

CDS-AFCAT 1 2025

SSBCrack
EXAMS

LIVE

MATHS

AVERAGE

CLASS 1



NAVJYOTI SIR



09 Oct 2024 Live Classes Schedule

8:00AM -- 09 OCTOBER 2024 DAILY CURRENT AFFAIRS RUBY MA'AM

9:00AM -- 09 OCTOBER 2024 DAILY DEFENCE UPDATES DIVYANSHU SIR

SSB INTERVIEW LIVE CLASSES

9:30AM -- OVERVIEW ON SRT & SDT ANURADHA MA'AM

NDA 1 2025 LIVE CLASSES

11:30AM -- GK - GEOGRAPHY MCQ CLASS RUBY MA'AM

1:00PM -- BIOLOGY - MCQ - CLASS 2 SHIVANGI MA'AM

4:00PM -- MATHS - TRIGONOMETRY - CLASS 2 NAVJYOTI SIR

5:30PM -- ENGLISH - SYNONYMS - CLASS 1 ANURADHA MA'AM

CDS 1 2025 LIVE CLASSES

11:30AM -- GK - GEOGRAPHY MCQ CLASS RUBY MA'AM

1:00PM -- BIOLOGY - MCQ - CLASS 2 SHIVANGI MA'AM

5:30PM -- ENGLISH - SYNONYMS - CLASS 1 ANURADHA MA'AM

✓ 7:00PM -- MATHS - AVERAGE - CLASS 1 NAVJYOTI SIR

AFCAT 1 2025 LIVE CLASSES

4:00PM -- STATIC GK - INDIAN FESTIVALS & FOLK DANCES DIVYANSHU SIR

5:30PM -- ENGLISH - SYNONYMS - CLASS 1 ANURADHA MA'AM

✓ 7:00PM -- MATHS - AVERAGE - CLASS 1 NAVJYOTI SIR

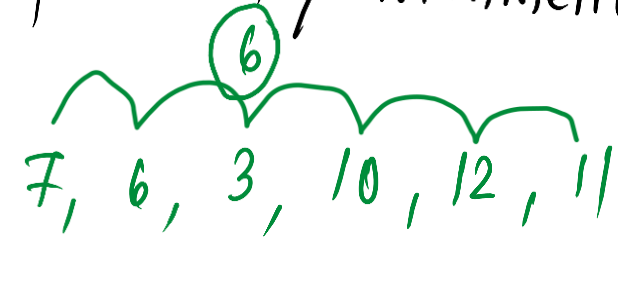


AVERAGE

$$\text{Average} = \frac{\text{sum of all observations}}{\text{Number of observations}}$$

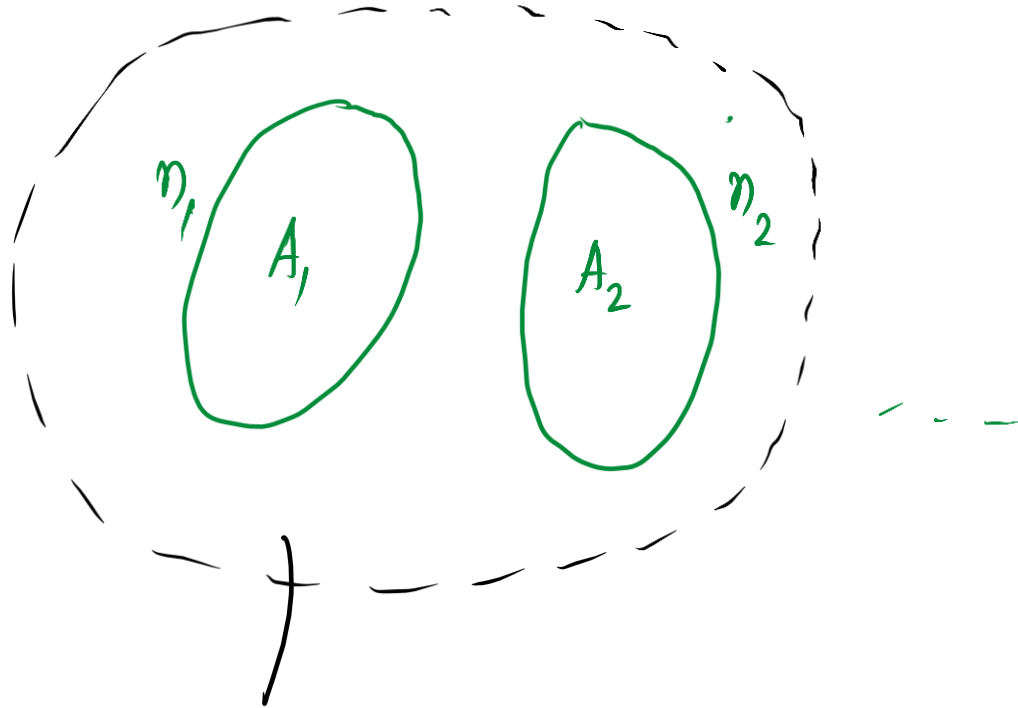
→ Also called Mean / Arithmetic Mean.

