths.

72. Required average = $\left[\dfrac{(40 \times 7) - (39 \times 4)}{3}\right]^{\circ}$ C

$= \left(\dfrac{124}{3}\right)^{\circ}$ C $= 41.3°$C.

73. Required average = $\dfrac{(15 \times 80) - [(16 \times 15) + (14 \times 25)]}{80 - (15 + 25)}$

$= \dfrac{1200 - (240 + 350)}{40} = \dfrac{610}{40} = 15.25$.

74. Required average = $₹\left[\dfrac{(5680 \times 75) - \{(5400 \times 25) + (5700 \times 30)\}}{75 - (25 + 30)}\right]$

$= ₹\left[\dfrac{426000 - (135000 + 171000)}{20}\right]$

$= ₹\left(\dfrac{120000}{20}\right) = ₹ 6000$.

75. Required average = $\dfrac{(76 \times 16) - (75 \times 10)}{6} = \left(\dfrac{1216 - 750}{6}\right)$

$= \dfrac{466}{6} = \dfrac{233}{3} = 77\dfrac{2}{3}$.

76. Let the highest marks obtained by the student be x.

Then, second highest marks = $x - 2$.

Sum of marks of these 2 subjects = $(87 \times 8) - (85 \times 6)$

$= 696 - 510 = 186$.

$\therefore x + (x - 2) = 186 \Rightarrow 2x = 188 \Rightarrow x = 94$.

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

Then, $(50 \times 40) - [x + (x - 172)] = 38 \times 48$

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

$\Leftrightarrow 2x = 348$

$\Leftrightarrow x = 174$.

78. Sum of ages of the captain and the youngest player

$= [(28 \times 11) - \{(25 \times 3) + (28 \times 3) + (30 \times 3)\}]$ years

$= (308 - 249)$ years = 59 years.

Let the age of the youngest player be x years. Then, age of the captain = $(x + 11)$ years.

$\therefore x + (x + 11) = 59 \Rightarrow 2x = 48 \Rightarrow x = 24$.

79. Total price of the two books = $₹ [(12 \times 10) - (11.75 \times 8)]$

$= ₹ (120 - 94) = ₹ 26$.

Let the price of one book be $₹ x$.

Then, the price of other book = $₹ (x + 60\%$ of $x)$

$= ₹\left(x + \dfrac{3}{5}x\right) = ₹\left(\dfrac{8x}{5}\right)$.

So, $x + \dfrac{8x}{5} = 26 \Leftrightarrow 13x = 130 \Leftrightarrow x = 10$.

$\therefore$ The prices of the two books are $₹ 10$ and $₹ 16$.

80. Required number = $(12 \times 6) - (10 \times 5) = 72 - 50 = 22$.

81. Average after 11 innings = 36.

$\therefore$ Required number of runs = $(36 \times 11) - (32 \times 10)$

$= 396 - 320 = 76$.

82. Total sale for 5 months = $₹ (6435 + 6927 + 6855 + 7230 + 6562)$

$= ₹ 34009$.

$\therefore$ Required sale = $₹ [(6500 \times 6) - 34009]$

$= ₹ (39000 - 34009) = ₹ 4991$.

83. Required average = $\dfrac{(4375 \times 12) - (4000 \times 3)}{9}$

$= \dfrac{52500 - 12000}{9} = \dfrac{40500}{9} = 4500$.

84. Required run rate = $\dfrac{282 - (3.2 \times 10)}{40} = \dfrac{250}{40} = 6.25$.

85. Let the average score of the remaining 6 batsmen be x runs.

Then, sum of their scores = $6x$; captain's score = $(x + 30)$.

$\therefore 6x + (x + 30) = 310 \Rightarrow 7x = 280 \Rightarrow x = 40$.

Hence, captain's score = $x + 30 = 70$.

86. Number of men = $\left(\dfrac{1}{5} \times 120\right) = 24$.

Number of women = $\left(\dfrac{1}{4} \times 120\right) = 30$.

Number of children = $120 - (24 + 30) = 66$.

Average age of men = 60 years.

Average age of children = $\left(\dfrac{1}{4} \times 60\right)$ years = 15 years.

Average age of women = $\left(\dfrac{5}{6} \times 60\right)$ years = 50 years.

$\therefore$ Average age of the group

$= \left(\dfrac{60 \times 24 + 50 \times 30 + 15 \times 66}{120}\right)$ years

$= \left(\dfrac{3930}{120}\right)$ years = 32.75 years.

87. Let the attendance on the three days be $2x$, $5x$ and $13x$ respectively.

Then, total charges

$= ₹ (15 \times 2x + 7.50 \times 5x + 2.50 \times 13x)$

$= ₹ (30x + 37.5x + 32.5x)$

$= ₹ 100 x$.

$\therefore$ Average charge per person $= ₹\left(\dfrac{100 x}{2x + 5x + 13x}\right) = ₹ 5$.

88. Let the number of papers be x. Then, pupil's total score
$= 63x$.

$\therefore \dfrac{63x + 20 + 2}{x} = 65 \Rightarrow 2x = 22 \Rightarrow x = 11.$

89. Let the number of boys in the class be x.

Then, $18\,(x + 20) = 20x + 15 \times 20$

$\Rightarrow \quad 18x + 360 = 20x + 300$

$\Rightarrow \quad 2x = 60 \Rightarrow x = 30.$

90. Let the mean marks of the third group be x. Then,

$\dfrac{25 \times 60 + 50 \times 55 + 25 \times x}{25 + 50 + 25} = 58$

$\Rightarrow \quad 1500 + 2750 + 25x = 5800$

$\Rightarrow \quad 25x = 1550 \Rightarrow x = 62.$

91. Average marks in Physics $= \dfrac{60 \times 1 + 75 \times 1 + 85 \times 1 + 95 \times 2}{1 + 1 + 1 + 2}$

$= \dfrac{60 + 75 + 85 + 190}{5} = \dfrac{410}{5} = 82.$

92. Weighted arithmetic mean

$= \dfrac{50 \times 2 + 65 \times 2 + 70 \times 1 + 58 \times 1 + 63 \times 1}{2 + 2 + 1 + 1 + 1}$

$= \dfrac{100 + 130 + 70 + 58 + 63}{7} = \dfrac{421}{7} = 60.14 \approx 60.$

93. Let the eighth number be x. Then, sixth number $= (x - 7)$.

Seventh number $= (x - 7) + 4 = (x - 3)$.

So, $\left(2 \times 15\dfrac{1}{2}\right) + \left(3 \times 21\dfrac{1}{3}\right) + (x - 7) + (x - 3) + x = 8 \times 20$

$\Leftrightarrow \ 31 + 64 + (3x - 10) = 160 \ \Leftrightarrow \ 3x = 75 \ \Leftrightarrow \ x = 25.$

94. A.M. of 75 numbers $= 35$. Sum of 75 numbers

$= (75 \times 35) = 2625.$

Total increase $= (75 \times 5) = 375$. Increased sum

$= (2625 + 375) = 3000.$

Increased average $= \dfrac{3000}{75} = 40.$

95. Average of 10 numbers $= 7$.

Sum of these 10 numbers $= (10 \times 7) = 70$.

$\therefore \quad x_1 + x_2 + \dots + x_{10} = 70$

$\Rightarrow \quad 12x_1 + 12x_2 + \dots + 12x_{10} = 840$

$\Rightarrow \quad \dfrac{12x_1 + 12x_2 + \dots + 12x_{10}}{10} = 84$

$\Rightarrow$ Average of new numbers is 84.

96. $\dfrac{x_1 + x_2 + \dots + x_{10}}{10} = \overline{x}$

$\Rightarrow \quad x_1 + x_2 + \dots + x_{10} = 10\overline{x}$

$\Rightarrow \quad \dfrac{110}{100}x_1 + \dfrac{110}{100}x_2 + \dots + \dfrac{110}{100}x_{10} = \dfrac{110}{100} \times 10\overline{x}$

$\Rightarrow \quad \dfrac{\dfrac{110}{100}x_1 + \dfrac{110}{100}x_2 + \dots + \dfrac{110}{100}x_{10}}{10} = \dfrac{11}{10}\overline{x}$

$\Rightarrow$ Average is increased by 10%.

97. Correct sum $= (160 \times 35 + 104 - 144)$ cm $= 5560$ cm.

$\therefore$ Actual average height $= \left(\dfrac{5560}{35}\right)$ cm

$= 158.857$ cm ≈ 158.86 cm.

