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Sahi Prep Hai Toh Life Set Hai

AVERAGE-1

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Average - I

* Meaning of Average
  formula of Average
  Assumed Average

Some Basic Questions
(7-8Q)

Batting Average

Bowling Average

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What is Average ??

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FORMULA OF AVERAGE

$$Average = \frac{Sum\ of\ all\ values}{No.\ of\ values}$$

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Eg. Find the average of 5, 8, 11, 9, 2.

$$\frac{5+8+11+9+2}{5}$$

$$= \frac{35}{5} \Rightarrow 7$$

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MEANING OF AVERAGE

Average of a given set of a numbers is a number which when replaced by all the numbers, then their sum remains same.

If, $x_1, x_2, x_3 \ldots\ldots x_n$ are n numbers and their average is $\bar{x}$.

Then, according to definition of average:

$$(x_1 + x_2 + x_3 + \ldots\ldots + x_n) = \bar{x} + \bar{x} + \bar{x} \ldots\ldots (n \text{ times})$$

$$(x_1 + x_2 + x_3 + \ldots\ldots + x_n) = n\bar{x}$$

$$\bar{x} = \frac{x_1 + x_2 + x_3 \ldots\ldots\ldots\ldots x_n}{n}$$

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

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If there are n observations $x_1, x_2, x_3, \ldots x_n$ and their average is $\bar{x}$

$$x_1 + x_2 + x_3 + \cdots x_n = \bar{x} + \bar{x} + \bar{x} + \cdots \text{(n times)}$$

$$(x_1 - \bar{x}) + (x_2 - \bar{x}) + \cdots (x_n - \bar{x}) = 0$$

$$\sum_{i=1}^{n} (x_i - \bar{x}) = 0$$

$\sum \rightarrow$ Summation

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Q1. The average of n numbers $x_1, x_2 \ldots\ldots x_n$ is $\bar{x}$. Then the value of $\sum_{i=1}^{n}\left(x_i - \bar{x}\right)$ is equal to

(a) n

(b) 0

(c) $n\bar{x}$

(d) $\bar{x}$

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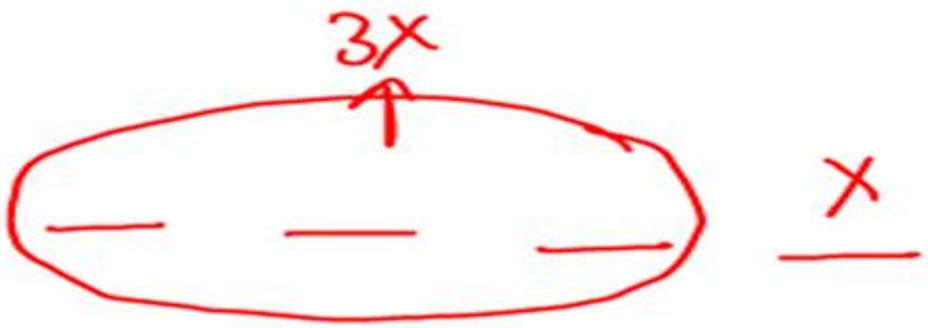
Ans. (b)



Sum = $3 \cdot 3X + 1 \cdot X$

$= 10X$

$10X = 20$

$X = 2$

Q2. Out of four numbers, the average of first three number is thrice the fourth number. If the average of the four numbers is 5, the fourth number is :

(a) 4.5 **(b) 5**

(c) 2 **(d) 4**

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Ans. (c)