Eg - $7, 6, 3, 10, 12, 11$



$$\text{Average} = \frac{7 + 6 + 3 + 10 + 12 + 11}{6}$$

AVERAGE OF GROUP



$A_1, A_2, A_3 \dots A_k$ are averages.
 $n_1, n_2, n_3 \dots n_k$ are number
of observations

$$\text{Overall Average} = \frac{\text{Overall sum}}{\text{Total number of observations}} = \frac{n_1 A_1 + n_2 A_2 + \dots + n_k A_k}{n_1 + n_2 + \dots + n_k}$$

(WEIGHED AVERAGE)

EXAMPLE

Out of 40 boys in a class, average weight of 30 is 60 kg and the average weight of the remaining is 56 kg. The average weight (in kilogram) of the whole class is

- (a) 58.5 (b) 58 (c) 57 (d) 59 ✓

$$\begin{aligned} \frac{30 \times 60 + 10 \times 56}{40} &= \frac{1800 + 560}{40} \\ &= \frac{2360}{40} = \underline{59 \text{ kg}} \end{aligned}$$

EXAMPLE

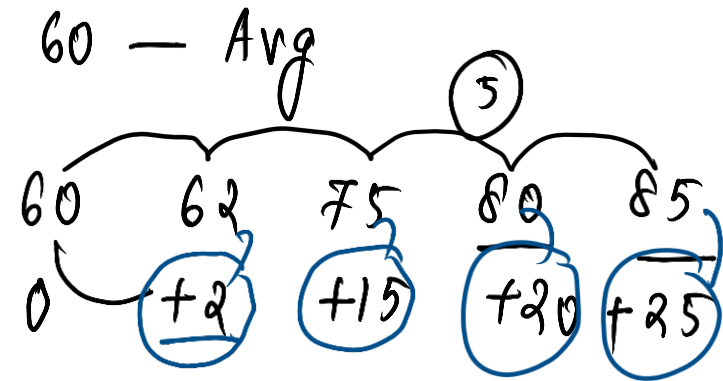
Out of 40 boys in a class, average weight of 30 is 60 kg and the average weight of the remaining is 56 kg. The average weight (in kilogram) of the whole class is

- (a) 58.5 (b) 58 (c) 57 (d) 59

Ans: (d)

CONCEPT OF DEVIATION TO FIND AVERAGE

Find the average of 60, 62, 75, 80 and 85.



$$\text{Mean / Avg.} = 60 + \frac{(2+15+20+25)}{5}$$

$$= 60 + \frac{62}{5} = 60 + 12.4$$

$$= \underline{72.4}$$

$\frac{60}{-15}$	$\frac{62}{-13}$	$\frac{75}{-}$	$\frac{80}{+5}$	$\frac{85}{+10}$
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$$75 + \frac{(-28+15)}{5}$$

$$75 + \frac{(-13)}{5}$$

$$75 - 2.6$$

$$= \underline{72.4}$$

$$\text{Average} = \text{Assumed Average} + \frac{\text{Sum of Deviations}}{\text{Number of observations}}$$

(any one from given observations)

IMPORTANT PROPERTIES

If X is the average of $x_1, x_2, x_3, \dots, x_n$ then

- (a) The average of $x_1 + a, x_2 + a, x_3 + a, \dots, x_n + a$ is $X + a$.
- (b) The average of $x_1 - a, x_2 - a, x_3 - a, \dots, x_n - a$ is $X - a$.

IMPORTANT PROPERTIES

(c) The average of $\underline{ax_1}, \underline{ax_2}, \dots, \underline{ax_n}$ is \underline{aX} , provided $a \neq 0$

(d) The average of $\frac{\underline{x_1}}{\underline{a}}, \frac{\underline{x_2}}{\underline{a}}, \frac{\underline{x_3}}{\underline{a}}, \dots, \frac{\underline{x_n}}{\underline{a}}$ is $\frac{\underline{X}}{\underline{a}}$, provided

$a \neq 0$

Changes in all observations = same change in Average.

