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AVERAGE

AVERAGE

Traditionally, average is calculated by dividing the sum of all the numbers by the number of numbers.

$$\text{Average} = \frac{\text{Sum of numbers}}{\text{Number of numbers}}$$

For example, the average of the four numbers 214, 215, 219, and 224 will be:

$$\text{Average} = \frac{214+214+219+224}{4} = 218$$

Central Value Meaning of Average

Average can also be seen as the central value of all the given values.

Applying this definition for the above example, let us assume the central value of all the given numbers = 214

Now, find the deviations of all the numbers from 214
214 215 219 224

When assumed central value is (214), the sum of the deviations

$$= 0 + 1 + 5 + 10$$

Now, finding the average of deviations gives us

$$\frac{0+1+5+10}{4} = \frac{16}{4} = 4$$

Hence, average = assumed central value + average of deviations = 214 + 4 = 218

Therefore, we can assume any value to be the assumed average and then find the average of all the deviations; and when we add all the numbers and divide it by number of numbers, 0 is assumed to be the central value.

Example 1 Average age of A, B and C is 84 years. When D joins them the average age of A, B, C, and D becomes 80 years. A new person E, whose age is 4 years more than D, replaces A and the average age of B, C, D, and E becomes 78 years. What is the age of A?

Solution Since the average age of A, B, and C is 84 years so, we can assume that age of A, B, and C is 84 years.

A = 84 years

B = 84 years

C = 84 years

After D has joined them,

Initially Finally

A 84 years 80 years

B 84 years 80 years

C 84 years 80 years

D 80 years

Decrease in the age of A, B, and C can be attributed to the increase in the age of D. So, after getting 12 years

in total (4 years each from A, B, and C) D is at 80 years. The original age of D = 80 - 12 = 68 years.

Hence, age of E = 72 years

Now, the average age of A, B, C, and D = 80 years; A + B + C + D = 320

And average of B, C, D, and E = 78 years; B + C + D + E = 312

(Since the average difference between the age of A and E is 2 years.)

Difference (A - E) = 2 × 4 = 8 years

Since E = 72 years, so A = 80 years

By using central value method of averages, every question of average can be done by mental calculation only.

Example 2 Average of 10 two-digit numbers is S. However, when we reverse one of the numbers AB as BA from the given 10 numbers, then the average becomes S + 1.8. What is the value of B - A?

Solution Average of 10 numbers is increasing by 1.8, so it can be assumed that 1.8 has been added to all the numbers.

Hence, BA is $1.8 \times 10 = 18$ more than AB.

There are so many two-digit numbers that satisfy the above condition. Using hit and trial method, the numbers can be 13, 24, 35, 46, 57, 68, and 79. In every case, difference between the digits = 2

Otherwise, we can use the formula

$$(BA - AB) = 9 \times (B - A)$$

Where BA and AB are two-digit numbers.

Example 3 The average score of Rahul Dravid after 25 innings is 46 runs per innings. If after the 26th innings, his average runs increased by 2 runs, then what is his score in the 26th inning?

Solution Runs in 26th inning = Total runs after 26th innings - Total runs after 25th innings
= $26 \times 48 - 25 \times 46 = 98$

Alternatively, this question can be done by the above given central value meaning of average. Since the average increases by 2 runs per innings, we can assume that 2 runs have been added to his score in each of the first 25 innings. Now, the total runs added in these innings have been contributed by the runs scored in the 26th inning, which must be equal to $25 \times 2 = 50$ runs.

And after contributing 50 runs, his score in the 26th inning is 48 runs.

