

**GS FOUNDATION**  
**BATCH FOR CSE 2023**  
**Ace CSAT 2023-Booklet 11**  
**Averages**

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## 1) MEANING OF AVERAGE OR MEAN

Concept of average is not new to us. (Sachin's average, Kohli's average etc.)

Average is simply sum of all items/units divided by number of units.

For example: Average marks of a class =  $\frac{\text{sum of marks of all students}}{\text{number of students}}$

In general,

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

Also,

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

And,

$$\text{Sum of items} = (\text{Number of items}) \times \text{Average}$$

Q. Find average/mean of following:

1. 23,34,45,65,13
2. 453,33,567
3. 12,12,12,12,12,12

## 2) AVERAGE OF COMBINED GROUP

If average of two groups separately is known and the average of combined group is to be determined:

- If there are m items in group 1 and n in group 2. And averages of two groups is a and b respectively.
- Then, sum of items in group 1 is ma and those in group 2 in nb.
- For the combined group, sum of items =  $ma + nb$  and total number of items is  $m + n$ .
- $\text{Average} = \frac{ma+nb}{m+n}$

Q. Average weight of 30 girls in class is 1500kg and 40 boys in class is 2400kg. Find the average weight of the class.

Q. Average salary of 30 workers is 6000 and average salary of 12 managers is 15000. What's their combined average salary.

## 3) ITEM/PERSON IS REPLACED IN A GROUP

If a group has 'n' items. And we replace one item with another of different value, average will change.

$$\text{New average} = \frac{\text{Old total sum} - \text{value of item left} + \text{value of item which replaced old}}{n}$$

**NOTE:** Old total sum can be found using old average.

**If new average is given and we're to find out value of new item:**

- If the average increases,

$$\text{Value of new item} = \text{Value of old item} + (\text{Increase in average} \times \text{Total number of items})$$

- If the average decreases,

$$\text{Value of new item} = \text{Value of old item} - (\text{Decrease in average} \times \text{Total number of items})$$

Q. If average age of a class is 17. Raju a boy aged 18 leaves class due to transfer of his father. After 3 weeks, Meera, joins the class making the average age 17.5. What is the age of Meera if there were 19 students in class after Raju left.

#### 4) AN ITEM/PERSON JOINS THE GROUP

If a group has 'n' items and another one is added to the group. It'll increase both the total sum and total number of items. Average may get affected.

$$\text{New average} = \frac{\text{Old total sum} + \text{value of new item}}{n + 1}$$

**NOTE:** Old total sum can be found using old average.

**If new average is given and we're to find out value of added item:**

- **If average increases:**

$$\begin{aligned}\text{Value of added item} &= \text{Previous average} + \text{Increase in average} \times (n + 1) \\ \text{Value} &= A + (n + 1)x\end{aligned}$$

Where, A is old average and 'x' is the increase

- **If average decreases:**

$$\begin{aligned}\text{Value of added item} &= \text{Previous average} - \text{Decrease in average} \times (n + 1) \\ \text{Value} &= A - (n + 1)x\end{aligned}$$

#### 5) AN ITEM/PERSON LEAVES THE GROUP

If a group has 'n' items and one of them leaves the group reducing both the total sum and the number of items. It may change the average as well.

$$\text{New Average} = \frac{\text{Old total sum} - \text{value of item left}}{n - 1}$$

**NOTE:** Old total sum can be found using old average

**If new average is given and we're to find out value of item left:**

- **If average increases:**

*Value of item removed = Previous average + Increase in average × (1 – n)*

$$\text{Value} = A + (1 - n)x$$

Where, A is old average and 'x' is the increase

- **If average decreases:**

*Value of item removed = Previous average – Decrease in average × (1 – n)*

$$\text{Value} = A - (1 - n)x$$

## 6) QUESTIONS:

1. If the sum of few numbers is 630 and their mean is 90. If another number 120 is included, what is the new mean?
  - A. 75
  - B. 86.25
  - C. 92.75
  - D. 98.125
2. The average of 9 quantities is 8. The average of 4 of them is 10. What is the average of remaining 5?
  - A. 8
  - B. 6.4
  - C. 6.5
  - D. 6.66
3. The average temperature on 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> September was 37 degrees and the average temperature on 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> September was 38 degrees. If the temperature on 4<sup>th</sup> was 39, what was the temperature on 1<sup>st</sup>?
  - A. 36
  - B. 37
  - C. 38
  - D. 39
4. The average weight of the class was 48 kg for a class of 29 students. If the teacher's weight is included, the average increases by 0.5kg. What is the weight of the teacher?
  - A. 54 kg
  - B. 60 kg
  - C. 63 kg
  - D. 72 kg
5. What is the average of all prime numbers from 10 to 30?

- A. 18.67
- B. 20.33
- C. 21
- D. 24.67

### 7) PYQS

CSE 2022: The average weight of A, B, C is 40 kg, the average weight of B, D, E is 42 kg and the weight of F is equal to that of B. What is the average weight of A, B, C, D, E and F?

- (a) 40.5 kg
- (b) 40.8 kg
- (c) 41 kg
- (d) Cannot be determined as data is inadequate

CSE 2021: There are two Classes A and B having 25 and 30 students respectively. In Class-A the highest score is 21 and lowest score is 17. In Class-B the highest score is 30 and lowest score is 22. Four students are shifted from Class-A to Class-B.

Consider the following statements:

- 1. The average score of Class-B will definitely decrease.
- 2. The average score of Class-A will definitely increase.

Which of the above statements is/are correct?

- (a) 1 only
- (b) 2 only
- (c) Both 1 and 2
- (d) Neither 1 nor 2

CSE 2021: The average age of a teacher and three students is 20 years. If all the three students are of same age and the difference between the age of the teachers and each student is 20 years, then what is the age of the teacher?

