

Averages Problem
Day - 2

$$\text{Avg} = \frac{\text{Sum}}{\text{number}}$$

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06/02/2026

1) The average of 20 numbers is 25. If two numbers 35 and 45 are removed, what will be the new average?

$$A + B + \dots = 25$$

$$A = 35 \quad \text{Total} = 500$$

$$B = 45 \quad 500 - 80 = 420$$

$$\text{New Total} = 420 - 2 \cancel{45} = 385$$

$$\boxed{\text{New Avg.} = 23.3}$$

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$$\begin{array}{r} 25 \\ 20 \\ \hline 00 \\ 50 \times \\ \hline 80 \\ 80 \\ \hline 0 \\ 10 \\ 8 \\ 8 \\ \hline 2 \\ 34 \\ 30 \\ 40 \\ \hline 10 \\ 8 \\ 8 \\ \hline 45 \\ 385 \end{array} \quad \begin{array}{l} A+B=70 \\ 10 = 50 \\ 11 = 55 \\ 15 = 45 \\ 17 = 20 \\ 18 = 25 \\ 19 = 21 \\ 19 = 27 \end{array}$$

2) The average weight of 15 students increases by 2 kg when one new student of weight 60 kg joins. Find the average weight of the original 15 students?

$$1 \text{ to } 15 = \text{increase } 2 \text{ kg.}$$

$$A = 60 \text{ kg}$$

$$\text{Total students weights} = 900$$

$$\text{New Total} = 900 + 30 = 930$$

$$\boxed{\text{Ans} = 62}$$

New Solutions:

$$\text{Original total weight} = 15A$$

$$\text{New Average} = A + 2$$

$$\text{New total weight (16 students)} = 16(A + 2)$$

$$\text{New total} = \text{Old total} + \text{new student's weight}$$

$$16(A + 2) = 15A + 60$$

$$16A + 32 = 15A + 60$$

$$A = 60 - 32$$

$$A = 28$$

$$\boxed{\text{Ans} = 28 \text{ kg}}$$

$$\begin{array}{r} 60 \times 15 = \\ 15 \\ 300 \\ 60 \times \\ \hline 900 \\ 60 \\ \hline 30 \\ 2 \\ 30 \\ 15 \\ 15 \\ \hline 1 \\ 30 \\ 15 \\ 45 \\ 15 \\ \hline 1 \\ 60 \\ 15 \\ \hline 45 \\ 15 \\ \hline 90 \end{array}$$

4. The average marks of 40 students is 50. When the marks of one student are incorrectly entered as 84 instead of 48, find the correct average?

$$A + \dots ? = 40 \times 50 = 2000$$

$$A = 84$$

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$$= 2000 - 84 \Rightarrow 1916 + 48 = 1964$$

$$\Rightarrow \frac{1964}{48} = 49.1$$

Ans = 49.1

$$\begin{array}{r} 50 \\ 40 \\ \hline 00 \\ 200 \times \\ \hline 200 \\ 196 \\ \hline 48 \\ \hline 1964 \end{array}$$

5. The average salary of 20 workers is 12,000. If the manager's salary is included, the average becomes 12,500. Find the manager's salary?

$$\text{Total} = 20 \times 12000 = 120000$$

$$\text{manager salary} = x$$

$$= 21 \times 12,500 \Rightarrow 26,2500$$

Manager salary.

$$262500 - 120000 = \boxed{142500}$$

$$\begin{array}{r} 12000 \\ 20 \\ \hline 0000 \\ 24000 \times \\ \hline 240000 \end{array}$$

$$\begin{array}{r} 12,500 \\ 21 \\ \hline 12500 \\ 12500 \times \\ \hline 25000 \\ 262500 \\ \hline 240000 \\ \hline 22500 \end{array}$$

3. The average of 11 numbers is 60. The average of the first six is 58, and the average of the last six is 62. Find the 6th number?