98. Correct sum $= (78.4 \times 25 + 96 - 69) = 1987$.

$\therefore$ Correct mean $= \dfrac{1987}{25} = 79.48.$

99. Correct sum $= (68 \times 20 + 72 + 61 - 48 - 65) = 1380$.

$\therefore$ Correct average $= \left(\dfrac{1380}{20}\right) = 69.$

100. Correct sum $= (40.2 \times 10 - 18 + 33 - 13) = 404$.

$\therefore$ Correct average $= \left(\dfrac{404}{10}\right) = 40.4.$

101. Let there be x pupils in the class.

Total increase in marks $= \left(x \times \dfrac{1}{2}\right) = \dfrac{x}{2}.$

$\therefore \quad \dfrac{x}{2} = (83 - 63) \ \Rightarrow \ \dfrac{x}{2} = 20 \ \Rightarrow \ x = 40.$

102. Correct sum $= 36 \times 100 + 90 - 40 = 3650$.

Correct average $= \dfrac{3650}{100} = 36.5.$ Error $= (36.5 - 36) = 0.5.$

$\therefore$ Error% $= \left(\dfrac{0.5}{36.5} \times 100\right)\% = \dfrac{100}{73}\% = 1.36\%.$

103. Age of the boy sitting in the middle
$= [26 \times 7 - (19 \times 3 + 32 \times 3)] = (182 - 153)$ years
$= 29$ years.

104. Third number $= [306.4 \times 5 - (431 \times 2 + 214.5 \times 2)]$
$= (1532 - 1291) = 241.$

105. Marks obtained by the 11th candidate
$= [(45 \times 22) - (55 \times 10 + 40 \times 11)]$
$= (990 - 990) = 0.$

106. Middle number $= [(10.5 \times 6 + 11.4 \times 6) - 10.9 \times 11]$
$= (131.4 - 119.9) = 11.5.$

107. Temperature on the fourth day $= [(40.2 \times 4 + 41.3 \times 4)$
$- (40.6 \times 7)]°C = 41.8$ °C.

108. Total weight of $(A + B + C) = \left(54\dfrac{1}{3} \times 3\right)$ kg $= 163$ kg.

Total weight of $(B + D + E) = (53 \times 3)$ kg $= 159$ kg.
Adding both, we get : $A + 2B + C + D + E = (163 + 159)$
kg $= 322$ kg.
So, to find the average weight of A, B, C, D and E, we
ought to know B's weight, which is not given. So, the
data is inadequate.

109. Sumit + Krishna + Rishabh $= 43 \times 3 = 129$. ...(*i*)
Sumit + Rishabh + Rohit $= 49 \times 3 = 147$ ...(*ii*)
Subtracting (*i*) from (*ii*), we get: Rohit − Krishna = 18
$\Rightarrow$ Krishna $= 54 - 18 = 36.$

110. $M + T + W = (37 \times 3)°$C $= 111°$ C ...(*i*)
$T + W + Th = (34 \times 3)°$ C $= 102°$ C ...(*ii*)
Subtracting (*ii*) from (*i*), we get:

$M - Th = 9°$ C $\Rightarrow M - \dfrac{4}{5}M = 9 \Rightarrow \dfrac{1}{5}M = 9 \Rightarrow M = 45.$

$\therefore$ Temperature on Thursday $= \left(\dfrac{4}{5} \times 45\right)°$ C $= 36°$ C.

111. Sum of temperatures on 1st, 2nd, 3rd and 4th days

$= (58 \times 4) = 232$ degrees   ...(i)

Sum of temperatures on 2nd, 3rd, 4th and 5th days

$= (60 \times 4) = 240$ degrees   ...(ii)

Subtracting (i) from (ii), we get:

Temperature on 5th day – Temp. on 1st day = 8 degrees.

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

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

∴   Temperature on the 5th day $= 8x = 64$ degrees.

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

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

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

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

Adding (ii) and (iii), we get: $A + 2B + C = 166$ ...(iv)

Subtracting (i) from (iv), we get: B = 31.

∴   B's weight = 31 kg.

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

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

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

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

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

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

∴   P's monthly income = ₹ 4000.

114. Age of the instructor $= (34 \times 11 - 32 \times 10)$ years

$= (374 - 320)$ years = 54 years.

115. Monthly income of the married daughter

$= ₹ (15130 \times 4 - 14660 \times 3)$

$= ₹ (60520 - 43980) = ₹ 16540$.

116. Weight of the teacher $= (35.4 \times 25 - 35 \times 24)$ kg = 45 kg.

117. Age of the mother $= (12 \times 7 - 7 \times 6)$ years = 42 years.

118. Total weight increased $= (8 \times 1.5)$ kg = 12 kg.

Weight of the new man $= (65 + 12)$ kg = 77 kg.

119. Total age decreased $= (24 \times 1)$ months = 24 months

$= 2$ years.

∴   Age of the newcomer $= (18 - 2)$ years = 16 years.

120. Sum of the weights of the students after replacement

$= [(52 \times 45) - (48 \times 5) + (54 \times 5)]$ kg = 2370 kg.

∴   New average $= \left(\dfrac{2370}{45}\right)$ kg $= 52\dfrac{2}{3}$ kg.

121. Sum of heights of the 5 boys $= (25 \times 1.4 - 20 \times 1.55)$ m

$= 4$ m.

∴   Required average $= \left(\dfrac{4}{5}\right)$ m = 0.8 m.

122. Total age decreased $= (11 \times 2)$ months = 22 months

$= 1$ year 10 months.

∴   Average age of two new players $= \left(\dfrac{35 \text{ years 2 months}}{2}\right)$

$= 17$ years 7 months.

123. Let the original strength of the class be x.

Sum of ages of the whole class $= (40x)$ years.

Sum of ages of 12 new students $= (12 \times 32)$ years

$= 384$ years.

∴ $\dfrac{40x + 384}{x + 12} = 36$

$\Rightarrow$ $40x + 384 = 36x + 432$

$\Rightarrow$ $4x = 48$

$\Rightarrow$ $x = 12$.

Hence, the original strength of the class = 12.

124. Let the original average weight of the class be x kg and let there be n students.

Then, sum of weights of n students $= (nx)$ kg.

∴ $\dfrac{nx + 50}{n + 1} = x + 1$

$\Rightarrow$ $nx + 50 = (n + 1)(x + 1)$

$\Rightarrow$ $nx + 50 = nx + x + n + 1$

$\Rightarrow$ $x + n = 49 \Rightarrow 2x + 2n = 98$ ...(i)

And, $\dfrac{nx + 100}{n + 2} = x + 1.5$

$\Rightarrow$ $nx + 100 = (n + 2)(x + 1.5)$

$\Rightarrow$ $nx + 100 = nx + 1.5n + 2x + 3$

$\Rightarrow$ $2x + 1.5n = 97$ ...(ii)

Subtracting (ii) from (i), we get: $0.5n = 1$ or $n = 2$.

Putting $n = 2$ in (i), we get: $x = 47$.

125. Let there be n numbers in the original list and let their mean be x.

Then, sum of n numbers $= nx$.

∴ $\dfrac{nx + 15}{n + 1} = x + 2$

$\Rightarrow$ $nx + 15 = (n + 1)(x + 2)$

$\Rightarrow$ $nx + 15 = nx + 2n + x + 2$

$\Rightarrow$ $2n + x = 13$ ...(i)

And, $\dfrac{nx + 16}{n + 2} = (x + 2) - 1$

$\Rightarrow$ $nx + 16 = (n + 2)(x + 1)$

$\Rightarrow$ $nx + 16 = nx + n + 2x + 2$

$\Rightarrow$ $n + 2x = 14$ ...(ii)

Solving (i) and (ii), we get: $n = 4$, $x = 5$.

126. Let the average age of the whole team be x years.

∴ $11x - (26 + 29) = 9(x - 1)$

$\Leftrightarrow$ $11x - 9x = 46$

$\Leftrightarrow$ $2x = 46 \Leftrightarrow x = 23$.

So, the average age of the team is 23 years.

127. Let the average for 20 innings be x. Then,

$\dfrac{20x + 84}{21} = x + 2$

$\Rightarrow$ $20x + 84 = 21x + 42$

$\Rightarrow$ $x = 42$.

∴ Average after 21st inning $= 42 + 2 = 44$.