Hence, runs scored in the 26th inning = new average + old innings × change in average

$$= 48 + 25 \times 2 = 98$$

To have a mental mapping, we can see the whole situation as:

No. of Innings	Avg. 1 st 25 innings	Avg. 1 st 26 innings	Addition
1	46	48	2
2	46	48	2
3	46	48	2
...
...
...
25	46	48	2
26		48	

Properties of Average

- Average always lies in between the maximum and the minimum value. It can be equal to the maximum or minimum value if all the numbers are equal.
For example, A1, A2, A3, and A4 are four numbers given where $A1 > A2 > A3 > A4$.
Average of these four numbers will always lie in between A1 and A4.
However, if all the four numbers are equal ($A1 = A2 = A3 = A4$), then the average will be equal to each of these numbers.
Average = $A1 = A2 = A3 = A4$
- Average is the resultant of net surplus and net deficit, as used in the central tendency method.
- When weights of different quantities are same, then simple method is used to find the average. However, when different weights of different quantities are taken, then, it is known as weighted average. Here, the method of weighted average is used to find the average. For example, assume per capita income of India is USD 500 and per capita income of US is USD 200. Now, if we merge India and United States into one country, then it is observed that per capita income of this new country will not be equal to $\frac{500+200}{2} = \text{USD } 350$.
- If the value of each quantity is increased or decreased by the same value S, then the average will also increase or decrease, respectively, by S.
- If the value of each quantity is multiplied by the same value S, then the average will also be multiplied by S.
- If the value of each quantity is divided by the same value S ($S \neq 0$), then the average will also be divided by S.

Example 4 The average of 4 positive numbers is A and the average of all the possible triples formed out of these four positive numbers is B. Which of the following is true regarding A and B?

- (a) $A = B$ (b) $A > B$
(c) $A < B$ (d) Cannot be determined

Solution Let us assume that the numbers are 1, 2, 3, and 4

Average of 1, 2, 3, and 4: $1 + 2 + 3 + 4 = 10/4 = 2.5$

The triplets are 1, 2, and 3; and the average = $\frac{6}{3}$

1, 2, and 4; and the average = $\frac{7}{3}$

1, 3, and 4; and the average = $\frac{8}{3}$

2, 3, and 4; and the average = $\frac{9}{3}$

Average of these four averages = $\frac{\frac{6}{3} + \frac{7}{3} + \frac{8}{3} + \frac{9}{3}}{4} = 2.5$

Hence, option (a) is the answer.

Central Value Method

It should be observed here that when we find the average of all the possible triplets, all the numbers (1, 2, 3, 4) are added thrice. So effectively we are adding 12 numbers. Hence, the average should be equal to:

$$\frac{3(1+2+3+4)}{12} = 2.5$$

Therefore, the average will be equal in all the cases.

Extension to this problem The average of four positive numbers is A and the average of all the possible pairs formed out of these four positive numbers is B. Which of the following is true?

- (a) $A = B$ (b) $A > B$
(c) $A < B$ (d) Cannot be determined

Some Special Cases

1. Average Involving Time, Speed, and Distance

$$\text{Average speed} = \frac{\text{Total distance}}{\text{Total time}}$$

However, while solving the questions involving time, speed, and distance, we should assume some distance, preferably the LCM of all the given speeds.

Example 5 Lovely goes to Patna from New Delhi at a speed of 40 km/h and returns with a speed of 60 km/h. What is her average speed during the whole journey?

Solution Assuming that the total distance between Patna and New Delhi is 120 km (LCM of 40 and 60) the total time taken (Patna – New Delhi and New Delhi – Patna) = $3 + 2 = 5$ h

Hence, average speed = $240/5 = 48$ km/h

2. Average Involving Age

Average of a group of n persons given at any point of time can be calculated in the following way

5 years ago	10 years ago	Now	10 yrs later	5 yrs later
N-5	N-10	N	N+10	N+5

Example 6 The average age of the five members of a family is 20 years. The youngest member of the family is 4 years old. At the time of his birth, the average age

of the rest of the family was N years. What is the average age of the family (in terms of N) excluding the youngest member?

Solution Sum of ages of all the members of the family = 100

Sum of ages of all the members of the family excluding the youngest number = $100 - 4 = 96$

Hence, average age of all the members of the family excluding the youngest number = $96/4 = 24 = N$

The average age of the family (in terms of N) excluding the youngest member = $N + 4$

3. Average Involving Number System

Average of 1st n consecutive natural numbers

$$= \frac{n+1}{2}$$

For example, the average of 1st five natural numbers = 3

The average of 1st n consecutive even natural numbers = $n + 1$

Sum of 1st n consecutive even natural numbers = $n(n + 1)$

For example, the average of 1st five even natural numbers = 6

The average of 1st n consecutive odd natural numbers = n

Sum of 1st n consecutive odd natural numbers = n^2

For example, the average of 1st five odd natural numbers = 5

PREVIOUS YEAR QUESTIONS

Q1.