$$\text{Total} = 11 \times 60 = 660$$

$$\frac{\text{Total}}{\text{Total}} = 58 \times 6 = 348$$

$$\frac{\text{Total}}{\text{Total}} = 62 \times 6 = 372$$

6th number = 24

6th number = 60

$$\begin{array}{r} 11111111111 \\ \hline 60 \\ 11 \\ \hline 60 \\ 60 \times \\ \hline 660 \\ 660 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 372 \cdot 348 \\ \hline 348 \\ 720 \\ \hline 660 \\ 660 \\ \hline 0 \\ 372 \\ \hline 348 \\ 24 \end{array}$$

8.) The average age of 30 students is 12 years. If the teacher's age is also included, the average increases by 1 year. Find the teacher's age?

$$\text{Total} = 30 \times 12 = 360$$

$$\checkmark \quad \text{Teacher's age} + \text{avg} = 12 + 1 = 13$$

$$\Rightarrow \cancel{30 \times 13 = 390} \quad \text{Total people} = 31$$

$$\boxed{\text{Teacher age} = 43}$$

$$\begin{aligned} \text{New Average} &= 12 + 1 = 13 \text{ years} \\ \text{Total age including teacher.} & \\ &= 31 \times 13 = 403 \end{aligned}$$

$$\begin{array}{r} 30 \\ 12 \\ \hline 60 \\ 30 \times \\ \hline 360 \\ \cancel{360} \\ \hline 13 \\ 90 \\ 30 \times \\ \hline 390 \\ 360 \\ \hline 30 \end{array}$$

10.) The average runs scored by a batsman in 20 innings is 42. How many runs should he score in the next innings to increase his average by 2?

$$\rightarrow \text{current average} = 42 \text{ over 20 innings}$$

$$\text{Total runs} = 20 \times 42 = 840$$

$$\text{New Average needed} = 42 + 2 = 44 \text{ over 21 innings.}$$

$$\begin{array}{r} 42 \\ \cancel{20} \\ \hline 00 \\ 84 \times \\ \hline 840 \end{array}$$

$$\text{Total runs needed} = 21 \times 44 = 924$$

$$\text{Runs to score in next innings}$$

$$\Rightarrow 924 - 840 = 84$$

$$\begin{array}{r} 44 \\ \cancel{21} \\ \hline 12 \\ 924 \\ \hline 144 \\ 840 \\ \hline 84 \\ \hline 924 \end{array}$$

6.) The average of 10 consecutive odd numbers is 35.

Find the largest number?

$$\begin{array}{ccccccc} 35 & 37 & 39 & 41 & 43 & 45 & 47 \\ \cancel{35} & \cancel{37} & \cancel{39} & \cancel{41} & \cancel{43} & \cancel{45} & \cancel{47} \\ \hline 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{array}$$

$$1 \text{ to } 10 = 35$$

Shortcut:

$$\text{largest} = \text{Average} + (n-1)$$

$$\begin{array}{ccccccc} 35 & 37 & 39 & 41 & 43 & 45 & 47 \\ \cancel{35} & \cancel{37} & \cancel{39} & \cancel{41} & \cancel{43} & \cancel{45} & \cancel{47} \\ \hline 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{array}$$

$$\begin{array}{r} 35 \\ 9 \\ \hline 4 \end{array}$$

$$= 35 + (10-1) \Rightarrow 35 + 9 = 44$$

another solution: \downarrow
10 consecutive odd numbers \Rightarrow difference = 2

$$35 - 9 = 26, \quad 35 - 7 = 28, \quad 35 - 5 = 30, \quad 35 - 3 = 32, \quad 35 - 2 = 33, \quad 35 - 1 = 34, \quad 35 + 1 = 36, \quad 35 + 3 = 38, \quad 35 + 5 = 40, \quad 35 + 7 = 42$$

$$\begin{array}{r} 26 \\ 28 \\ 30 \\ 32 \\ 33 \\ 34 \\ 36 \\ 38 \\ 40 \\ 42 \\ \hline 26 \end{array}$$

$$26, 28, 30, 32, 33, 34, 36, 38, 40, 42 \quad \boxed{44}$$

$$\boxed{\text{Ans} = 44}$$

7) A man's average expenditure for the first 4 months is ₹500, for the next 3 months is ₹800. & for the last 5 months is ₹3000. If he saves ₹5,200 in the year find his annual income?