128. Let the number of wickets taken till the last match be x. Then,

$$\frac{12.4x + 26}{x + 5} = 12 \Rightarrow 12.4x + 26 = 12x + 60$$

$$\Rightarrow 0.4x = 34 \Rightarrow x = \frac{34}{0.4} = \frac{340}{4} = 85.$$

129. Let the total score be x.

$$\therefore \frac{x + 92 - 85}{8} = 84 \Rightarrow x + 7 = 672 \Rightarrow x = 665.$$

130. Average speed $= \frac{2xy}{x+y} = \left(\frac{2 \times 50 \times 30}{50 + 30}\right)$ km/hr $= 37.5$ km/hr.

131. Let A, B, C, D and E represent their respective weights. Then,

$A + B + C = (84 \times 3) = 252$ kg, $A + B + C + D = (80 \times 4)$
$\qquad = 320$ kg.

$\therefore \quad D = (320 - 252)$ kg $= 68$ kg, $E = (68 + 3)$ kg $= 71$ kg.

$B + C + D + E = (79 \times 4) = 316$ kg.

Now, $(A + B + C + D) - (B + C + D + E) = (320 - 316)$ kg
$\qquad\qquad\qquad\qquad\qquad = 4$ kg.

$\therefore \quad A - E = 4 \Rightarrow A = (4 + E) = 75$ kg.

132. Sum of the present ages of husband, wife and child
$\qquad\qquad = (23 \times 2 + 5 \times 2) + 1 = 57$ years.

$\therefore \quad$ Required average $= \left(\frac{57}{3}\right) = 19$ years.

133. Sum of the present ages of A and B
$\qquad = (18 \times 2 + 4 \times 2)$ years $= 44$ years.

Sum of the present ages of A, B and C
$\qquad = (24 \times 3)$ years $= 72$ years.

C's present age $= (72 - 44)$ years $= 28$ years.

$\therefore$ C's age after 8 years $= (28 + 8)$ years $= 36$ years.

134. Sum of the present ages of A, B, C and D
$\qquad = (45 \times 4 + 5 \times 4)$ years $= 200$ years.

Sum of the present ages of A, B, C, D and X
$\qquad = (49 \times 5)$ years $= 245$ years.

$\therefore$ X's present age $= (245 - 200)$ years $= 45$ years.

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

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

$\therefore \quad$ Husband's present age $= (90 - 50)$ years $= 40$ years.

136. Sum of the ages of husband and wife at the time of their marriage $= (25 \times 2)$ yrs $= 50$ yrs.

Sum of the ages of husband and wife when their son was born $= (50 + 2 \times 2)$ yrs. $= 54$ yrs.

Sum of the ages of husband, wife and son at present
$\qquad = (24 \times 3)$ years $= 72$ years.

$\therefore$ Age of son $= \frac{(72 - 54)}{3} = \frac{18}{3} = 6$ years.

Hence, the couple got married $(6 + 2) = 8$ years ago.

137. Sum of the ages of father, mother and son at the time of son's marriage $= (42 \times 3)$ years
$\qquad\qquad = 126$ years.

Sum of the present ages of father, mother and son
$\qquad\qquad = (126 + 3 \times 6)$ years $= 144$ years.

Sum of the present ages of father, mother, son and grandson
$\qquad\qquad = (144 + 5)$ years $= 149$ years.

Sum of the present ages of father, mother, son, daughter-in-law and grandson
$\qquad\qquad = (36 \times 5)$ years $= 180$ years.

Daughter-in-law's present age
$\qquad\qquad = (180 - 149)$ years $= 31$ years.

$\therefore$ Age of daughter-in-law at the time of marriage
$\qquad\qquad = (31 - 6)$ years $= 25$ years.

138. Sum of the ages of 4 members, 4 years ago
$\qquad\qquad = (18 \times 4)$ years $= 72$ years.

Sum of the ages of 4 members now
$\qquad\qquad = (72 + 4 \times 4)$ years $= 88$ years.

Sum of the ages of 5 members now
$\qquad\qquad = (18 \times 5)$ years $= 90$ years.

$\therefore$ Age of the baby $= (90 - 88)$ years $= 2$ years.

139. Age decreased $= (5 \times 3)$ years $= 15$ years.

So, the required difference $= 15$ years.

140. Since the total or average age of all the family members is not given, the given data is inadequate. So, the age of second child cannot be determined.

141. Let the initial number of persons be x. Then,

$16x + 20 \times 15 = 15.5\ (x + 20) \Leftrightarrow 0.5x = 10 \Leftrightarrow x = 20.$

142. Sum of the ages of all 8 members, 10 years ago
$\qquad\qquad = 231$ years.

Sum of the ages of all members, 7 years ago
$\qquad\qquad = (231 + 8 \times 3 - 60)$ years $= 195$ years.

Sum of the ages of all members, 4 years ago
$\qquad\qquad = (195 + 8 \times 3 - 60)$ years $= 159$ years.

Sum of the present ages of all 8 members
$\qquad\qquad = (159 + 8 \times 4)$ years $= 191$ years.

$\therefore$ Current average age $= \left(\frac{191}{8}\right)$ years

$\qquad\qquad\qquad = 23.8$ years ≈ 24 years.

143. When the first child was born, the total age of all the family members $= (16 \times 3)$ years
$\qquad\qquad\qquad = 48$ years.

When the second child was born, the total age of all the family members $= (15 \times 4)$ years
$\qquad\qquad\qquad = 60$ years.

By the time the second child was born, each one of the 3 family members had grown by

$\qquad \left(\frac{60 - 48}{3}\right) = \frac{12}{3} = 4$ years.

Hence, the age of eldest son when the second child was born $= 4$ years.

When the third child was born, the total age of all the family members $= (16 \times 5)$ years
$\qquad\qquad\qquad = 80$ years.

By the time, the third child was born, each one of the four family members had grown by $\left(\frac{80 - 60}{4}\right) = 5$ years.

So, the age of the eldest son when the third child was born = (4 + 5) years = 9 years.

When the fourth child was born, the total age of all the family members = (15 × 6) years

$$= 90 \text{ years.}$$

By the time, the fourth child was born, each of the five family members had grown by $\left(\dfrac{90-80}{5}\right) = 2$ years.

So, the age of the eldest son when the fourth child was born = (9 + 2) years = 11 years.

At present, the total age of all the 6 family members

$$= (16 \times 6) \text{ years} = 96 \text{ years.}$$

By now, each one of the 6 members have grown by $\left(\dfrac{96-90}{6}\right) = 1$ year.

Hence, the present age of the eldest son

$$= (11 + 1) \text{ years} = 12 \text{ years.}$$

144. Let the fixed cost be ₹ x and the variable cost be ₹ y per boarder.

Then, $x + 25y = 700 \times 25 \Rightarrow x + 25y = 17500$ ...(i)
$\qquad x + 50y = 600 \times 50 \Rightarrow x + 50y = 30000$ ...(ii)

Subtracting (i) from (ii), we get: $25y = 12500$ or $y = 500$.

Putting $y = 500$ in (i), we get: $x = 5000$.

∴ Total expenses of 100 boarders = ₹ (5000 + 500 × 100)
$$= ₹ 55000.$$

Hence, average expense = $₹\left(\dfrac{55000}{100}\right)$ = ₹ 550.

145. Let the daily wage of a man be ₹ x. Then, daily wage of a woman = ₹ $(x - 5)$.

Now, $600x + 400(x - 5) = 25.50 \times (600 + 400)$
$$\Leftrightarrow \quad 1000x = 27500$$
$$\Leftrightarrow \quad x = 27.50.$$

∴ Man's daily wages = ₹ 27.50; Woman's daily wages
$$= (x - 5) = ₹ 22.50.$$

146. Let the required mean score be x. Then,
$$20 \times 80 + 25 \times 31 + 55 \times x = 52 \times 100$$
$$\Leftrightarrow \quad 1600 + 775 + 55x = 5200$$
$$\Leftrightarrow \quad 55x = 2825 \quad \Leftrightarrow x = \dfrac{565}{11} \approx 51.4.$$

147. Let the number of students in batches Y and Z be $6x$ and $7x$ respectively, and the number of students in batch X be y.