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

eg1 $?? = \frac{600}{30}$

eg2 $15 = \frac{??}{10}$

eg3 $20 = \frac{1000}{??}$

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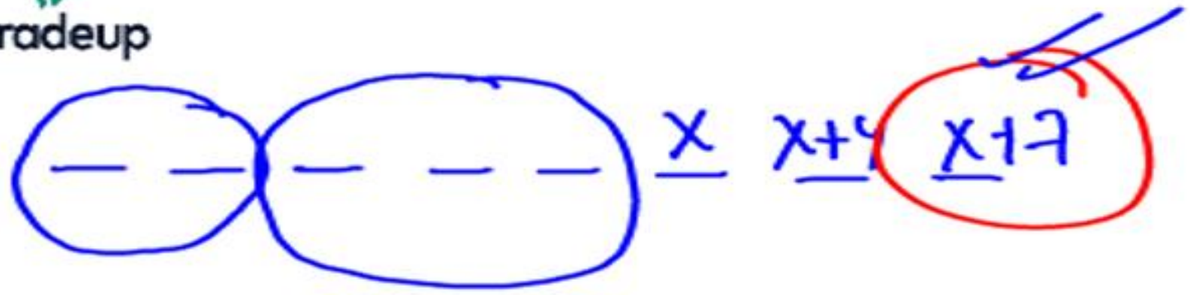

$15\frac{1}{2} \cdot 2 + 21\frac{1}{3} \cdot 3 + x + x+4 + x+7 = 160$

$31 + 64 + 3x + 11 = 160$

$3x = 54$

$x = 18$

Q3. The average of 8 numbers is 20. The average of first two numbers is 15½ and that of the next three is $21\frac{1}{3}$. If the sixth number be less than the seventh and eight numbers by 4 and 7 respectively, then the eight number is :

(a) 18
(b) 22
(c) 25
(d) 27

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Ans. (c)

CONCEPT OF ASSUMED AVERAGE

Eg. **Find the average of :**
84, 89, 86, 83, 96, 91, 99, 85

let Avg = 90

$-6, -1, -4, -7, +6, +1, +9, -8$

$$90 \quad \frac{-7}{8}$$

$$90 - 0.875 = 89.125$$

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Eg. **Find the average of :**
68, 73, 76, 64, 67

Let Avg = 70

$-2, +3, +6, -6, -3$

$70 \quad \frac{-2}{5}$

69.6

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Q4. Out of 20 boys, 6 are each of 1 m 15 cm height, 8 are of 1 m 10 cm and rest of 1 m 12 cm. The average height of all of them is :

(a) 1 m 12.1 cm

(b) 1 m 21.1 cm

(c) 1 m 21 cm

(d) 1 m 12 cm

6 1m 15cm +3 = +18cm

8 1m 10cm -2 = -16cm

6 1m 12cm ✗

+2cm

$\frac{2cm}{20}$

$= 0.1$

Let Avg height 1m 12cm

1m 12.1cm

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Ans. (a)

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Q5. If the average marks of three batches of 55, 60 and 45 students respectively is 50, 55 and 60, then the average marks of all the students is :

(a) 54.68 (b) 53.33

(c) 55 (d) 56

No. of stud Avg

11 ~~55~~ 50 -5×11

12 ~~60~~ 55 0×12

9 ~~45~~ 60 $+5\times9$

-5×2

55 $-\frac{10}{32}$

$55-\frac{1}{3}\approx54.67$

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Ans. (a)

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INCOME = EXPENDITURE + SAVINGS

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7 months × 6700 = 46900

5 months × 7800 = 39000

85900

Annual savings = 1700

Eg. If a person spends Rs. 6700 per month on an average for first 7 months and Rs. 7800 on an average for next 5 months. If his annual savings are Rs. 1700. Find his average monthly income.

Avg monthly Income

Income = 85900 + 1700

= 87600

$\frac{87600}{12}$ = 7300 ₹

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7 months 6700 ×

5 months 7800 +5500

1700

7200

Annual savings : 1700

Avg monthly Income → let 6700

+600

7300

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Ans. 7300

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Q6. A man spends Rs. 1800 monthly on an average for the first four months and Rs. 2000 monthly for the next eight months and saves Rs.5600 a year. His average monthly income is

(a) Rs. 2000 (b) Rs. 2200

(c) Rs. 2400 (d) Rs.2600

$4 \times 1800 = 7200$

$8 \times 2000 = 16000$

Savings $\rightarrow 5600$ $+5600$

28800

$\frac{28800}{12} = 2400$

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Ans. (c)

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Q7. The average monthly expenditure of a family for the first four months is Rs.2570, for the next three months Rs.2490 and for last five months Rs.3030. If the family saves Rs.5320 during the whole years, the average monthly income of the family during the year is:

