AVERAGE- TRICKS & TIPS

What is Average?

Average of n values is equal to the sum of n values divided by the total number of values (n)

$$\text{Averages} = \frac{Sum\ of\ observation}{Number\ of\ observation}$$

$$\text{Average} = \frac{Sum}{n}$$

Formulae

Numbers	Sum	Average= Sum/n
First n natural numbers	$\dfrac{n(n+1)}{2}$	$\dfrac{(n+1)}{2}$
First n odd numbers	n^2	n
First n even numbers	$n(n+1)$	$(n+1)$
First n natural numbers square	$\dfrac{n(n+1)(2n+1)}{6}$	$\dfrac{(n+1)(2n+1)}{6}$
Consecutive numbers or Numbers in A.P	$\dfrac{n(First\ term + Last\ term)}{2}$	$\dfrac{(First\ term + Last\ term)}{2}$

Some properties of Average:

If we have N number of observation as a1, a2, a3, a4 …………aN and their average is A, then

1. If we add or subtract the same value (suppose x) from all the observations then average will be directly added or subtracted by x.

2. If we multiply or divide each observation by a same value (Suppose x), then average also multiplied or divided by the same value x.

If terms are in A.P or consecutives

1. If the terms are consecutives or are in A.P then average is always the middle term of the sequence if the number of observations are odd.

2. If number of observations are even then average is the average of two middle numbers.

Question : Find the average weight of 5 boys having weights 30kg, 40kg, 50kg, 60kg, 70kg?

(a) 50 kg

(b) 40 kg

(c) 45 kg

(d) 55 kg

Question : Find the average of 50, 52, 54, 56, ...150

(a) 80

(b) 90

(c) 100

(d) 110

Question : Find the average of all even numbers up to 100.

(a) 50

(b) 51

(c) 52

(d) 55

Question : Find the average of 1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21

(a) 11

(b) 9

(c) 13

(d) 15

Question : Find the average of 13, 16, 19, 22, 25, 28

(a) 22

(b) 19

(c) 19.5

(d) 20.5

Question : If the average of 5 consecutive number is 21. Find the largest number.

(a) 22

(b) 23

(c) 24

(d) 25

Question : Find the average of first 100 natural numbers.

(a) 50

(b) 50.5

(c) 51

(d) 49

Question : Find the average of first 100 whole numbers.

(a) 50

(b) 50.5

(c) 49.5

(d) 49

Question : The average of first 10 even numbers is?

(a) 18

(b) 22

(c) 9

(d) 11

Question : Find the average of 17 multiples of 5?

(a) 50

(b) 85

(c) 45

(d) 60

COMBINED AVERAGE

Class A
0

Class B
100

What is the combined average?
50 marks??
NO

We cannot determine the average without knowing the number of students in each class

The combined average depends on the number of students and the average in each class

$$\text{Combined Average} = \frac{n1w1 + n2w2}{n1 + n2}$$

Question : There are 36 students in a class A whose average weight is 30kg and 24 students in class B whose average is 40kg. What will be the average if the classes are combined?

(a) 35

(b) 34

(c) 36

(d) 32

Question : There are 63 students in a class A whose average weight is 32kg and 21 students in class B whose average is 44kg. What will be the average if the classes are combined??

(a) 33

(b) 35

(c) 36

(d) 38

Question : In a class there are 20 boys and 40 girls. The average age of boys is 18 years and that of girls is 15 years. What will be the average age of the whole class?

(a) 16.5 Years

(b) 17 years

(c) 16 years

(d) 14.2 Years

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

(a) 100

(b) 110

(c) 120

(d) 150

Question : A man goes from home to his office at speed of 40km/h and return from office to home at a speed of 60Km/h. Find the average speed during whole journey.

(a) 45 Km/h

(b) 48Km/h

(c) 50Km/h

(d) 55Km/h

Equal Distribution of Data

Example: Average of 5 students marks is 30. If one student having 90 mark is added to the team then what will be the new average ?

All the problems in this concept are solved by assuming all the values as average itself.

Step1: Assume all the values to be 30.
$$30\ 30\ 30\ 30\ 30$$

If the new mark is also 30 then the average will remain the same.
$$30\ 30\ 30\ 30\ 30\quad \boxed{30}$$

Step2: Finding the extra values-
But the actual new mark is 90, which means extra 60 is added to the values.
$$30\ 30\ 30\ 30\ 30\quad \boxed{30}$$
+60

90

Step3: Distributing the extra values equally-
The extra 60 should be divided equally among 6 values as 10 each.

$$30 \quad 30 \quad 30 \quad 30 \quad 30 \quad 30$$
$$+10 \quad +10 \quad +10 \quad +10 \quad +10 \quad +10$$
$$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow \quad \downarrow \quad \downarrow$$
$$40 \quad 40 \quad 40 \quad 40 \quad 40 \quad 40$$

$\therefore$ the new average is 40

Question : If the average weight of 10 students in a class is 30Kg, when weight of teacher is also included new average becomes 33. Find weight of teacher.

(a) 63Kg

(b) 54Kg

(c) 66Kg

(d) 70Kg

Question : The average weight of a class of 24 students is 30Kg when weight of the teacher is also included the average weight is increases by 1Kg.What is the weight of teacher in kg?

(a) 60Kg

(b) 61Kg

(c) 37Kg

(d) 55Kg

Question : The average weight of 8 person increases by 2.5 kg when a new person comes in place of one of them weighing 65 kg. What might be the weight of the new person?

(a) 70Kg

(b) 80Kg

(c) 75Kg

(d) 85Kg

Question : A teacher while calculating the average marks of 30 students of an examination, by mistake enter a student's marks as 68, instead of 86 and obtained the average as 58. Find the actual average.

(a) 59

(b) 60

(c) 58.6

(d) 60.5

Question : A Student's marks were wrongly entered as 83 instead of 63. Due to that the average marks of the class got increased by 2. The number of students in class is?

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(a) 10

(b) 12

(c) 15

(d) 18

Question : The average age of a committee of 12 members is 48 Years. A member of age 62 retired and in place a new person aged 26 joined the committee. Find the new average of the committee.

(a) 44

(b) 45

(c) 46

(d) 47

Question : Average of 5 numbers is 27, if one number is excluded the new average becomes 25. Find the excluded number.

(a) 35

(b) 30

(c) 38

(d) 25

Question : The average of a family is 24 years which is consisting of 5 members, out of which the youngest being 6 years old. What would be the average age of family just before his birth?

(a) 20

(b) 22

(c) 22.5

(d) 23.5

Question : The average age of 10 members in a committee is increased by 3 years when two men whose ages are 25 years and 35 years are replaced by two new men. Find the average age of two new men.

(a) 40

(b) 45

(c) 48

(d) 52

Question : Average of 7 values is 20. If average of first 4 is 15 and that of last 4 is 25. Find the 4th number.

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(a) 20

(b) 25

(c) 30

(d) 40

Question : The average marks of some students is 40 and 10 of them get 60 marks instead of 90 marks by mistake. After correction the new average becomes 50. Find the number of students.

(a) 20

(b) 30

(c) 25

(d) 35

Question : In a hostel there are 30 students and if the number of students increased by 5 then the expense is increased by 40 per day. But the average expenditure diminishes by 3. Find the original expenditure.

(a) 810

(b) 870

(c) 910

(d) 950