$$1 \text{ to } 4 \text{ months} = 2500 \times 4 = 10,000$$

$$\begin{array}{r} 2 \\ 2500 \\ \hline 10000 \end{array}$$

$$4 \text{ to } 7 = 2800 \times 3 = 8,400$$

$$\begin{array}{r} 2 \\ 2800 \\ \hline 8400 \end{array}$$

$$7 \text{ to } 12 = 3000 \times 5 = 15,000$$

$$\begin{array}{r} 3000 \\ \hline 15000 \end{array}$$

$$\text{Per year Saving} = 5,200$$



$$\text{Total 12 months} = 33,400$$

$$\begin{array}{r} 33400 \\ - 5200 \\ \hline 38200 \end{array}$$

$$\text{New Total} = 33,400 + \text{Saving}$$

$$= 33,400 + 5200 \Rightarrow 38,600$$

$$\boxed{\text{Ans} = 38,600}$$

$$\begin{array}{r} 5200 \\ \hline 10400 \\ 5200 \\ \hline 56200 \end{array}$$

9) The average of five consecutive odd numbers is 45.

Find the smallest number?

$$A + B + C + D + E = 45$$

~~$$45 - 25 - 45 - 33 - 45 - 1 - 45 + 1 - 45 + 3$$~~

$$45 - 4 \quad 45 - 2 \quad 45 \cancel{+} \quad 45 + 2 \quad 45 + 4$$

$$41, 43, 45, 47, 49$$

$$\boxed{\text{Ans} = 41}$$



Shortcut:

$$\text{Smallest} = \text{Average} - 4$$

$$= 45 - 4$$

$$= 41 \checkmark$$

Simple example :-

Average - From - Scratch

Numbers : 2, 4, 6

$$\text{Sum} = 12$$

$$\text{Count} = 3$$

$$\text{Avg} = \frac{12}{3} = 4$$

Reverse Formula :-

$$\text{Sum} = \text{Average} \times \text{Number of observations}$$

→ If avg of 5 numbers is 10

$$\text{Sum} = 5 \times 10 = 50$$

Types of Average Questions :-

1. Simple Average

Eg :- Average of 4 numbers is 20. Find sum?

$$\text{Sum} = 4 \times 20 = 80$$

$$\begin{array}{r} 20 \\ \times 4 \\ \hline 80 \end{array}$$

2. Average After Adding / Removing a Number?

Formula :

$$\text{New Avg} = \frac{\text{Old sum} + \text{Number}}{\text{New Count}}$$

Eg :- Average of 5 numbers is 10. If one number 20 is added, find new average?

$$A + B + C + D + E = 10 \times 5 = 50$$

$$F = 20 + 50 = 70$$

$$\text{New Total} = 70$$

$$\text{New average} = \frac{70}{6} = 11.6$$

$$\boxed{\text{Ans} = 11.6}$$

3.) Average when one number is Replaced \leftrightarrow

Shortcut formula :-

$$\text{New Avg} = \text{Old Avg} + \frac{\text{New Value} - \text{Old value}}{n}$$

Eg: Average of 6 numbers is 12. One number 18 is replaced by

Ans.

$$A+B+C+D+E+F = 12 \times 6 = 72$$

$$\begin{aligned} A &= 18 \\ \text{New Avg} &= \text{Total} - A = 72 - 18 = 54 + 18 = \\ &= \frac{13}{61} \quad \text{New Avg} = \frac{13}{61} = 13 \end{aligned}$$

$$\begin{array}{r} 6 \ 12 \\ 1 \ 2 \\ + 18 \\ \hline 54 \\ 24 \\ \hline 78 \end{array}$$

$$\boxed{\text{Ans} = 13}$$

$$\begin{array}{r} 12 \\ + 6 \\ \hline 18 \\ 12 \\ \hline 6 \end{array}$$

$$\text{Difference} = 24$$

4.) Average of Consecutive Numbers?