- (a) 25 years
- (b) 30 years
- (c) 35 years
- (d) 45 years

CSE 2021: The average score of a batsman after his 50th innings was 46.4. After 60th innings, his average score increases by 2.6. What was his average score in the last ten innings?

- (a) 122
- (b) 91
- (c) 62
- (d) 49

CSE 2021: In a class, there are three groups A, B and C. If one student from group A and two students from group B are shifted to group C, then what happens to the average weight of the students of the class?

- (a) It increases.
- (b) It decreases.
- (c) It remains the same.
- (d) No conclusion can be drawn

CSE 2019: A family has two children along with their parents. The average of the weights of the children and their mother is 50 kg. The average of the weights of the children and their father is 52 kg. If the weight of the father is 60 kg, then what is the weight of the mother?

- (a) 48 kg
- (b) 50 kg
- (c) 52 kg
- (d) 34 kg

CSE 2019: The average marks of 100 students are given to be 40. It was found later that marks of one student were 53 which were misread as 83. The corrected mean marks are

- (a) 39
- (b) 39.7
- (c) 40
- (d) 40

CSE 2017: Suppose the average weight of 9 persons is 50 kg. The average weight of the first 5 persons is 45 kg, whereas the average weight of the last 5 persons is 55 kg. Then the weight of the 5th person will be

- (a) 45 kg
- (b) 47.5 kg
- (c) 50 kg
- (d) 52.5 Kg

CSE 2017: There are thirteen 2-digit consecutive odd numbers. If 39 is the mean of the first Five such numbers, then what is the mean of all the thirteen numbers?

- (a) 47
- (b) 49
- (c) 51
- (d) 45

CSE 2016: The sum of the ages of 5 members comprising a family, 3 years ago was 80 years. The average age of the family today is the same as it was 3 years ago, because of an addition of a baby during the intervening period. How old is the baby?

- (a) 6 months
- (b) 1 year
- (c) 2 years
- (d) 2 years and 6 months

CSE 2016: The average monthly income of a person in a certain family of 5 is Rs. 10,000. What will be the average monthly income of a person in the same family if the income of one person increased by Rs. 1,20,000 per year?

- (a) Rs. 12,000
- (b) Rs. 16,000
- (c) Rs. 20,000
- (d) Rs. 34,000

CSE 2016: The monthly average salary paid to all the employees of a company was Rs. 5000. The monthly average salary paid to male and female employees was Rs. 5200 and Rs. 4200 respectively. Then the percentage of males employed in the company is

- (a) 75%
- (b) 80%
- (c) 85%
- (d) 90%

CSE 2014: The following table shows the marks obtained by two students in different subjects:

Subjects	Student A	Maximum marks	Student B	Maximum marks
English	60	100	80	150
Psychology	70	100	70	100
History	30	100	60	100
Sanskrit	50	50	15	25

The difference in the mean aggregate percentage marks of the students is

- (a) 2.5%
- (b) 13.75%
- (c) 1.25%
- (d) Zero

CSE 2011: A student on her first 3 tests receives an average score of  $N$  points. If she exceeds her previous average score by 20 points on her fourth test, then what is the average score for the first 4 tests?

- (a)  $N + 20$
- (b)  $N + 10$
- (c)  $N + 4$
- (d)  $N + 5$

## 8) COMPREHENSION

Good corporate governance structures encourage companies to provide accountability and control. A fundamental reason why corporate governance has moved onto the economic and political agenda worldwide has been the rapid growth in international capital markets. Effective corporate governance enhance access to external financing by firms, leading to greater investment, higher growth and employment. Investors look to place their funds where the standards of disclosure, of timely and accurate financial reporting, and of equal treatment to all stakeholders are met.

Q. Which of the following statements best reflects the logical inference from the passage given above?

- (a) It is an important agenda of the countries around the world to ensure access to good external financing.
- (b) Good corporate governance improves the credibility of the firms.
- (c) International capital markets ensure that the firms maintain good corporate governance.
- (d) Good corporate governance paves the way for robust supply chains

Elephants are landscape architects, creating clearings in the forest, preventing overgrowth of certain plant species and allowing space for the regeneration of others, which in turn provide sustenance to other herbivorous animals. Elephants eat plants, fruits and seeds, propagating the seeds when they defecate in other places as they travel. Elephant dung provides nourishment to plants and animals and acts as a breeding ground for insects. In times of drought, they access water by digging holes which benefits other wildlife.

Q. Which one of the following statements best reflects the most logical and rational inference that can be drawn from the passage?

- (a) The home range of elephants needs to be a vast area of rich biodiversity.
- (b) Elephants are the keystone species and they benefit the biodiversity.
- (c) Rich biodiversity cannot be maintained in the forests without the presence of elephants.
- (d) Elephants are capable of regenerating forests with species as per their requirement.

The emissions humans put into the atmosphere now will affect the climate in the middle of the century and onwards. Technological change, meanwhile, could make a future transition away from fossil fuels cheap or it might not, leaving the world with a terrible choice between sharply reducing emissions at huge cost or suffering through the effects of unabated warming. Businesses that do not hedge against the threat of uncertain outcomes fail. The world cannot afford such recklessness on climate change.

Q. Which one of the following statements best reflects the crucial message conveyed by the author of the passage?

- (a) Businesses that cause emissions may need to close down or pay for pollution in future.
- (b) The only solution is technological development related to the issues of climate change.
- (c) Waiting to deal with carbon emissions until technology improves is not a wise strategy.
- (d) Since future technological change is uncertain, new industries should be based on renewable energy sources.

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