The average of 5 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?

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

Q2.

Kamlesh bought 65 books for Rs. 1,050 from one shop and 50 books for Rs. 1,020 from another. What is the average price he paid per book?

- (a) 36.4
- (b) Rs. 18.20
- (c) Rs. 24
- (d) 18
- (e) None of these

Q3.

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

- (a) 72
- (b) 84
- (c) 96
- (d) 108
- (e) None of these

Q4.

The average weight of a group of 53 girls was calculated as 58 kg. It was later discovered that the weight of one of the girls was read as 65 kg. Whereas her actual weight was 45 kg. What is the actual average weight of the group of 53 girls? (rounded off to two digits after decimal)

- (a) 58.62 kg.
- (b) 58.37 kg.
- (c) 57.37 kg.
- (d) 57.62 kg.
- (e) None of these

Q5.

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

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

Q6.

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

- (a) 20 years
- (b) 16 years
- (c) 12 years
- (d) 18 years
- (e) 21 years

Q7.

The average of 5 numbers is 65. The average of the first two numbers is 81 and the average of the last two numbers is 38. What is the third number?

- (a) 63
- (b) 87
- (c) 99
- (d) Cannot be determined
- (e) None of these

Q8.

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

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

Q9.

The average age of 80 boys in a class is 15 years, The average age of a group of 15 boys in the class is 16 years and the average age of another 25 boys in the class is 14 years. What is the average age of the remaining boys in the class?

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

Q10.

The average age of seven boys sitting in a row facing North is 26 years. If the average age of first three boys is 19 years and the average age of last three boys is 32 years, what is the age of the boy who is sitting in middle of the row?

- (a) 28 years
- (b) 29 years
- (c) 24 years
- (d) 31 years
- (e) None of these

Q11.

Ram's present age is three times his son's present age and two-fifth of his father's present age. The average of the present age of all of them is 46 years. What is the difference between the Ram's son's present age and Ram's father's present age?

- (a) 68 years
- (b) 88 years
- (c) 58 years
- (d) Cannot be determined
- (e) None of these

Q12.

The average, of five numbers is 56. If the average of first four numbers is 54, what is the value of the fifth number?

- (a) 68
- (b) 72
- (c) 56
- (d) 64
- (e) None of these

Q13.

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

- (a) 36.07 kg.
- (b) 36.16 kg.
- (c) 35.84 kg.
- (d) Cannot be determined
- (e) None of these

Q14.

Seema's present age is four times her son's present age and four-seventh of her father's present age. The average of the present age of all three of them is 32 years. What is the difference between the Seema's son's present age and Seema's father's present age?

- (a) 44 years
- (b) 48 years
- (c) 46 years
- (d) Cannot be determined
- (e) None of these

Q15.

The sum of eight consecutive even numbers of set-A is 376. What is the sum of different set of five consecutive numbers whose lowest number is 15 more than the mean of set-A ?

- (a) 296
- (b) 320
- (c) 324
- (d) 284
- (e) None of these

Q16.

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

- (a) 120
- (b) 111

- (c) 117
(d) Cannot be determined
(e) None of these

Q17.

The sum of 8 consecutive odd numbers is 656. Also average of four consecutive even numbers is 87. What is the sum of the smallest odd number and second largest even number?

- (a) 165
(b) 175
(c) 163
(d) Cannot be determined
(e) None of these

Q18.

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

- (a) 56
(b) 55
(c) 57.5
(d) 58.5
(e) None of these

Q19.

The average age of some males and 15 females is 18 years. The sum of the ages of 15 females is 240 years and average age of males is 20 years. Find the number of males.

- (a) 8
(b) 7
(c) 10
(d) 15
(e) None of these

Q20.

The sum of the present ages of P and Q is 25 years more than the age of R. The present age of Q is 5 years more than that of R. Find the present age of P.

- (a) 20 years
(b) 25 years
(c) 21 years
(d) 22 years
(e) None of these

Q21.