Formula : $\text{Average} = \frac{\text{First} + \text{Last}}{2}$

Eg: Average of numbers from 11 to 19?

$$\Rightarrow \frac{11 + 19}{2} = \frac{30}{2} = 15$$

5.) Average Speed? ~~☆☆☆~~

Formula:-

$$\text{Average Speed} = \frac{xy}{x+y}$$

Eg: Speed is 30 km/hr going, 60 km/hr coming back?

$$\Rightarrow \frac{2 \times 30 \times 60}{30+60} \quad \text{Ans} = \frac{60 \times 60}{90}$$

$$\Rightarrow \frac{3600}{90} = 40 \text{ km/hr}$$

$$\begin{array}{r} 60 \\ 60 \\ \hline 00 \\ 30 \\ \hline 360 \\ 360 \\ \hline 00 \\ 90 \end{array}$$

6.) Combined Average

Formula :

$$CA = \frac{n_1 a_1 + n_2 a_2}{n_1 + n_2}$$

Eg:

10 students avg = 40

20 students avg = 50

$$CA = \frac{10 \times 40 + 20 \times 50}{10 + 20} = \frac{400 + 1000}{30}$$

$$\begin{array}{r} 10 \\ 40 \\ \hline 00 \\ 40 \times \\ \hline 400 \end{array}$$

$$\begin{array}{r} 50 \\ 20 \\ \hline 00 \\ 100 \times \\ \hline 000 \end{array}$$

$$= \frac{466.7}{30} = 46.67$$

Combined Average = 46.67

Level - Practice :-

Q1.) Average of 5 numbers is 18\$. If one number is 28,
find average of remaining 4?

$$\text{Total} = 5 \times 18 = 90$$

$$A = 28$$

$$\text{New Total} = 90 - 28 = 62$$

$$\begin{array}{r} 15.5 \\ 62 \cancel{2} 20 \\ \hline 4, \end{array} \quad \begin{array}{r} 18 \\ 5 \\ \hline 8900 \\ 28 \\ \hline 62 \end{array}$$

New Avg = 15.5



Q2.) Average age of 6 people is 24. One person aged 30 leaves. Find new average?

$$A + B + C + D + E + F = 24 \times 6 = 144$$

$$\text{New Total} = 144 - 30 = 114$$

~~New Avg = 22.8~~

~~New Avg = 22.8~~

$$\begin{array}{r} \text{remaining people} = 5 \\ 22.8 \\ \hline 112 \\ 144 - 30 \\ \hline 84 \\ 8, \end{array}$$

$$\begin{array}{r} 3/9 \\ 4/12 \\ 5/15 \\ 6/18 \\ 7/21 \\ 8/24 \\ \hline 24 \\ 6 \\ \hline 144 \\ 30 \\ \hline 114 \\ 38. \end{array}$$

Q3) Find average of first 20 natural numbers?

$$= \frac{1^{\text{st}} + 2^{\text{nd}}}{2} = \frac{1 + 20}{2} = \frac{21}{2} = 10\cancel{.5}$$

$$\boxed{\text{Avg} = 10.5}$$

$$\checkmark \quad \frac{10.5}{2} = 10.5$$

Practice - 2

Q1) The average of 7 numbers is 24. If one number is 30, what is the average of the remaining numbers? (Basic but tricky)

$$A + B + C + D + E + F + G = 24 \times 7 = 168$$

$$A = 30$$

$$\begin{aligned}\text{New Total} &= \text{Old Total} - 30 \\ &= 168 - 30\end{aligned}$$

$$\text{New Total} = 138$$

$$\boxed{\text{New Avg} = 23}$$

$$\begin{array}{r} 24 \\ 7 \\ \hline 168 \end{array} \quad \begin{array}{r} 14 \\ 7 \\ \hline 21 \\ 21 \\ \hline 0 \end{array}$$

$$\begin{array}{r} 168 \\ 30 \\ \hline 138 \end{array} \quad \begin{array}{r} 23 \\ 6 \\ \hline 18 \end{array}$$