Then, $72y + 60 \times 6x = 69(6x + y)$
$$\Rightarrow \quad 72y + 360x = 414x + 69y$$
$$\Rightarrow \quad 3y = 54x \Rightarrow y = 18x.$$

∴ Required average = $\dfrac{72 \times 18x + 60 \times 6x + 50 \times 7x}{18x + 6x + 7x}$

$$= \dfrac{1296 + 360 + 350}{31} = \dfrac{2006}{31} = 64.7.$$

148. Let the total number of workers be x. Then,
$$8000x = (12000 \times 7) + 6000(x - 7)$$
$$\Leftrightarrow \quad 2000x = 42000$$
$$\Leftrightarrow \quad x = 21.$$

149. Let the number of girls be x. Then, number of boys = $(600 - x)$.

Then, $\left(11\dfrac{3}{4} \times 600\right) = 11x + 12(600 - x)$
$$\Leftrightarrow \quad x = 7200 - 7050$$
$$\Leftrightarrow \quad x = 150.$$

150. Let the number of boys and girls in the class be $3x$ and x respectively. Let the average score of the girls be y.

Then, $3x(A + 1) + xy = (3x + x)$ A
$$\Rightarrow \quad 3(A + 1) + y = 4A$$
$$\Rightarrow \quad y = A - 3.$$

151. Let the number of Mechanical Engineering graduates be M and the number of Electronics Engineering graduates be E.

Then, $2.45 M + 3.56 E = 3.12(M + E)$
$$\Rightarrow \quad 2.45 M + 3.56 E = 3.12 M + 3.12 E$$
$$\Rightarrow \quad 0.44 E = 0.67 M$$
$$\Rightarrow \quad \dfrac{M}{E} = \dfrac{0.44}{0.67} = \dfrac{44}{67}.$$

Since the ratio 44 : 67 is in its simplest form, so least number of Electronics graduates = 67.

152. Let the ratio be $k : 1$. Then,
$$k \times 16.4 + 1 \times 15.4 = (k + 1) \times 15.8$$
$$\Leftrightarrow \quad (16.4 - 15.8)k = (15.8 - 15.4)$$
$$\Leftrightarrow \quad k = \dfrac{0.4}{0.6} = \dfrac{2}{3}.$$

∴ Required ratio = $\dfrac{2}{3} : 1 = 2 : 3.$

153. Let the number of students with work experience be x and those without work experience be y.

Then, $18000 x + 12000 y = 16000(x + y)$
$$\Rightarrow \quad 2000 x = 4000 y$$
$$\Rightarrow \quad \dfrac{x}{y} = \dfrac{2}{1}.$$

∴ Percentage of students with work experience

$$= \left(\dfrac{2}{3} \times 100\right)\% = 66.67\%.$$

Percentage of students without work experience
$$= (100 - 66.67)\% = 33.33\%.$$

154. Let x ml of kerosene be there in 1 litre mixture.

Then, quantity of petrol in 1 litre mixture = $(1000 - x)$ ml.

$$\therefore \quad \dfrac{40}{1000}(1000 - x) + \dfrac{18}{900}x = 38$$

$$\Rightarrow \quad \dfrac{x}{25} - \dfrac{x}{50} = 2 \Rightarrow \dfrac{x}{50} = 2$$

$$\Rightarrow \quad x = 100.$$

So, 1 litre mixture has 900 ml petrol and 100 ml kerosene.

Cost of 1 litre petrol = ₹ 30.

Cost of 1 litre kerosene = $₹\left[\left(1 - \dfrac{2}{3}\right) \times 30\right] = ₹ 10.$

Cost of 1 litre mixture = $₹\left(\dfrac{30}{1000} \times 900 + \dfrac{10}{1000} \times 100\right) = ₹ 28.$

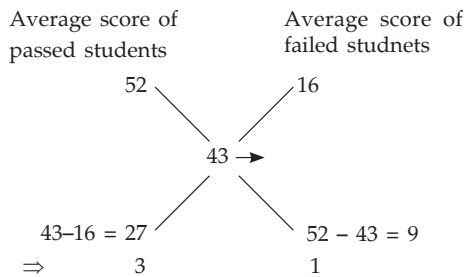∴ Additional amount earned by pump-owner
$$= ₹ (30 - 28) = ₹ 2.$$

155. Total number of students in class = 60

Average score of passed students = 52

Average score of failed students = 16

By applying the rule of alligation,

Average score of passed students	Average score of failed studnets

52 ⟍ ⟋ 16

43 →

43–16 = 27 ⟋ ⟍ 52 – 43 = 9

⇒ 3   1

∴ Number of students who failed in exam = $\frac{1}{4} \times 60 = 15$

156. The average of 11 results = 60

The total of 11 results = 60 × 11 = 660

Average of first six results = 58

Average of last six results = 63

Total of first six results = 58 × 6 = 348

Total of last six results = 63 × 6 = 378

∴ sixth results = total of first and last six results = total of 11 results

= (348 + 378) − 660

= 726 − 660 = 66

157. Average weights of 21 boys = 64 kg

Total weights of 21 boys = 64 × 21 = 1344kg

The weight of the teacher was added then average increase by 1kg

⇒ total weight of teachers and 21 boys = 65 × 21 = 1430 kg

Weight of teacher = 1430 − 1344 = 86kg

158. Average of 12 number = 15

Total of 12 number = 15 × 12 = 180

Average of first two number = 14

Total of first two number = 14 × 2 = 28

Total of remaining ten numbers = 180 − 28 = 152

Required average of remaining ten number = $\frac{152}{10} = \frac{76}{5} = 15\frac{1}{5}$

159. Average expenditure of a man for the first five month
= ₹ 1200

Average expenditure of a man for the next seven month
= ₹ 1300

Total annual expenditure of man

= ₹ (5 × 1200 + 7 × 1300)

= ₹ (6000 + 9100)

= ₹ 15100

Man saves = ₹ 2900

His total annual income

= ₹ (15100 + 2900)

= ₹ 18000

∴ Average monthly income = $\frac{18000}{12}$ = ₹ 1500

160. Let the number of female students be x

Let weight of female students = $57x$

Number of male students = 66

Total weight of male students = 65.9 × 66

Average weight of all the students 60.3 kg

Total weigh of all the students = 60.3 (66 + x)

According to given information

Then, 60.3 (66 + x) = 66 × 65.9 + 57x

60.3 × 66 + 60.3x = 66 × 65.9 + 57x

60.3x − 57x = 66(65.9 − 60.3)

or, 3.3x = 66(65.9 − 60.3)

or, 3.3x = 66 × 5.6

∴ $x = \frac{66 \times 5.6}{3.3} = 2 \times 56 = 112$

161. Total number of teachers = 10

Age of new teacher = 25 years

Age of the retired teacher

= (25 + 3 × 10) years

= 55 years

162. Numbers are

$x > y > z > p > q > r$

According to the question,

Average of first five numbers = 30

Sum of first five number

= $a + y + z + p + q = 5 \times 30 = 150$ ….(i)

Average of last five number = 25

Sum of last five numbers

= $y + z + p + q + r = 5 \times 25 = 125$ ….(ii)

By equation (i) and (ii) $a - r = 150 - 125 = 25$

163. Average weight of A, B and C = 40 kgs

Total weights of A, B and C = 40 × 3 = 120 kgs

Weight of C = (A + 24)kg and C = (B − 3) kg

∴ A + 24 = B − 3

⇒ B = A + 27

Now A + B + C = 120

⇒ A + A + 27 + A + 24 = 120

⇒ 3A + 51 = 120

⇒ A = $\frac{69}{3}$ = 23 kg

B = A + 27 = 23 + 27 = 50 kg

C = 120 − 23 − 50 = 47 kg

D = 47 − 15 = 32 kg

∴ Required average weight of A, B, C and D

= $\frac{23 + 50 + 47 + 32}{4}$

= $\frac{152}{4}$ = 38 kg

164. Total weight of Arun + Suraj + Vinay = 68 × 3 = 204 ..(i)

Total weight of Raju + Pratap = 72 × 2 = 144   …(ii)

Weight of Suraj = 78 kg

Weight of Raju = 68 kg

Weight of Vinay = 46 kg

Then, from (ii)

Weight of Pratap = 144 − 68 = 76 kg

And from (i)

Weight of Arun = 204 − 124 = 80 kg

Arun > Suraj > Pratap > Raju > Vinay

Second highest weight gainer = Suraj

Total weight of (Arun + Suraj + Vinay + Raju)

= (68 × 4) = 272 kg

Weight of Suraj = 78 kg

Weight of Raju = 68 kg

Weight of Vinay = 46 kg

Weight of Pratap is not known.

Only statement I alone was sufficient to answer the question.