IMPORTANT PROPERTIES

① Average of first 'n' natural numbers

$$1 + 2 + 3 + 4 \dots n = \frac{n(n+1)}{2}$$

$$\text{Average} = \frac{\left[\frac{n(n+1)}{2} \right]}{n} = \frac{n+1}{2}$$

$$1, 2, 3, 4, 5 \rightarrow \frac{5+1}{2} = 3$$

IMPORTANT PROPERTIES

② Average of squares of first 'n' natural numbers :

$1^2, 2^2, 3^2, \dots, n^2$

$$\text{Average} = \frac{\text{Sum}}{n} = \frac{1^2 + 2^2 + 3^2 + \dots + n^2}{n} = \frac{\cancel{n}(n+1)(2n+1)}{6} = \frac{(n+1)(2n+1)}{6}$$

IMPORTANT PROPERTIES

③ Average of cubes of first 'n' natural numbers :

$1^3, 2^3, 3^3, \dots, n^3$

$$\text{Average} = \frac{\text{sum}}{n} = \frac{\left[\frac{n(n+1)}{2} \right]^2}{n} = \frac{n^2(n+1)^2}{4n} = \frac{n(n+1)^2}{4}$$

IMPORTANT PROPERTIES

- ★ The average of odd numbers from 1 to n is

$$\frac{\text{last odd number} + 1}{2}$$

$$1 + 3 + 5 + 7 + 9 \dots + (2n - 1)^2 = n^2$$

- ★ The average of even numbers from 1 to n is

$$\frac{\text{last even number} + 2}{2}$$

$$\begin{aligned} 2 + 4 + 6 + 8 \dots + 2n &= 2(1 + 2 + 3 + \dots + n) \\ &= \cancel{2} \frac{n(n+1)}{\cancel{2}} = n(n+1) \end{aligned}$$

Average of first 'n' odd numbers = $\frac{n^2}{n} = n$

" " " even number = $\frac{n(n+1)}{n} = n+1$

IMPORTANT PROPERTIES

- ★ If n is odd: The average of n consecutive numbers, consecutive even numbers or consecutive odd numbers is always the middle number.

1 3 (5) 7 9
← →


1 2 (3) 4 5
← →

2 4 6 (8) 10 12 14
← →

IMPORTANT PROPERTIES


- ★ If n is even: The average of n consecutive numbers, consecutive even numbers or consecutive odd numbers is always the average of the middle two numbers.

1 2 3 4




$$\frac{2+3}{2} = \underline{2.5}$$

1 3 5 7 9 11



$$\frac{5+7}{2} = \underline{6}$$

2 4 6 8 10 12



$$\frac{6+8}{2} = \underline{7}$$

IMPORTANT PROPERTIES

- ★ If the average of n consecutive numbers is m , then the difference between the smallest and the largest number is $2(n - 1)$.

QUESTION

What is the difference between the average of first 50 even natural numbers and the average of first 50 odd natural numbers?

- (a) 0
- (b) 0.5
- (c) 1
- (d) 2

(PYQ – CDS 2 2024)

$$2 + 4 + 6 + \dots + 2n = 2(1 + 2 + 3 + \dots + n)$$

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

$$\text{Avg} = \frac{n(n+1)}{n} = \underline{n+1}$$

$$\text{Avg}(50) = 50 + 1 = 51$$

$$1 + 3 + 5 + \dots + (2n-1) = n^2$$

$$\text{Avg.} = \frac{n^2}{n} = \underline{n}$$

$$\text{Avg}(50) = 50$$

$$\text{diff.} = 51 - 50 = \underline{1}$$

QUESTION

What is the difference between the average of first 50 even natural numbers and the average of first 50 odd natural numbers ?

(PYQ – CDS 2 2024)

- (a) 0
- (b) 0.5
- (c) 1
- (d) 2

Ans: (c)

Q) The average age of a group of person 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 becomes 15.5 years. Find the number of persons initially going for picnic.

(a) 20

(b) 18

(c) 22

(d) None of these

 $\rightarrow x$

$$0.5x = 10$$

$$x = \frac{10}{0.5} = \underline{20}$$

$$\frac{16x + 15(20)}{x + 20} = 15.5$$

$$x + 20$$

$$16x + 300 = 15.5x + 310$$

Q) The average age of a group of person 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 becomes 15.5 years. Find the number of persons initially going for picnic.

- (a) 20 (b) 18
(c) 22 (d) None of these

Ans: (a)

Q) The average of 20 numbers is zero. Of them, at the most, how many may be greater than zero?