Q2) The average of 10 numbers is 20. One number 35 is replaced by 25. (Replacement type)

$$A \times 10 = 20 \times 10 = 200$$

$$A = 35$$

$$\text{New Total} = 200 - 35 = 165 + 25 = 190$$

$$\text{New Avg} = \frac{190}{10} = 19$$

$$\boxed{\text{Ans} = 19}$$

$$\begin{array}{r} 200 \\ 35 \\ \hline 165 \\ 25 \\ \hline 190 \end{array}$$

Q3) The average of 5 numbers is 18. If another number is added, the average becomes 20. Find the added number? (Add a number)

$$A + B + C + D + E = 18 \times 5 = 90$$

$$x + 90 \Rightarrow \text{avg} = 20$$

$$6 \times 20 = 120$$

$$\Rightarrow 120 - 90 = 30 \quad \checkmark$$

$$\begin{array}{r} 18 \\ 5 \\ \hline 90 \\ 20 \\ \hline 120 \end{array}$$

$$6 \times 20 = 120$$

$$\begin{array}{r} 120 \\ 90 \\ \hline 30 \end{array}$$

Q4) Find the average of all multiples of 5 from 5 to 100?

(Consecutive numbers)

first = 5 Last = 100

$$\Rightarrow \frac{F+L}{2} = \frac{5+100}{2} = \frac{105}{2} = 52.5$$

$$\boxed{\text{Ans} = 52.5}$$



Q5.) (combined average →)

The average marks of 12 students is 65.

The average marks of another 8 students is 75.

Find the average marks of all 20 students?

$$A - - ? = 12 \times 65 = 780$$

$$B - - ? = 8 \times 75 = 600$$

$$\Rightarrow 780 + 600 = 1380$$

$$\boxed{\text{Ans} = 69}$$



$$\begin{array}{r} 1 \\ 65 \\ 12 \\ \hline 130 \\ 65 \times \\ \hline 780 \\ 1380 - \\ \hline 69 \end{array} \quad \begin{array}{r} 4 \\ 75 \\ 8 \\ \hline 600 \\ 780 \\ 600 \\ \hline 70 \end{array} \quad \begin{array}{r} 49 \\ 7 \\ 6 \\ 7 \\ \hline 70 \end{array}$$

Q6.) The average age of 4 persons is 30 years. $\underline{1380}$

After 5 years, what will be their average age?

(Average age logic)

$$A+B+C+D = 30 \times 4 = 120$$

$$\begin{array}{rcl} +5 & = 30 + 5 \times 4 \Rightarrow 35 \times 4 = 140 \\ = \frac{1380 + 32.5}{4} & = 32.5 & \times \end{array}$$

Solutions here :-

$$\boxed{\text{Ans} = 32.5}$$

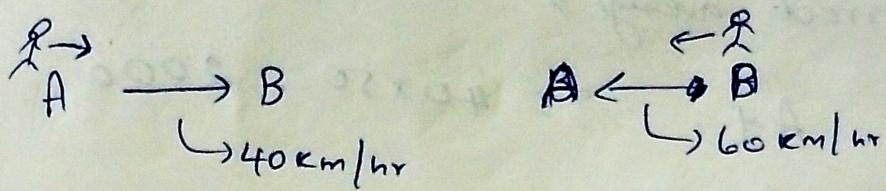
After 5 years,

Average + 5

$$\text{New Average} = 30 + 5 = 35$$

$$\boxed{\text{Ans} = 35}$$

Q7) A man travels from A to B at 40 km/hr & returns at 60 km/hr.
Find his average speed for the whole journey?



Formula:-

$$\frac{2xy}{x+y} \Rightarrow \frac{2 \times 40 \times 60}{40+60} = \frac{4800}{100} = 48$$

$$\begin{array}{r}
 60 \\
 40 \\
 \hline
 00 \\
 240x \\
 \hline
 2400 \\
 2400 \\
 \hline
 4800
 \end{array}$$

$\text{Ans} = 48 \text{ km/hr}$



Q8) The average weight of 6 boys is 50 kg. When one boy leaves, the average becomes 48 kg. Find the weight of the boy who left?

$$A + \dots ? = 50 \times 6 = 300$$

$$\begin{array}{r}
 210 \\
 800 \\
 \hline
 240 \\
 \hline
 60
 \end{array}$$

$$A = \text{leave.} = 48 \times 5 = 240$$

$\text{Ans} = 60$



$$\begin{array}{c}
 1 \\
 \hline
 8
 \end{array}$$

Net bad.