165. Average marks of Subodh in History Geography and Chemistry = 75

Total marks of H + G + C = 75 × 3 = 225 …(i)

H + G + P = 78 × 3 = 234 …(ii)

From (i) and (ii)

Marks of Subodh in Physics = 234 − 225 = 9

166. Let the three positive numbers in increasing order be a, b and c and the average of these numbers be A.

Then, $\dfrac{a+b+c}{3} = A$ …(i)

Given $c - \dfrac{A}{3} = 8$

or, $c - \dfrac{a+b+c}{9} = 8$ …(ii)

Also, given $\dfrac{b+a}{2} = 8$ …(iii)

$\Rightarrow a + b = 16$

Putting the value of $(a + b)$ in equation (ii), we get

$c - \left(\dfrac{16+c}{9}\right) = 8$

or, $9c - 16 - c = 72$

or, $8c = 72 + 16 = 88$

or, $8z = 88$

∴ $c = 11$

∴ Highest number = 11

167. Average sales per day for six days of the week = ₹ 15,640/-

Total sales of six days of the week = 15640 × 6 = ₹ 93,840/-

Average sales of Tuesday to Saturday = ₹ 14,124/-

Total sales from Tuesday to Saturday = 14,124 × 5

= ₹ 70,620/-

∴ Sales on Sunday = (₹ 93,840 − 70,620) = ₹ 23,220/-

168. Average temperature of first four days = 25°C

Total temperature of first four days = 25° × 4 = 100°C

Average temperature last four days = 25.5°

Total temperature of four days = 25.5° × 4 = 102°C

Total temperature of whole week = 25.2 × 7 = 176.4°C

∴ Temperature of the 4th day = 100° + 102° − 176.4° = 25.6°C

169. Sum of numbers = 205 + 302 + 108 + 403 + 202 = 1220

Required average $= \dfrac{1220}{5} = 244$

170. Average monthly income of P and Q = ₹ 6,000/-

Average monthly income of Q and R = ₹ 5,250/-

Average monthly income of P and R = ₹ 5,500/-

Total income of P + Q = 2 × 6,000 = ₹ 12,000/- …(i)

Total income of Q + R = 2 × 5,250 = ₹ 10,500/- …(ii)

Total income of R + P = 2 × 5,500 = ₹ 11,000/- …(iii)

On adding equation (i) (ii) and (iii), we get

2(P + Q + R) = 12,000 + 10,500 + 11,000

$\Rightarrow$ P + Q + R $= \dfrac{33500}{2}$

= ₹ 16,750/- ….(iv)

By equation (iv) − (ii)

P's monthly income

= ₹ (16,750 − 10,500) = ₹ 6,250/-

171. Average of 6 numbers = 7

Sum of 6 numbers = 6 × 7 = 42

Average of three numbers = 5

Sum of three numbers = 5 × 3 = 15

∴ Sum of the remaining three numbers

= 42 − 15 = 27

∴ Required average $= \dfrac{27}{3} = 9$

172. Let the number of boys and girls in the class are x and y.

According to given information

$30x + 20y = 23.25(x + y)$

$30x + 20y = 23.25x + 23.25y$

$30x - 23.25x = 23.25y - 20y$

$6.75x = 3.25y$

or, $\dfrac{x}{y} = \dfrac{3.25}{6.75} = \dfrac{13}{27}$

Hence, possible number of boys and girls 13 and 27 respectively.

173. Average of a, b and c = 11

Total of a, b and c = 33 …(i)

Similarly, Average of c, d, and e = 17

Sum of $c + d + e = 3 \times 17 = 51$ (ii)

Average of e and f is 22

Sum of $e + f = 2 \times 22 = 44$ …(iii)

Average of e and c is 17

Sum of $e + c = 2 \times 17 = 34$ ….(iv)

By equations (i) + (ii) + (iii) − (iv)

$a + b + c + c + d + e + e + f - e - c$

= 33 + 51 + 44 − 34

= 128 − 34 = 94

∴ Required average $= \dfrac{94}{6}$

$$= \frac{47}{3} = 15\frac{2}{3}$$

174. According to given information average of odd numbers = Average of even numbers − 6

$$\Rightarrow \frac{x_1 + x_2 + x_3 + x_4}{4}$$

$$= \frac{y_1 + y_2 + y_3}{3} - 6$$

$$\Rightarrow \frac{x_1 + x_2 + x_3 + x_4}{4} = \frac{y_1 + y_2 + y_3 - 18}{3}$$

$$\Rightarrow 3(x_1 + x_2 + x_3 + x_4)$$

$$= 4(y_1 + y_2 + y_3) - 72$$

Also, $y_1 + y_2 + y_3 = x_1 + x_2 + x_3 + x_4 - 16$

$$\Rightarrow x_1 + x_2 + x_3 + x_4 = y_1 + y_2 + y_3 + 16 \dots(i)$$

So, we have

$$3(y_1 + y_2 + y_3 + 16)$$

$$= 4(y_1 + y_2 + y_3) - 72$$

$$\Rightarrow 3y_1 + 3y_2 + 3y_3 + 48$$

$$\Rightarrow = 4y_1 + 4y_2 + 4y_3 - 72$$

$$\Rightarrow 4y_1 + 4y_2 + 4y_3 - 3y_1 - 3y_2 - 3y_3 = 48 + 72$$

$$\Rightarrow y_1 + y_2 + y_3 = 120$$

$$\Rightarrow x_1 + x_2 + x_3 + x_4 = 120 + 16 = 136 \quad \text{[From (i)]}$$

∴ Average of four odd numbers

$$= \frac{x_1 + x_2 + x_3 + x_4}{4} = \frac{136}{4} = 34$$

175. If a month beings with Sunday then there are 5 Sundays in that month.

Total number of visitors come on Sunday
$$= 510 \times 5 = 2550$$

Total number of visitors come on other days
$$= 240 \times 25 = 6000$$

∴ Average number of visitors per day

$$= \frac{2550 + 6000}{30} = \frac{8550}{30} = 285$$

176. Total marks of six boys $= 48 + 59 + 87 + 37 + 78 + 57 = 366$

Required average $= \frac{366}{6} = 61$

177. Average weight of 75 girls = 47 kgs

Total weight of 75 girls = 47 × 75 = 3525 kg

Actual weight of 75 girls = x

Correct weight of 75 girls

3525 − 45 + 25 = 3525 − 20 = 3505 kg

∴ Required average weight = $x = \frac{3505}{75} = 46.73$ kg

EXERCISE

(DATA SUFFICIENCY TYPE QUESTIONS)

Directions (*Questions 1 to 28*): *Each of the questions given below consists of a statement and/ or a question and two statements numbered I and II given below it. You have to decide whether the data provided in the statement(s) is/ are sufficient to answer the given question. Read both the statements and*

*Give answer (**a**) if the data in Statement I alone are sufficient to answer the question, while the data in Statement II alone are not sufficient to answer the question;*

*Give answer (**b**) if the data in Statement II alone are sufficient to answer the question, while the data in Statement I alone are not sufficient to answer the question;*

*Give answer (**c**) if the data either in Statement I or in Statement II alone are sufficient to answer the question;*

*Give answer (**d**) if the data even in both Statements I and II together are not sufficient to answer the question;*

*Give answer (**e**) if the data in both Statements I and II together are necessary to answer the question.*

1. Sachin's monthly salary is ₹ 4,000. What is Rajan's monthly salary? **(Bank P.O., 2010)**

   I. Rajan gets ₹ 500 more than the average salary of his and Sachin's.

   II. Average of Sachin's and Rajan's salary is ₹ 4500.

2. Is r equal to the average of x, y and z?

   I. $x + y + z = 3r$ II. $\dfrac{x + y + z}{6} = \dfrac{r}{2}$

3. What marks have been obtained by Arun?

   I. Arun's marks are the average of marks of Nitin and Manick.

   II. Nitin obtained 80 marks and this is 25% more than the marks obtained by Manick.

4. Which of the four numbers w, x, y and z is the largest?

   I. The average of w, x, y and z is 25.

   II. The numbers w, x and y are each less than 24.

5. What is the average weight of the three new members who are recently included into the team?

   I. The average weight of the team increases by 20 kg.

   II. The three new men substitute earlier members whose weights are 64 kg, 75 kg and 66 kg.

6. The total of the present ages of A, B, C and D is 96 years. What is B's present age? **(SNAP, 2005)**

   I. The average age of A, B and D is 20 years.

   II. The average age of C and D is 25 years.

7. What is the average age of children in the class?

   (N.M.A.T., 2006)