(a) Rs. 3000
(b) Rs. 3185
(c) Rs. 3200
(d) Rs. 3580

$2570 \times 4 = 10280$

$2490 \times 3 = 7470$

$3030 \times 5 = 15150$

Savings 5320

38220

$\frac{38220}{12} = 3185$

Ans. (b)

4	2570	−460×4	−1840
3	2490	−540×3	−1620
5	~~4~~ 3030 ~~1~~	0	+5320
Savings	5320		

$\frac{1860}{12} = 155$

$3030 + 155$

$= 3185$

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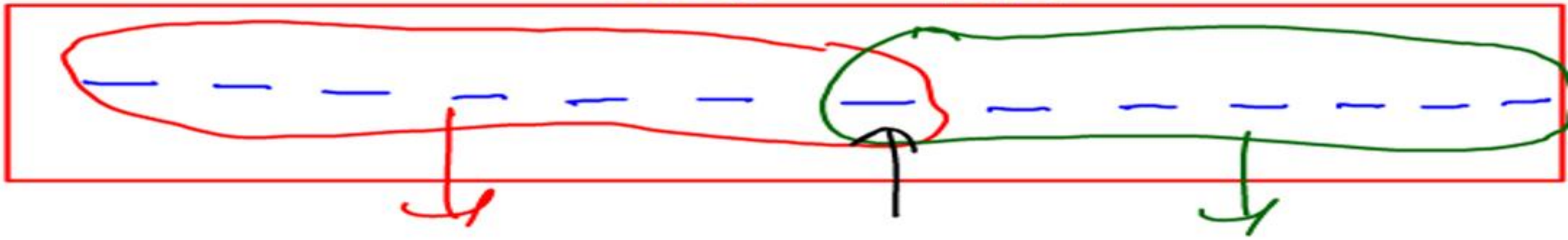
I^st

Detailed App

Eg. Average of 13 numbers is 78. If average of first 7 numbers is 75 and average of last 7 numbers is 79. Find the 7th number.

$78 \times 13 = 1014$



$75 \cdot 7 = 525$

$79 \cdot 7 = 553$

$525 + 553 = 1014 + 7^{th}$

$7^{th} = 64$

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Ans. 64

Common element

Better Approach

13 no → 78

first 7no → 75 (-3) -21

last 7no → 79 (+1) +7

7th no → ??

