GATE

ALL BRANCHES

GENERAL APTITUDE

Quantitative Aptitude

Lecture No: 01

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TOPICS TO BE COVERED

1. Concept of Average
2. Difference between Average & Mean
3. Logical Approach to questions
4. Brainstorming on the Topic

Formulae

Numerical Ability

Logic

Number

① Quantitative

② Analytical

③ Spatial

Quant

AVERAGE

औसत

Equal Distribution

Normal Average (Mean)

$$\frac{\text{Sum}}{\text{No}}$$

15 20 25

(-5)

Favourable Average (Mode)

15 20 20

Middle Average (Median)

10

Average & Mean

$D = \text{Speed} \times \text{Time}$

$\text{Speed} = \frac{D}{T}$

$\text{Time} = \frac{D}{S}$

20 km/hr

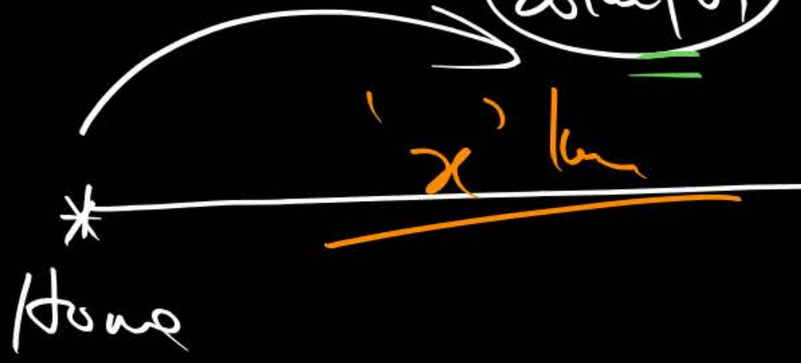
30 km/hr

24 km/hr

A. Mean

$\frac{\text{Sum}}{\text{No.}}$

20 km/hr



A.S. = 24 km/hr

$\frac{x}{20} + \frac{x}{30} = \frac{2x}{A.S}$ 30 km/hr $\Rightarrow \frac{5x}{60} = \frac{2x}{A.S}$

12

Equal Distribution

$$\text{Average} = \frac{\text{Sum of obs.}}{\text{No. of obs.}}$$

Q. What would be the average of: 1, 2, 3, 4, 5, ...49, 50.

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

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

$\frac{50+1}{2}$

$= \frac{51}{2} = 25.5$

Sum / No.

1275

50

$x = 1+2+3+\cdots\cdots+49+50$

$+\quad x = 50+49+48+\cdots\cdots+2+1$

$2x = 50 \times 51$

Natural Number

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

Even → $n+1$

$+$ $-$

1, 2, ——— 50

Odd → n

2, 4, 6, 8, 10 → 6

25, 26 → 25

1, 3, 5, 7, 9 → 5

2, 4, 6, 8, 10, 12 → 7

1, 3, 5 → 3

Average of Even & Odd

$$A = \frac{Sum}{No.}$$

$A \times No. = Sum$

$(n+1) \times n = n(n+1)$

$n \times n = n^2$

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

Even $= n+1$

Odd $= n$

* n = no. of observation

Sum of Even & Odd

Shortcut

Sum of Even $= n(n+1)$

Sum of odd $= n^2$

Q. What is the average of first five multiples of 12?

A. 42

B. 40

C. 36

D. 38

12, 24, 36, 48, 60

36

$12(1, 2, 3, 4, 5)$

$12 \times 3 = 36$

Q. A class with 20 students has the average age as 16 years. When the teacher is included in the group, the average becomes 18 years. Find the age of the teacher.

$$\text{Average} = \frac{\text{Sum}}{\text{No.}}$$

$$\text{Average} \times \text{No.} = \text{Sum}$$

$16 \times 20 = 320$

$18 \times 21 = 378$

$378 - 320 = 58$

$17\frac{2}{11}$

Q. A team of 10 employees has the average age as 20 years. If team leader is excluded from the group the average of remaining 9 employees decreases by two months. Find the age of the team leader.

$\frac{357}{2}$

$\frac{200}{178.5}$ $\quad 21.5$

$A \times No. = Sum$

$20 \times 10 = 200$

$19\frac{10}{12} \times 9 = 178.5$

$= \frac{119}{\cancel{12}_2} \times \cancel{9}^3$

21.5 years

OR

21 yrs 6 months

Q. In a school with 15 teachers, the average monthly salary is ₹4500. When three teachers left the school, the average monthly salary decreased by ₹500. Find the average monthly salary of three teachers who left the school.

No × A = Sum

15 × 4500 = 67500

12 × 4000 = 48000

19500

$\frac{6500}{} = \frac{19500}{3}$

Q. The average score of a class of 40 students is 52. What will be the average score of the rest of the students if the average score of 10 of the students is 61.

A. 47

B. 49

C. 50

D. 48

$$A = \frac{(40 \times 52) - (10 \times 61)}{30}$$

A B C D

-3 -3 -3

Q. The average weight of a school of 40 teachers is 80 kg. If, however, the weight of the principle be included, the average decreases by 1 kg. What is the weight of the principal?

A. 49

B. 109

C. 39

D. 29

$$79 = \frac{40 \times 80 + x}{41}$$

$80 - 41$

$= 39$

Q. The average age of Abhijeet and Daya is 20 years. Their average age 5 years hence will be

A. 20

B. 30

C. 25

D. 22

Q. The average monthly salary of 20 employes is Rs. 1500. If the manager's salary is added the average becomes Rs. 1600. The manager's salary is

A. 3500

B. 3600

C. 3800

D. 3900

$1500 + 2100$

$= 3600$

Q. Three years ago, the average age of a family of 5 members was 17 years. A baby having been born, the average of the family is the same today. What is the age of the baby?

A. 1 year

B. 2 year

C. 6 months

D. 9 months

$$17 = \frac{20 \times 5 + x}{6}$$

20
−18
2 yrs

Q. 12 yrs ago, the average age of a husband and his wife was 20yrs. The average age is same today, they having two children. What is the present age of the youngest child if children differ in age by 2yrs?

A. 8

B. 6

C. 7

D. 9

$$20 = \frac{32 \times 2 + Y + E}{4}$$

$$80 = 64 + Y + E$$

$$\boxed{16 = Y + E}$$

H&W

A

32

$C_1 + C_2$

B

Y

E

$E - Y = 2$

Q. The average of 5 consecutive integers starting with x is y. What is the average of 6 consecutive numbers starting with (x+2)?

A. $y+3$

B. $\frac{2y+9}{2}$

C. $y+2$

D. $\frac{2y+5}{2}$

$y, y+1, y+2, y+3, y+4, y+5$

$= \frac{3(2y+5)}{6} = \frac{6y+15}{6}$

$= \frac{2y+5}{2}$

$x, x+1, x+2, x+3, x+4$

$y = \frac{5x+10}{5}$

$y = \frac{5(x+2)}{5}$

$y = x+2$

Q. A cricketer has certain average of runs for his 64 innings. In his 65th innings, he is bowled out for no score on his part. This brings down his average by 2 runs. His new average is?

A. 130

B. 128

C. 70

D. 68

Assignment

Q. In an organisation, in 2020, there were 30 employees with the average age of 40 years. In 2022, 4 employees retired at the age of 60. Two new employees were hired in 2023, whose total age was 74. What is the average age of company in 2023?

A. 41 years

B. 42 years

C. 43 years

D. 44 years

Thank You!