I. Age of the teacher is as many years as the number of children.

II. Average age increased by 1 year if the teacher's age is also included.

8. If there is an average of 250 words on each page, how many pages can Michael read in an hour? **(M.A.T., 2006)**

I. There is an average of 25 ten-word lines on each page.

II. Michael can read 30 ten-word lines per minute.

9. John had an average score of 85 in three tests. What was John's lowest score?

I. John's highest score was 95. **(M.B.A., 2007)**

II. Average of John's two highest scores was 92.

10. The average age of *P*, *Q*, *R* and *S* is 30 years. How old is *R*? **(R.B.I., 2003)**

I. The sum of ages of *P* and *R* is 60 years.

II. *S* is 10 years younger than *R*.

11. How old will *C* be after 10 years ?

I. Five years ago, the average age of *A* and *B* was 15 years.

II. Average age of *A*, *B* and *C* today is 20 years.

12. What is the salary of *R*, in a group of *P*, *Q*, *R*, *S* and *T* whose average salary is ₹ 45980? **(Bank P.O., 2008)**

I. Total of the salary of *P* and *T* is ₹ 90670.

II. Total of the salary of *Q* and *S* is ₹ 76540.

13. The average of three quotations for a particular item is ₹ 120. Is the highest quotation less than or equal to ₹ 139? **(M.B.A., 2008)**

I. The lowest quotation is of ₹ 90.

II. One of the quotations is ₹ 125.

14. During a five day period, Monday through Friday, the average high temperature was 86 degrees Fahrenheit. What was the high temperature on Friday?

I. The average high temperature for Monday through Thursday was 87 degrees Fahrenheit.

II. The high temperature on Friday reduced the average high temperature by 1 degree Fahrenheit.

15. Find out the value of the eleventh number in a set of eleven numbers.

I. The average of the first ten numbers in the set is *x*. **(J.M.E.T., 2007)**

II. The average of all the eleven numbers is *y*.

16. Find the average score for all the juniors and seniors combined.

I. The average of the scores was 85 for juniors and 89 for seniors.

II. The groups are of equal size.

17. What is the average monthly income per family member? **(Bank P.O., 2011)**

I. Each male earns ₹ 1250 a month and each female earns ₹ 1050 a month.

II. Ratio of males to females in the family is 2 : 1.

18. How many children are there in the group?

I. Average age of the children in this group is 15 years. The total age of all the children in this group is 240 years.

II. The total age of all the children in the group and the teacher is 264 years. The age of the teacher is 9 years more than the average age of the children.

19. Deepak's marks in Hindi are 15 more than the average marks obtained by him in Hindi, Economics, Sociology and Philosophy. What are his marks in Philosophy ? **(S.N.A.P., 2005)**

I. The total marks obtained by him in Hindi and Philosophy together is 120.

II. The difference between the marks obtained by him in Sociology and Economics is 120.

20. How many candidates were interviewed everyday by the panel *A* out of the three panels *A*, *B* and *C*? **(Campus Recruitment, 2008)**

I. The three panels on an average interview 15 candidates everyday.

II. Out of a total of 45 candidates interviewed everyday by the three panels, the number of candidates interviewed by panel A is more by 2 than the candidates interviewed by panel *C* and is more by 1 than the candidates interviewed by panel *B*.

21. *P*, *Q*, *R* and *S* are four consecutive even numbers. What is the value of the largest integer among these?

I. The average of the four numbers is the first prime number greater than 10.

II. The ratio between the largest and the smallest of the numbers is less than 10.

22. Is 500 the average score on the GMAT? **(C.A.T., 2002)**

I. Half of the people, who take the GMAT, score above 500 and half of the people score below 500.

II. The highest GMAT score is 800 and the lowest score is 200.

23. What is the average of the best and worst score out of 8 tests taken by a student?

I. The average of all 8 tests is 84%.

II. After dropping the best and worst grade, the average of remaining 6 tests is 86%.

24. Sapna's marks in Geography are 16 more than the average marks obtained by her in Mathematics, Science, English and Hindi. What are her marks in Geography? **(N.M.A.T. 2005)**

I. The maximum marks in each subject were 100.

II. The total marks obtained by her in Mathematics, Science, English and Hindi were 250.

25. What was the combined average attendance per game at the Jawaharlal Nehru stadium for the months of June and July?

   I. The total attendance for the month of June was 23100 and the total attendance for the month of July was 25200.

  II. There were 20 games played in June and 22 games played in July.

26. The average age of teacher and students in a class is 3 years more than the average age of students. What is the age of the class teacher?

   I. There are 11 students in the class.

  II. The average age of teacher and students is 14 years.

27. What will be the average weight of the remaining class? **(N.M.A.T., 2005)**

   I. Average weight of 30 children out of total 46 in the class is 22.5 kg and that of the remaining children is 29.125 kg. A child having weight more than 40 kg is excluded.

  II. Average weight of a class of 46 children is 23.5 kg. A child weighing 46 kg is dropped out.

28. How long did the secretary's speech last?

   I. He spoke at an average of 50 words per minute.

  II. He would have spoken for 10 minutes extra, had his speech rate been 4 words less per minute.

Directions (*Questions 29 to 36*) : *Each of the questions given below consists of a question followed by three statements. You have to study the question and the statements and decide which of the statement(s) is/are necessary to answer the question.*

29. How many marks did Tarun secure in English?

   I. The average marks obtained by Tarun in four subjects including English is 60.

  II. The total marks obtained by him in English and Mathematics together is 170.

  III. The total marks obtained by him in Mathematics and Science together is 180.

(*a*) I and II only   (*b*) II and III only

(*c*) I and III only   (*d*) All I, II and III

(*e*) None of these

30. What is the average weight of girls in the class? **(S.B.I.P.O., 2005)**

   I. Average weight of all the 60 students is 42 kg.

  II. Average weight of boys is 43 kg.

  III. Total weight of all girls together is 1144 kg.

(*a*) I and II only

(*b*) II and III only

(*c*) All I, II and III

(*d*) Any two of the three

(*e*) Question cannot be answered even with information in all three statements

31. What is the average age of 45 students studying in a class? **(Bank P.O., 2008)**

   I. The average age of boys is 15.4 years while the average age of girls is 14.6 years.

  II. Boys and girls are respectively in the ratio 4 : 5.

  III. The number of boys is less than that of girls by 5.

(*a*) Only I and II   (*b*) Only I and III

(*c*) All I, II and III   (*d*) I and either II or III

(*e*) None of these

32. What is the average of the six members *A*, *B*, *C*, *D*, *E* and *F* in the family?

   I. Total age of *D* and *E* is 14 years.

  II. Average age of *A*, *B*, *C* and *F* is 50 years.

  III. Average age of *A*, *B*, *D* and *E* is 40 years.

(Bank P.O., 2009)

(*a*) Only I and II   (*b*) Only I and III

(*c*) Only II and III   (*d*) All I, II and III

(*e*) None of these

33. Find three positive consecutive even numbers. **(M.A.T., 2006)**

   I. The average of four consecutive even numbers starting from the last of the given numbers is 17.

  II. The difference of the highest and the lowest numbers is 4.

  III. The sum of the squares of the three numbers is 440.

(*a*) I only   (*b*) III only

(*c*) I and II only   (*d*) Either I or III only

(*e*) None of these

34. Is the average of the largest and the smallest of four given numbers greater than the average of the four numbers? **(M.A.T., 2006)**

   I. The difference between the largest and the second largest numbers is less than the difference between the second largest and the second smallest numbers.

  II. The difference between the largest and the second largest numbers is greater than the difference between the second smallest and the smallest numbers.

  III. The difference between the largest and the second smallest numbers is greater than the difference between the second largest and the smallest numbers.

(*a*) I only   (*b*) Either II or III

(*c*) I and either II or III   (*d*) Any two of them

35. The mean temperature of Monday to Wednesday was 37°C and of Tuesday to Thursday was 34°C. What was the temperature on Thursday ?

 I. The temperature on Thursday was $\frac{4}{5}$th that of Monday.

 II. The mean temperature of Monday and Thursday was 40.5°C.

 III. The difference between the temperature on Monday and that on Thursday was 9°C.

 (*a*) I and II only   (*b*) II and III only

 (*c*) Either I or II   (*d*) Either I, II or III

 (*e*) Any two of the three

36. In a cricket eleven, the average age of eleven players is 28 years. What is the age of the captain ?

 I. The captain is eleven years older than the youngest player.

 II. The average age of 10 players, other than the captain is 27.3 years.

 III. Leaving aside the captain and the youngest player, the average ages of three groups of three players each are 25 years, 28 years and 30 years respectively.