The average of four consecutive even numbers P, Q, R and S respectively (in increasing order) is 51. What is the product of P and R?

- (a) 2592

- (b) 2400
(c) 2600
(d) 2808
(e) None of these

Q22.

The average height of 27 persons was recorded as 162 cm. If the height of Shreya was deleted from the observation, the average height reduced by 1 cm. What was Shreya's height?

- (a) 184 cm.
(b) 226 cm.
(c) 179 cm.
(d) 186 cm.
(e) None of these

Q23.

The average of the 9 consecutive positive integers is 63. The product of the largest and smallest integer is

- (a) 3935
(b) 3953
(c) 3853
(d) 3835
(e) 3635

Q24.

The present age of Romila is one fourth of that of her father. After 6 years the father's age will be twice the age of Kapil. If Kapil celebrated fifth birth day 8 years ago, What is Romila's present age ?

- (a) 7 years
(b) 7.5 years
(c) 8 years
(d) 8.5 years
(e) None of these

Q25.

The average height of 16 students is 142 cm. If the height of the teacher is included, the average height increases by 1 cm. The height of the teacher is

- (a) 156 cm
(b) 159 cm
(c) 158 cm
(d) 157 cm
(e) 159.5 cm

Q26.

There are three positive numbers, $\frac{1}{3}$ of average of all the three numbers is 8 less than the value of the highest number. Average of the lowest and the second lowest number is 8. Which is the highest number ?

- (a) 11
(b) 14

- (c) 10
(d) 9
(e) 13

Q27.

X's age 3 years ago was three times the present age of Y. At present, Z's age is twice the age of Y. Also Z is 12 years younger than X. What is the present age of Z ?

- (a) 15 years
(b) 24 years
(c) 12 years
(d) 6 years
(e) 18 years

Q28.

Average score of a class of 50 students, in an exam is 34. Average score of the students who have passed is 52 and the average score of students who have failed is 16. How many students have failed in the exam ?

- (a) 25
(b) 20
(c) 15
(d) 18
(e) 30

Q29.

The average speed of a car is $\frac{5}{7}$ th of that of a bus. The bus covers 750 km. in 10 hours. How much distance (in km) will the car cover in 7 hours ?

- (a) 375
(b) 285
(c) 365
(d) 295
(e) None of these

Q30.

The average of the age of Sumit, Krishna and Rishabh is 43 years and the average of the age of Sumit, Rishabh and Rohit is 49 years. If Rohit is 54 years old, what is Krishna's age?

- (a) 45 years
(b) 24 years
(c) 36 years
(d) Cannot be determined
(e) None of these

Q31.

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

Q32.

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 probably weights of Arun?

- (a) 69 kg
(b) 67 kg
(c) 68 kg
(d) Data inadequate
(e) None of these

Q33.

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

- (a) 53.8 kg
(b) 52.4 kg
(c) 53.2 kg
(d) Data inadequate
(e) None of these

Q34.

The difference between the present age of Arun and Deepak is 14 years. Seven years ago the ratio of their ages was 5:7 respectively. What is Deepak's present age?

- (a) 49 years
(b) 42 years
(c) 63 years
(d) 35 years
(e) None of these

Q35.

The average age of 80 girls was 20 years, the average age of 20 of them was 22 years and that of another 20 was 24 years. Find the average age of the remaining girls.

- (a) 17 years
(b) 19 years
(c) 21 years
(d) 15 years
(e) None of these

Q36.

In a Zumba class, the average age of all the members was 43.5 years, 10 members left the class and 6 new

members joined. If the average age increased by 2 years and the total age decreased by 110, what was the number of members in the class initially?

- (a) 34
(b) 36
(c) 32
(d) 40
(e) 30

Q37.

The number of heat wave days in the Indian sub continent in 1995 was 29 and deaths due to heat wave were 406. What was the average of deaths per heat wave day in 1995?

- (a) 12
(b) 13
(c) 14
(d) 15
(e) None of these

Q38.