(a) 0

(b) 1

(c) 10

(d) 19

Ans: (d)

QUESTION

The average of the temperatures recorded at noontime from Monday to Sunday is 31°C . If the lowest temperature recorded is 30°C , then what is the maximum of temperature that is possible to record at noontime on any one of the days

(PYQ – CDS 2 2024)

$$31 \times 7 = \underline{217^{\circ}\text{C}}$$

$$30 \times 6 + x = 217^{\circ}\text{C}$$

$$x = 217$$

$$- 180$$

$$\underline{\quad}$$
$$37$$

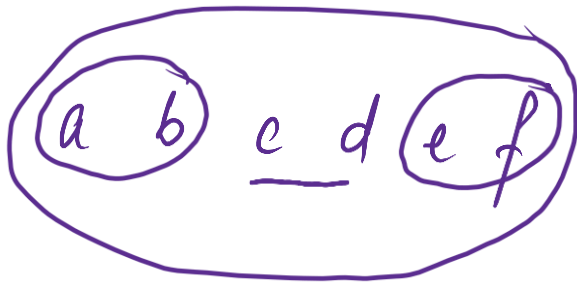
$$37^{\circ}\text{C}$$

- (a) 34°C
- (b) 35°C
- (c) 36°C
- (d) 37°C

Q) The average of six numbers is 3.95. The average of two of them is 3.4, while the average of the other two is 3.85. What is the average of the remaining two numbers?

- (a) 4.5 (b) 4.6 ✓ (c) 4.7 (d) 4.8

$$\text{Sum of 6 nos.} = 3.95 \times 6 = 23.70$$



$$a + b = 2 \times 3.4 = 6.8$$

$$e + f = 2 \times 3.85 = 7.70$$

$$\text{+} \quad 14.50$$

$$\begin{array}{r} 23.70 \\ - 14.50 \\ \hline 9.20 \end{array} \quad \text{--- } c + d$$

$$\frac{9.20}{2} = \text{avg of } c \text{ and } d$$

$$= \frac{4.60}{1} = \underline{4.6}$$

Q) The average of six numbers is 3.95. The average of two of them is 3.4, while the average of the other two is 3.85. What is the average of the remaining two numbers?

- (a) 4.5 (b) 4.6 (c) 4.7 (d) 4.8

Ans: (b)

Q) The average of 5 consecutive numbers is n . If the next two numbers are also included, the average of the 7 numbers will

- | | |
|---------------------|---------------------|
| (a) increase by 2 | (b) increase by 1 |
| (c) remain the same | (d) increase by 1.4 |

Ans: (b)

Q) There are 50 boys in a class. Their average weight is $\overline{45}$ kg. When one boy leaves the class, the average reduces by $\overline{100}$ g. Find the weight of the boy who left the class. $\curvearrowright x$

- (a) 40.9 kg (b) 42.9 kg (c) 49.9 kg (d) 39.9 kg

$$\frac{(50 \times 45) - x}{49} = 44.9$$

$$2250 - 49 \times 44.9 = x$$

$$(50 \times 45) - (50 - 1) \times 44.9 = x$$

$$50(45 - 44.9) + 44.9 = x$$

$$50(0.1) + 44.9 = x$$

$$x = 44.9$$

$$+ 5$$

$$\underline{\underline{49.9 \text{ kg} \checkmark}}$$

- Q)** There are 50 boys in a class. Their average weight is 45 kg. When one boy leaves the class, the average reduces by 100 g. Find the weight of the boy who left the class.
- (a) 40.9 kg (b) 42.9 kg (c) 49.9 kg (d) 39.9 kg

Ans: (c)

Q) The average of a batsman for 40 innings is 50 runs. His highest score exceeds his lowest score by 172 runs. If these two innings are excluded, his average drops by 2 runs. Find his highest score.

(a) 172

(b) 173

(c) 174

(d) 175

(x) runs

$$\frac{x}{2} + \frac{x-172}{2}$$

$$50 \times 40 = (48 \times 38) + x + (x-172)$$

$$50 \times 40 - (50-2) \times 38 = 2x - 172$$

$$(50 \times 2) + 2 \times 38 + 172 = 2x$$

$$100 + 76 + 172 = 2x$$

$$\frac{348}{2} = x$$

$$\underline{x = 174}$$

Q) The average of a batsman for 40 innings is 50 runs. His highest score exceeds his lowest score by 172 runs. If these two innings are excluded, his average drops by 2 runs. Find his highest score.

- (a) 172 (b) 173 (c) 174 (d) 175

Ans: (c)

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EXAMS

LIVE

MATHS

AVERAGE

CLASS 2



NAVJYOTI SIR