 (*a*) Any two of the three

 (*b*) All I, II and III

 (*c*) II only or I and III only

 (*d*) II and III only

 (*e*) None of these

Directions (*Question 37*): *The given question is followed by three statements labelled I, II and III. You have to study the question and all the three statements given to decide whether any information provided in the statement(s) is/are redundant and can be dispensed with while answering the given question.*

37. What is the average salary of 15 employees?

 I. Average salary of 7 clerical cadre (out of the 15 employees) is ₹ 8500.

 II. Average salary of 5 officer cadre (out of the 15 employees) is ₹ 10000.

 III. Average salary of the 3 sub-staff employees (out of the 15 employees) is ₹ 2500.

 (*a*) None   (*b*) Only I

 (*c*) Only II   (*d*) Only III

 (*e*) Question cannot be answered even with information in all the three statements.

ANSWERS

1. (*c*)	**2.** (*c*)	**3.** (*e*)	**4.** (*e*)	**5.** (*d*)	**6.** (*d*)	**7.** (*d*)	**8.** (*b*)	**9.** (*b*)	**10.** (*d*)
11. (*e*)	**12.** (*e*)	**13.** (*e*)	**14.** (*c*)	**15.** (*e*)	**16.** (*e*)	**17.** (*e*)	**18.** (*a*)	**19.** (*d*)	**20.** (*b*)
21. (*a*)	**22.** (*d*)	**23.** (*e*)	**24.** (*a*)	**25.** (*e*)	**26.** (*e*)	**27.** (*b*)	**28.** (*e*)	**29.** (*e*)	**30.** (*c*)
31. (*d*)	**32.** (*a*)	**33.** (*d*)	**34.** (*b*)	**35.** (*c*)	**36.** (*c*)	**37.** (*a*)			

SOLUTIONS

1. I. Let their average salary be ₹ x. Then, Rajan's salary = ₹ $(x + 500)$.

∴ $\frac{4000 + (x + 500)}{2} = x \Rightarrow 4500 + x = 2x \Rightarrow x = 4500.$

Sum of Rajan's and Sachin's salaries = ₹ (4500×2)
= ₹ 9000.

∴ Rajan's salary = ₹ $(9000 - 4000)$ = ₹ 5000.

So, I alone gives the answer.

II. Rajan's salary can be calculated from the given data as shown above.

So, II alone also gives the answer.

∴ Correct answer is (*c*).

2. From each one of I and II, we have: $r = \frac{x + y + z}{3}$.

i.e., r = average of x, y and z.

So, either I alone or II alone gives the answer.

∴ Correct answer is (*c*).

3. II. Let the marks obtained by Manick be x.

Then, 125% of $x = 80 \Rightarrow x = \left(\frac{80 \times 100}{125}\right) = 64.$

I. Average of marks of Nitin and Manick = $\frac{80 + 64}{2} = 72.$

∴ Arun's marks = 72.

So, both I and II together give the answer.

∴ Correct answer is (*e*).

4. I. $w + x + y + z = 25 \times 4 = 100.$ ...(*i*)

II. $w < 24$, $x < 24$, $y < 24$

⇒ $w + x + y < (24 \times 3)$

⇒ $w + x + y < 72$ ...(*ii*)

From (*i*) and (*ii*), we have: $z > 28$. So, z is the largest number.

Thus, both I and II together are needed.

∴   Correct answer is (*e*).

5. Let the number of team members be n.

    I. Total increase in weight on replacement = $(20n)$ kg.

    II. Total weight of new members = $[(64 + 75 + 66) + 20n]$ kg
= $(205 + 20n)$ kg.

∴ Required average = $\dfrac{(205 + 20n)}{3}$ kg and we need n to get the answer.

∴ Correct answer is (d).

6. $A + B + C + D = 96$ ...(i)

    I. gives, $A + B + D = (3 \times 20) \Rightarrow A + B + D = 60$ ...(ii)

    II. gives, $C + D = (2 \times 25) \Rightarrow C + D = 50$. ...($iii$)

From (i), (ii) and (iii) also, we cannot find B.

∴ Correct answer is (d).

7. Let there be x children.

    I. gives, age of teacher = x years.

    II. gives, average age of $(x + 1)$ persons = $(x + 1)$ years.

      ∴ Teacher's age = $(x + 1)(x + 1) - x^2$
= $(x^2 + 1 + 2x) - x^2 = (1 + 2x)$.

    Thus, teacher's age cannot be obtained.

∴ Correct answer is (d).

8. **I.** gives, total number of words on each page
= $(25 \times 10) = 250$

which is the same as given in the question.

    II. gives, number of words Michael reads in 1 hour
= $(30 \times 10 \times 60) = 18000$.

∴ Number of pages read by Michael in 1 hour

= $\dfrac{18000}{250} = 72$.

So, II alone gives the answer while I alone does not.

∴ Correct answer is (b).

9. **II.** gives, John's lowest score = $(85 \times 3) - (92 \times 2)$
= $255 - 184 = 71$.

So, II alone gives the answer while I alone does not.

∴ Correct answer is (b)

10. $P + Q + R + S = (30 \times 4) \Rightarrow P + Q + R + S = 120$ ...(i)

    I. $P + R = 60$ ...(ii)

    II. $S = (R - 10)$ ...(iii)

From (i), (ii) and (iii), we cannot find R.

∴ Correct answer is (d).

11. **I.** $A + B = (15 \times 2) + (5 \times 2)$
$\Rightarrow A + B = 40$ ...(i)

    II. $A + B + C = (20 \times 3)$
$\Rightarrow A + B + C = 60$ ...(ii)

From (i) and (ii), we get $C = 20$.

C's age after 10 years = $(20 + 10)$ years = 30 years.

∴ Correct answer is (e).

12. $P + Q + R + S + T = 45980 \times 5 = 229900$ ...(i)

    I. $P + T = 90670$ ...(ii)

    II. $Q + S = 76540$ ...(iii)

Adding (ii) and (iii) and subtracting from (i), we get:

$R = 229900 - (90670 + 76540) = 229900 - 167210 = 62690$.

Thus, both I and II together give the answer.

∴ Correct answer is (e).

13. **I** and **II** give:

Highest quotation = $(120 \times 3) - (90 + 125) = 360 - 215$
= $145 > 139$.

So, both I and II together give the answer.

∴ Correct answer is (e).

14. $M + T + W + Th + F = (86 \times 5) = 430$. ...($i$)

    I. gives: $M + T + W + Th = (87 \times 4) = 348$. ...($ii$)

    II. gives: $M + T + W + Th = (87 \times 4) = 348$. ...($iii$)

Thus, from (i) and (ii), as well as from (i) and (iii), we have: $F = (430 - 348) = 82°F$.

Thus, either I alone or II alone gives the answer.

∴ Correct answer is (c).

15. **I.** gives, sum of first 10 numbers = $10x$. ...(i)

    II. gives, sum of all the 11 numbers = $11y$. ...(ii)

From (i) and (ii), we have 11th number = $11y - 10x$.

So, both I and II together are needed.

∴ Correct answer is (e).

16. From both **I** and **II**, we have:

Let each group have x students.

Then, the average score for all = $\left(\dfrac{85x + 89x}{2x}\right) = \dfrac{174}{2} = 87$.

So, both I and II together give the answer.

∴ Correct answer is (e).

17. From both **I** and **II**, we have:

Let the number of males and females in the family be $2x$ and x respectively.

Then, the average monthly income per member

= ₹$\left(\dfrac{1250 \times 2x + 1050 \times x}{2x + x}\right) = ₹\left(\dfrac{3550}{3}\right) = ₹\,1183.33$.

So, both I and II together are needed.

∴ Correct answer is (e).

18. Let there be x children in the group.

    I. Average age = 15 years. ∴ Total age = $15x$ years.

    ∴ $15x = 240 \Leftrightarrow x = \dfrac{240}{15} \Leftrightarrow x = 16$.

So, there are 16 children in the group.

    II. Total age of x children and 1 teacher is 264 years.

Age of teacher = $(15 + 9)$ years = 24 years.

Total age of x children = $(264 - 24)$ years = 240 years.

This does not give the answer.

∴ Correct answer is (a).