The age of Jaya 10 years ago is equal to Simaran's present age. The sum of Jaya's age 8 years hence from today and Simaran's age 12 years ago is 90 years. What was the age of Komal 13 years ago from now if Komal is 9 years younger than Simaran ?

- (a) 42 years
(b) 33 years
(c) 20 years
(d) 22 years
(e) None of these

Q39.

- | | | | | | |
|------|------|------|------|------|------|
| 1 e | 2 d | 3 e | 4 d | 5 b | 6 b |
| 7 b | 8 a | 9 a | 10 b | 11 e | 12 d |
| 13 a | 14 b | 15 b | 16 b | 17 c | 18 e |
| 19 d | 20 a | 21 e | 22 e | 23 b | 24 b |
| 25 b | 26 a | 27 e | 28 a | 29 a | 30 e |
| 31 c | 32 d | 33 d | 34 e | 35 a | 36 b |
| 37 c | 38 c | 39 c | 40 b | 41 a | |

Detailed explanations

1.(5) According to the question,
Sum of five numbers = $5 \times 3.6.4$
= 1532

\therefore Third number
= $1532 - 2 \times 431 - 2 \times 214.5$
= $1532 - 862 - 429 = 241$

2.(4) Required average
= $(1050 + 1020)/(65 + 50)$
= $2070/115 = \text{Rs. } 18$

3.(5) Third number

There are 14 members in a yoga training centre. Four members of it leave and 6 new members join the centre. As a result, the average age of the members of the centre decreases by 5 years and the sum of all members also decreases by 20 years. What is the new average age of the members ?

- (a) 28 years
(b) 27 years
(c) 25 years
(d) 29 years
(e) None of these

Q40.

The mean temperature of Monday to Wednesday was 37°C and of Tuesday to Thursday was 34°C . If the temperature on Thursday was $\frac{4}{5}$ th that of Monday, then what was the temperature on Thursday?

- (a) 36.5
(b) 36
(c) 35.5
(d) 34
(e) None of these

Q41.

Three years ago the average age of A and B was 18 years. While C joining them now, the average become 22 years. How old is C now?

- (a) 24
(b) 27
(c) 28
(d) 30
(e) None of these

ANSWERS :

$$= 290 - 2 \times 48.5 - 2 \times 53.5$$

$$= 290 - 97 - 107 = 86$$

4.(4) Actual weight of 53 girls
= $53 \times 58 + 45 - 65$

$$= 3074 + 45 - 65 = 3054 \text{ kg}$$

\therefore Required actual average weight
= $3054/53 = 57.62 \text{ kg}$.

Or

$$\text{Decrease in weight} = 65 - 45$$

$$= 20 \text{ kg}$$

\therefore Required actual average weight

$$= 3054/53 = 57.62 \text{ kg}$$

Or

$$\text{Decrease in weight} = 65 - 45 = 20 \text{ kg}$$

$$\therefore \text{Required actual average weight}$$

$$= (58 - 20/53) \text{ kg} = 57.62$$

$$\mathbf{5.(2)} \text{ Difference of marks}$$

$$= 72 + 61 - 48 - 65 = 20$$

$$\therefore \text{Correct average marks}$$

$$= 68 + 20/20 = 69$$

$$\mathbf{6.(2)} \text{ Total age of 5 member family} = 24 \times 5 = 120 \text{ years}$$

