AVERAGES

1. Average (A) = $\frac{\text{Sum of Quantities (S)}}{\text{No. of Quantities (N)}}$

$$S = N \times A$$

$$N = \frac{S}{A}$$

2. 1 to n, consecutive 'n' natural numbers

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

$$N = n$$

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

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

$$= \frac{\text{Last no.} + 1}{2}$$

$$A = \frac{\text{Last no.} + \text{First no.}}{2}$$

3. 1 to n, consecutive 'n' odd numbers

Eg:- 1, 3, 5, 7, 9 $\rightarrow$ Total 5 no's = n

$$A = \frac{25}{5} = 5$$

$$\boxed{A = n}$$

4. 1 to n, consecutive 'n' even numbers

Eg:- 2, 4, 6, 8, 10

$$A = \frac{30}{5} = 6$$

5. Any consecutive 'n' natural numbers

No. of numbers = odd

Eg:- 50, 51, (52), 53, 54

Average = 52

6. Any consecutive, 'n' natural numbers

No. of numbers = even

Eg:- 50, 51, 52, | 53, 54, 55

A = 52.5

7. combined or Group or weighted average

$n_1 \rightarrow x_1$

$n_2 \rightarrow x_2$

$n_3 \rightarrow x_3$

$$A = \frac{n_1x_1 + n_2x_2 + n_3x_3 + \cdots}{n_1 + n_2 + n_3 + \cdots\cdots}$$

P.9 NO:- 67

1.

Grand parents	parents	Grand children
A = 67 years	A = 35 years	A = 6 years
N = 2	N = 2	N = 3

$$A = \frac{67\times2 + 35\times2 + 6\times3}{2+2+3}$$

$$= 31.\frac{5}{7} \text{ years}$$

2.

Sunday	Other days
A = 510	A = 240
N = ?	N = ?

$$A = \frac{510\times5 + 240\times25}{30}$$

$$= 285$$

1 – sunday$_1$

7 – days

8 – sunday$_2$

7

15 – S_3

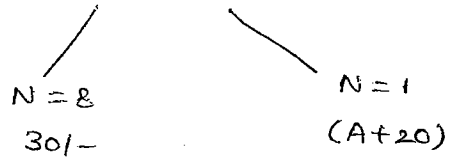
7

22 – S_4

7

29 – S_5

3. $\boxed{N=9}$ A



$$\frac{8 \times 30 + 1 \times (A+20)}{9} = A$$

$$A = \frac{260}{8}$$

$$= 32.50$$

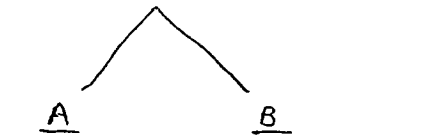
$$A = 32.50$$

$$\text{Sum} = A \times N$$

$$= 32.50 \times 9$$

$$= 292.50 \text{ Rs.}$$

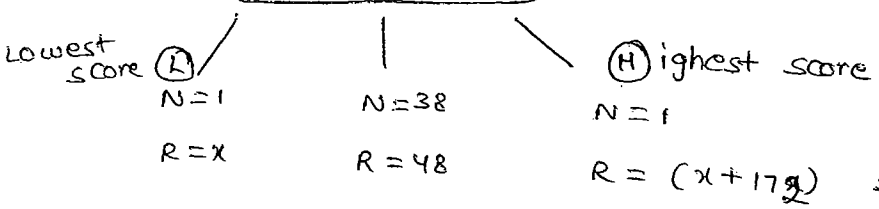
4. $\boxed{N=16}$ Avg = 76



$$\frac{75 * 10 + 6 \times x}{16} = 76$$

$$x = 77\frac{2}{3}$$

5. $\boxed{N=40,\ R=50}$



$\Rightarrow 2+172 = 174$

$$\frac{1 \times x + 38 \times 48 \times 1 \times (x+172)}{40} = 50$$

$$x = 2$$

6. $\left(\frac{I+II}{2}\right) - \left(\frac{II+III}{2}\right) = 15$

$$\frac{I + II - II + III}{2} = 15$$

$$I - III = 30$$

7. 1st day : 5th day

7 : 8

$8 \times 8^\circ = 64^\circ$

1, 2, 3, 4 $\longrightarrow$ A = 58, sum = $4 \times 58 = 232$

2, 3, 4, 5 $\longrightarrow$ A = 60, sum = $4 \times 60 = 240$

$1^{st} - 5^{th} = -8$

$5^{th} - 1^{st} = 8$

8. N = 36 $\longrightarrow$ A = 17 years

Teacher $\leftarrow$ T = +1 $\longrightarrow$ A = +1

N = 37 A = 18 years

Summation of Teachers (S_T) = $37 \times 18 = 666$ years

Summation of students (S_S) (−) = 612 years

54 years = Teacher's age

Note:-

17 years (Aug age)
+
37 years (Teacher added to group)
54 years

Level-2:-

1. 35 $\longrightarrow$ 1800

$125 \times 36 \longrightarrow$ 4500

6300

3. N = 11, A

C: N = 1, 26 yrs; W: N = 1, 29 yrs; N = 9, (A − 1)

$$\frac{1 \times 26 + 1 \times 29 + 9(A-1)}{11} = A$$

A = 23 years

4. N = 45, A = 52 kg $+\frac{2}{3} = 52 - \frac{2}{3}$

(−ve): N = 5, A = 48 kg; (+ve): N = 5, A = 54 kg

$5 \times 6 = \frac{30}{45} = \frac{2}{3}$

E = D + 3 = 68 + 3 = 71

5. (A, B, C) 84 kg (ABCD) – 80 kg (BCDE) = 79 kg

A + B + C = 84 × 3

= 252 kg

(–) 177

A = 75 kg

A + B + C + D = 80 × 4

= 320 kg

(–) 252

D = 68 kg

B + C + D + E = 79 × 4

= 316 kg

68 71 (–) 139

B + C = 177 kg

6. N = ? A = 63

↳ G = +20

H = +2

63 × N + 20 + 2 = 65 × N

2N = 22

N = 11

N = ? A = 65