19. $H = \dfrac{(H + E + S + P)}{4} + 15$

$\Rightarrow 4(H - 15) = H + E + S + P$

$\Rightarrow 3H - 60 = E + S + P$ ...(i)

    I. $H + P = 120$ ...(ii)

    II. $S - E = 120$ ...(iii)

From (i), (ii) and (iii), we cannot find P.

∴ Correct answer is (d).

20. **I.** Total candidates interviewed by 3 panels = $(15 \times 3) = 45$.

This is already given in II.

II. Let x candidates be interviewed by C.

Number of candidates interviewed by $A = (x + 2)$.

Number of candidates interviewed by $B = (x + 1)$.

$\therefore$ $x + (x + 2) + (x + 1) = 45$ $\Leftrightarrow$ $3x = 42$ $\Leftrightarrow$ $x = 14$.

So, the number of candidates interviewed by panel A is 14.

Thus, II alone is sufficient. Hence, the correct answer is (*b*).

21. Let $P = x$, $Q = x + 2$, $R = x + 4$ and $S = x + 6$.

I gives, $\dfrac{x + (x + 2) + (x + 4) + (x + 6)}{4} = 11$

$\Rightarrow$ $4x + 12 = 44$

$\Rightarrow$ $4x = 32 \Rightarrow x = 8$.

$\therefore$ Largest integer $= x + 6 = 14$.

So, I alone gives the answer.

II gives, $\dfrac{x + 6}{x} < 10$ $\Rightarrow x + 6 < 10x \Rightarrow 9x > 6 \Rightarrow x > \dfrac{2}{3}$.

Thus, II alone does not give the answer.

$\therefore$ Correct answer is (*a*).

22. The average score depends on all the individual scores and the range of scores as given in I and II, is insufficient to calculate it.

So, both I and II together are insufficient.

$\therefore$ Correct answer is (*d*).

23. **I** gives, sum of all 8 scores $= (84 \times 8) = 672$.   ...(*i*)

II gives, sum of remaining 6 scores $= (86 \times 6)$

$= 516$.   ...(*ii*)

From (*i*) and (*ii*), we have:

Sum of best and worst scores $= 672 - 516 = 156$.

$\therefore$ Average of best and worst scores $= \dfrac{156}{2} = 78\%$.

Thus, both I and II together give the answer. $\therefore$ Correct answer is (*e*).

24. **II**   gives, Average of marks in Mathematics, Science, English and Hindi $= \dfrac{250}{4} = 62.5$.

$\therefore$ Marks in Geography $= (62.5 + 16) = 78.5$.

So, II alone gives the answer while I alone is insufficient. $\therefore$ Correct answer is (*b*).

25. To calculate the average attendance per game, we need to know the total attendance and the number of games played.

I and **II** give:

Combined average attendance per game

$= \left(\dfrac{23100 + 25200}{20 + 22}\right) = \dfrac{48300}{42} = 1150$.

So, both I and II together are needed.

$\therefore$ Correct answer is (*e*).

26. Average age of 11 students and 1 teacher $= 14$ years

$\Rightarrow$ Total age of (11 students and 1 teacher) $= (14 \times 12)$ years $= 168$ years.

Average age of (11 students and 1 teacher) $=$ (Average age of 11 students) $+ 3$

$\Rightarrow$ Average age of 11 students $= (14 - 3)$ years $= 11$ years

$\Rightarrow$ Total age of 11 students $= (11 \times 11)$ years $= 121$ years.

$\therefore$ Age of the teacher $= (168 - 121)$ years $= 47$ years.

Thus, both I and II are needed to get the answer.

$\therefore$ Correct answer is (*e*).

27. **I.** Total weight of 46 children $= [(22.5 \times 30) + (29.125 \times 16)]$ kg $= 1141$ kg.

Weight excluded is not exact. So, average of remaining class cannot be obtained.

II. Total weight of 45 children $= [(23.5 \times 46) - 46]$ kg

$= 1035$ kg.

Average weight of 45 children $= \dfrac{1035}{45}$ kg $= 23$ kg.

$\therefore$ Data in II is sufficient to answer the question, while the data in I is not sufficient.

$\therefore$ Correct answer is (*b*).

28. Suppose the secretary's speech lasted for x minutes.

I gives, number of words in the speech $= 50x$.

II gives, number of words in the speech $= 46\,(x + 10)$.

$\therefore$ $50x = 46\,(x + 10) \Rightarrow 4x = 460 \Rightarrow x = 115$.

So, the secretary's speech lasted for 115 min *i.e.*, 1 hr 55 min.

Thus, both I and II are needed to find the answer.

$\therefore$ Correct answer is (*e*).

29. **I** gives, total marks in 4 subjects $= (60 \times 4) = 240$. ...(*i*)

II gives, E + M = 170.   ...(*ii*)

III gives, M + S = 180.

Thus, none of (*a*), (*b*), (*c*), (*d*) it true.

$\therefore$ Correct answer is (*e*).

30. **I** gives, sum of weights of 60 students $= (42 \times 60)$ kg

$= 2520$ kg. ...(*i*)

II gives, if there be x boys in the class, sum of weights of x boys $= (43x)$ kg.   ...(*ii*)

III gives, sum of weights of all the girls $= 1144$ kg. ...(*iii*)

From (*i*), (*ii*), and (*iii*), we have:

$43x + 1144 = 2520 \Rightarrow 43x = 1376 \Rightarrow x = 32$.

So, number of boys $= 32$, number of girls

$= (60 - 32) = 28$.

$\therefore$ Average weight of girls $= \left(\dfrac{1144}{28}\right)$ kg $= 40.86$ kg.

Thus, all I, II and III are needed to find the answer.

$\therefore$ Correct answer is (*c*).

31. From **I** and **II**, we have:

Let the number of boys and girls be $4x$ and $5x$ respectively.

Then, $4x + 5x = 45 \Rightarrow 9x = 45$ or $x = 5$.

So, number of boys $= 20$; number of girls $= 25$.

$\therefore$ Average age of 45 students $= \left(\dfrac{15.4 \times 20 + 14.6 \times 25}{45}\right)$ yrs

$= \left(\dfrac{673}{45}\right)$ years $= 14.96$ years.

Thus, I and II together give the answer.

From I and III, we have

Let number of girls be x. Then, number of boys $= x - 5$.

Then, $x + x - 5 = 45 \Rightarrow 2x = 50 \Rightarrow x = 25$.

So, number of girls = 25, number of boys = 20.

As calculated above, required average = 14.96 years.

Thus, I and III together also give the answer.

∴ Correct answer is (d).

32.   **I** gives: $D + E = 14$ ...(i)

II gives: $A + B + C + F = 50 \times 4 = 200$ ...(ii)

III gives: $A + B + D + E = 40 \times 4 = 160$ ...(iii)

Adding (i) and (ii), we have: $A + B + C + D + E + F = 214$.

∴ Required average = $\left(\dfrac{214}{6}\right)$ years = 35.67 years.

Thus, only I and II together give the answer

∴ Correct answer is (a).

33. Let the three consecutive even numbers be x, $x + 2$ and $x + 4$.

I gives, $\dfrac{(x + 4) + (x + 6) + (x + 8) + (x + 10)}{4} = 17$

$\Rightarrow x + 7 = 17 \Rightarrow x = 10$.

So, the required numbers are 10, 12 and 14.

Thus, I alone gives the answer.

II gives, Difference between highest and lowest numbers = $(x + 4) - x = 4$.

This does not help to find the value of x.

So, II alone is insufficient.

III gives, $x^2 + (x + 2)^2 + (x + 4)^2 = 440$

$\Rightarrow x^2 + (x^2 + 4 + 4x) + (x^2 + 16 + 8x) = 440$

$\Rightarrow 3x^2 + 12x - 420 = 0$

$\Rightarrow x^2 + 4x - 140 = 0$

$\Rightarrow x^2 + 14x - 10x - 140 = 0$

$\Rightarrow (x + 14)(x - 10) = 0 \Rightarrow x = 10$.

So, the required numbers are 10, 12 and 14.

Thus, III alone also gives the answer.

∴ Correct answer is (d).

34. Let the four numbers in decreasing order be x, y, z and w. Then, we have to find whether the following statement is true or false:

$$\dfrac{x + w}{2} > \dfrac{x + y + z + w}{4}$$

I   gives, $x - y < y - z$

II   gives, $x - y > z - w$

$\Rightarrow x + w > y + z$

$\Rightarrow 2(x + w) > x + y + z + w$