$$\text{Total age 8 years ago}$$

$$= 120 - 5 \times 8 = 80 \text{ years}$$

$$\therefore \text{Required average age}$$

$$= 80/5 = 16 \text{ years}$$

$$\mathbf{7.(2)} \text{ The third number.}$$

$$= 5 \times 65 - 2 \times 81 - 2 \times 38$$

$$= 325 - 162 - 76 = 87$$

$$\mathbf{8.(1)} \text{ According to question.}$$

$$P + C + M = 120 + C$$

$$P + M = 120$$

$$\text{Average} = 120/2 = 60$$

$$\mathbf{9.(1)} \text{ (Tricky Approach)}$$

Let the required average be x years

$$\text{then } 80 \times 15 = 15 \times 16 + 25 \times 14 + 40 \times x$$

$$= 40x = 1200 - 240 - 350 = 610$$

$$\therefore x = 610/40 = 15.25 \text{ years}$$

$$\mathbf{10.(2)} \text{ Age of the fourth boy}$$

$$= (26 \times 7 - 3 \times 19 - 3 \times 32) \text{ years}$$

$$= (182 - 57 - 96) \text{ years}$$

$$= 29 \text{ years}$$

$$\mathbf{11.(5)} \text{ (Tricky approach)}$$

Let Present age of Ram's son = x years

$$\therefore \text{Ram's present age} = 3x \text{ years}$$

Ram's father's present age

$$= 15/2 \text{ years}$$

$$\therefore x + 3x + 15x/2 = 46 \times 3$$

$$= 23x = 46 \times 3 \times 2$$

$$= x = 12$$

$$\therefore \text{Required difference}$$

$$= 15x/2 \text{ years}$$

$$\therefore x + 3x + 15x/2 = 46 \times 3$$

$$= 23x = 46 \times 3 \times 2$$

$$= x = 12$$

$$\therefore \text{Required difference}$$

$$= 15x/2 - x = 13x/2$$

$$= (13 \times 12)/2$$

$$= 78 \text{ years}$$

$$\mathbf{12.(4)} \text{ Fifth number}$$

$$= 5 \times 56 - 4 \times 54$$

$$= 280 - 216 = 64$$

$$\mathbf{13.(1)} \text{ Actual weight of all the students}$$

$$= 36 \times 45 - 34 + 32 - 40 + 45$$

$$= 1620 + 3 = 1623 \text{ kg}$$

$$\therefore \text{Actual average weight}$$

$$= 1623/45 = 36.07 \text{ kg.}$$

$$\mathbf{14.(2)} \text{ Let Seema's son's present age}$$

$$= x \text{ years}$$

$$\therefore \text{Seema's present age.}$$

$$= 4x \text{ years}$$

$$\therefore \text{Seema's father's present age}$$

$$= 4x \times 7/4 = 7x \text{ years}$$

$$\text{Now } x + 4x + 7x = 32 \times 3$$

$$= 12x = 96$$

$$x = 96/12 = 8$$

$$\therefore \text{Required difference}$$

$$= 7x - x = 6x$$

$$= 6 \times 8 = 48 \text{ years}$$

$$\mathbf{15.(2)} \text{ Mean of set A} = 376/8 = 47$$

The lowest number off second set

$$= 47 + 15 = 62$$

$$\therefore \text{Required sum} = 62 + 63 + 64 + 65 + 66 = 320$$

$$\mathbf{16.(2)} \text{ Ajay's score} = 63 + 30 = 93$$

$$\therefore \text{Rahul's score} = 93 - 15 = 78$$

$$\therefore \text{Sum of Manish's and Suresh's scores}$$

$$= 3 \times 63 - 78 = 189 - 78 = 111$$

$$\mathbf{17.(3)} \text{ Average of 8 consecutive odd numbers} = 656/8$$

$$= 82$$

$$\therefore \text{Fourth number} = 82 - 1 = 81$$

$$\therefore \text{First number} = 75$$

$$\text{Average of 4 even numbers} = 87$$

$$\therefore \text{Second even number}$$

$$= 87 - 1 = 86$$

$$\text{Second largest even number} = 88$$

$$\therefore \text{Required sum} = 75 + 88 = 163$$

$$\mathbf{18.(5)} \text{ Difference} = 48 + 59 + 67 - 44 - 45 - 61 = 24$$

$$\therefore \text{Correct average}$$

$$= 56 + 24/24 = 57$$

$$\mathbf{19.(4)} \text{ Let the number of males be } x,$$

$$\therefore 18 = (x \times 20 + 240)/(x + 15)$$

$$= 18x + 270 = 20x + 240$$

$$= 20x - 18 = 270 - 240$$

$$= 2x = 30$$

$$x = 30/2 = 15$$

$$\mathbf{20.(1)} P + Q = R + 25 \dots\dots (i)$$

$$Q = R + 5 \dots\dots\dots (ii)$$

Subtracting equation (ii) from equation (i)