-14

64

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eg

15 no → 83

first 8 no → 85 +16

last 8 no → 86 +264

+40

123

Find 8^{th} no →

---

eg

11 no → 73

first 6 no → 74 +6

last 6 no → 78 +30

Find 6^{th} no → 71

109

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eg

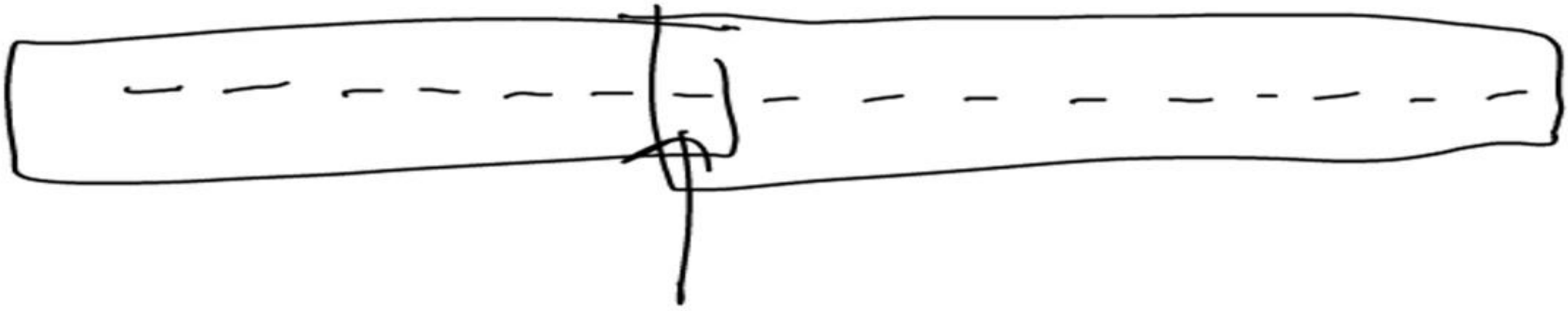
16 no ⟶ 38

first 7 no ⟶ 34 −28

last 10 no ⟶ 40 +20

And 7th no ⟶ ?? −8

80



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eg

18 no ⟶ 73

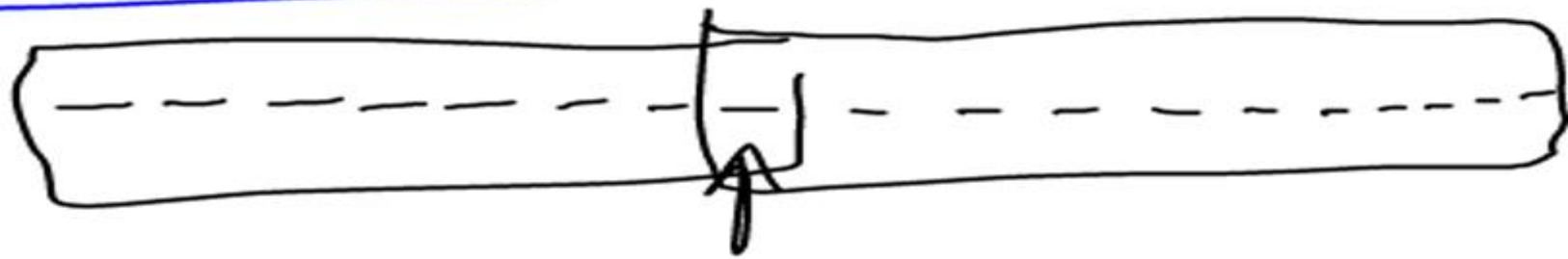
First 8 no ⟶ 75

Last 11 no ⟶ 70

Can't be determined

Find the 11th no ⟶ ??

Cond^{N} for shortcut ⟶ Common Element



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QUESTIONS BASED ON WRONG DATA

16 students

Average marks → 58

Original Note

42 24

59 53

68 76

+18

+6

−8

+16

Correct Avg of class → ??

59

$$\frac{+18}{100} = .18$$

Eg. A tabulator while calculating the average marks of 100 students of an examination, by mistake enters 68, instead of 86 and obtained the average as 58; the actual average of those students is

(a) 58.18 **(b) 57.82**

(c) 58.81 **(d) 57.28**

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Ans. (a)

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$$\frac{3000}{N} = 15$$

$$N = 200$$

Q. In an exam, the average marks obtained by the students was found to be 60. After omission of computational errors, the average marks of 100 candidates had to be changed from 60 to 30 and the average with respect to all the examinees came down to 45 marks. The total number of candidates who too the exam, was

(a) 200 (b) 210

(c) 240 (d) 180

Ans. (a)

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2 digit no ⟶ T U
x y

No ⟶ $10x + y$

Reverse no ⟶ y x

Reversed No ⟶ $10y + x$

$$\begin{array}{r} xy \\ -\ yx \\ \hline \\ \hline \end{array}$$

$$\begin{array}{r} 10x+y \\ 10y+x \\ \hline \\ 9x-9y \end{array} \Rightarrow 9(x-y)$$

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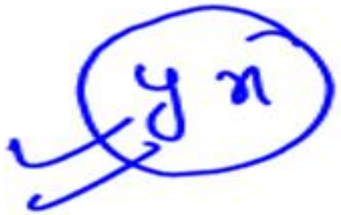
10 (Two digit no)

↓ 1.8



$9(x-y) = 18$

$x-y = 2$

Q. A student finds the average of ten 2-digit numbers. While copying numbers, by mistake. he writes one number with its digits interchanged. As a result his answer is 1.8 less than the correct answer. The difference of the digits of the number, in which he made mistake, is

(a) 2 **(b) 3**

(c) 4 **(d) 6**

Ans. (a)