$$P + Q - Q = R + 25 - R - 5$$

$$P = 20 \text{ years}$$

$$\mathbf{21.(5)} x + x + 2 + x + 4 + x + 6$$

$$= 4 \times 51$$

$$= 4x + 12 = 204$$

$$= 4x = 204 - 12 = 192$$

$$x = 192/4 = 48 = P$$

$$\therefore R = 48 + 4 = 52$$

$$\therefore P \times R = 48 \times 52 = 2496$$

$$\mathbf{22.(5)} \text{ [Tricky approach]}$$

Height of shreyas

$$= 162 + 26 = 188 \text{ cm}$$

$$\mathbf{23.(2)} \text{ Average of 9 consecutive positive integers} = 63$$

$$\therefore \text{Fifth number} = 63$$

$$\therefore \text{Smallest number} = 59$$

$$\text{Largest number} = 67$$

$$\therefore \text{Required product}$$

$$= 59 \times 67 = 3953$$

$$\mathbf{24.(2)} \text{ Kapil's present age} = 12 \text{ years}$$

$$\text{After 6 year's Kapil's age} = 18 \text{ years}$$

$$\therefore \text{Father's present age} = 36 - 3$$

= 30 years

∴ Romila's present age

= $\frac{1}{4} \times 30 = 7.5$ years

25.(2) [Tricky approach]

Height of teacher

= $(142 + 17)$ cm

= 159

26.(1) Let the numbers be:

$a < b < c$

According to the question,

$(a + b + c)/(3 \times 3) = c - 8$

= $a + b + c = 9c - 72$ (i)

Again, $a + b = 16$

∴ $16 + c = 9c - 72$

= $9c - c = 72 + 16$

= $8c = 88$

= $c = 11$

27.(5) Y's present age = y year (let)

∴ X's present age = $(3y + 3)$ years

∴ Z's present age = $2y$ years

According to the question,

$3y + 3 - 2y = 12$

$y + 3 = 12$

= $y = 12 - 3 = 9$ years

∴ Z's present age = $2y$

= 2×9

= 18 years

28.(1) Number of failure in the exam = x (let)

∴ Number of successful students = $50 - x$

According to the question,

$52(50 - x) + 16x = 50 \times 34$

= $2600 - 52x + 16x = 1700$

= $2600 - 36x = 1700$

$36x = 2600 - 1700 = 900$

$x = 900/36 = 25$

29.(1) Average speed of bus

= Total distance / total time

= $750 / 10 = 75$ kmph

∴ Speed of car = $5/7 \times 75 =$

$375/7$ kmph

∴ Distance covered by car in 7 hours

= Speed \times Time

= $375/7 \times 7 = 375$ km

30.(3) (Sumit + Krishna + Rishabh)'s age

= $43 \times 3 = 129$ years (i)

(Sumit + Rishabh + Rohit)'s age

= $3 \times 48 = 147$ years (ii)

By equation (i) - (ii), we have

Krishna's age = Rohit's age

= $129 - 147 = -18$

= Krishna's age = $54 - 18$

= 36 years

31.(5) Let the three numbers be x,y and z,

then $(x + y)/2 - (y + z)/2 = 15$

= $(x + y - y - z)/2$

= 15

= $x - z = 30$

32.(4) Arun's opinion : $65 < W < 72$

Brother's opinion:

$60 < W < 70$

Mother's opinion:

$W \leq 68$ or $W \geq 68$

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

Obviously, this can't be determined as we don't know the weight of H.

34.(5) Seven years ago, let Arun's and Deepak's age be $5x$ and $7x$ years respectively.

∴ Arun's present age

= $(5x + 7)$ Years

Deepak's present age

= $(7x + 7)$ Years

According to the question,

$7x + 7 - 5x - 7 = 14$

= $2x = 14$

$x = 14/2 = 7$

∴ Deepak's present age = $7x + 7$

= $7 \times 7 + 7 = 56$ years

35.(1) Total age of remaining 40 girls

= $(80 \times 20 - 20 \times 22 - 20 \times 24)$ years

= $(1600 - 440 - 480)$ years

= 680 years

∴ Required average age

= $680/40 = 17$ years

36.(2) Original number of members in the class = x (let)

Total age of these members = $43.5x$ years

Total age of $(x - 4)$ members

= $(43.5x - 110)$ years

According to the question,

$43.5x - 110 = (x - 4) \times 45.5$

= $43.5x - 110 = 45.5x - 182$

= $45.5x - 43.5x = 182 - 110$

= $2x = 72$

= $x = 72/2 = 36$





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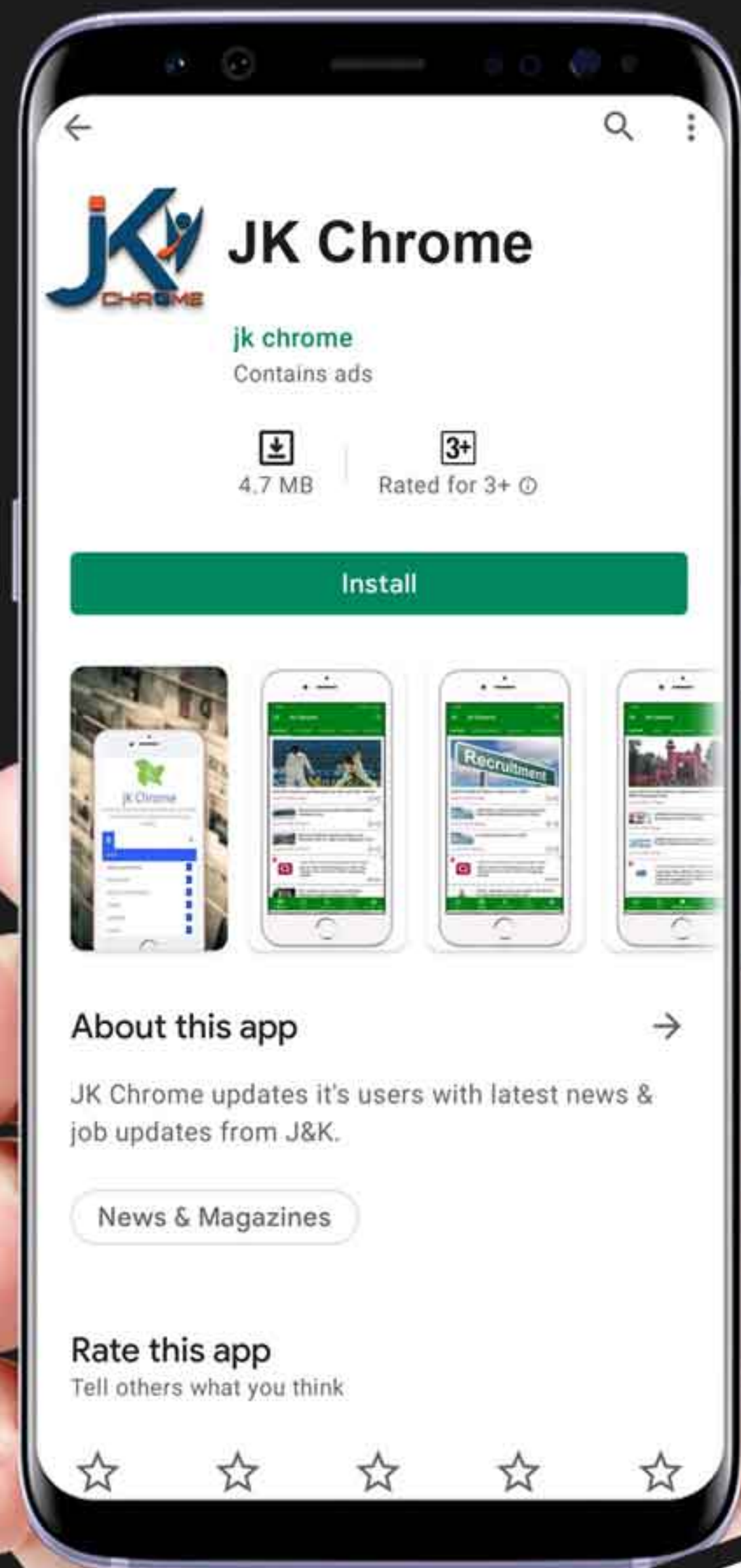
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