Group 2

1) Averages
2) Problem on Ages

1 Averages

Average → equitable distribution (E.D) = $\frac{\text{Sum of all}}{\text{Tot no of all}}$

⇓

Total Sum = Average × Total

Questions:

1) Knowing that Vijay's expense for 1st 3 days is Rs. 100, 125 and rs 85, what is his 4th day expens as his 4 days average expense is ₹ 90?

Sol: $Av = \frac{S}{T} \rightarrow 90 = \frac{100+125+85+x}{4}$

$90 = \frac{310+x}{4} \Rightarrow x = 360-310$

$\boxed{x = 50 \text{ Rs}}$

2) What will be avg price of all goods bought, if Ajay buys 30 erasers for ₹ 3 each, 35 chocolates for rs. 10 each, 25 clips at rate rs 4. each?

Sol $Av = \frac{S}{T}$ | Sum of all prices = $3 \times 30 + 10 \times 35 + 25 \times 4$

$= 90 + 350 + 100$

$\boxed{S = 540}$

Total items = $30 + 35 + 25$

$\boxed{T = 90}$

$A = \frac{S}{T} \Rightarrow \frac{540}{90}$

$\boxed{A = 6}$ // → avg price of all goods

3) Of 20 cycles sold by ajay, avg cost of 12 cycles is ₹ 18000. In total he earned ₹ 300000. What was avg cost of remaining cycle?

Sol:- Out of 20 cycle → 12 cycle sold for one avg
8 cycle sold for another avg

given 12 cycles → avg cost = 18000

Sum = avg × no of total

= 18000 × 12

price of Total sum = 216000

So price of 12 cycles ⇒ 216000

Also from question

total price of 20 cycles = 300000

So remaing 8 cycle cost = 300000 − 216000

= 84000//

Total cost of 8 cycles = 84000

No of cycles = 8

Avg of remaining 8 cycles = $\frac{84000}{8}$

₹ = 10500//

4) Without considering salary of boss, avg salary reduces by ₹ 1000. What will be salary of boss if average salary of 11 employees and boss is ₹ 18000?

Sol:- Here (2 avergs)

~~with boss (12) → 18000~~

with boss (11+1) → 18000

without boss (11) → 18000 − 1000 → 17000

with boss avg :-

$$18000 = \frac{S_1}{11+1}$$

(11 employee, 1 → boss)

$S_1 = 18000 \times 12$

$\boxed{S_1 = 216000}$

↓

Total salary include boss

without boss avg :-

$$18000 - 1000 = \frac{S_2}{11}$$

$17000 \times 11 = S_2$

$\boxed{S_2 = 187000}$

↓

Total salary without boss

Boss salary = 216000 − 187000

$\boxed{= ₹29000//}$

5) Avg age of 5 people is 42 years. Another group has 8 people who have avg age of 81 years. When both groups are mixed what is average age of all people?

Soln. What we need avg of all people → $Avg = \frac{S\ (\text{Total age years})}{5+8\ (\text{total people})}$

so S ⇒ ?

given

avg of 5 people :-

$42 = \frac{x}{5}$

$x = 210$ years

avg of 8 people :-

$81 = \frac{x}{8}$

$x = 648$ years

Total age years of 5+8 ⇒ 13 people is 648 + 210

$\boxed{S \Rightarrow 858 \text{ years}}$

$Avg = \frac{S}{T} \Rightarrow \frac{858}{13} \Rightarrow 66 \text{ years}//$

Avg age of all pople = 66 years.

6) 3 bones have some average weight. When one box which 89kg is replaced by another box, average weight increases by 5kg. How much new box weighs?

Soln: Seems complex but simple sum:-

3 bones
$w_1\ w_2\ w_3$ → $w_1+5\ \ w_2+5\ \ w_3+5$ (Normal assumption.

3 bones

→ total weight increases
→ avg increases × no of items
→ 5 × 3 = 15 kg.

avg → Z

avg increases by 5 ⇒ Z+5

∴ In question above change in avg by 5kg done by replacing single 89kg box with new box

so it should be heavier (5×3 ⇒ 15 kg)

So new replaced box weight ⇒ 89+15

⇒ 104 kg //

Note: if in question if avg decrease by 5kg then replaced box must be 89−15 kgs.

7) How old will Raju be if ratio of his age and one of his twin grandsons is 11:2 and ~~avg~~ Avg age of his and his both grandsons is 50 years?

Soln: Raju age : grandsons age ⇒ 11:2

they are twin grandsons so both age same

So Raju : 1st grandson : 2nd grandson

11 : 2 : 2

Now avg of all age ⇒ 50

$$\text{Avg} = \frac{S}{T} \Rightarrow 50 = \frac{\text{Total age sum}}{3}$$

Total sum of ages = 150 //

$150 = 11k + 2k + 2k$

$150 = 15k$

$\boxed{k = 10}$

Raju age $\Rightarrow 11k \Rightarrow 11(10)$

$\boxed{\text{Raju} = 110 \text{ years}}$

8) Had ajay scored 18 runs more in his 3rd innings and 4 runs more in his 7th innings, his average would have become 66 runs. But it is 64 runs. How many innings did he play?

Soln: $\text{Avg} = \frac{S}{T}$, Let no of innings be N

avg is 64

1st case	2nd case
For N innings	N + (18+4)
64 avg	66 avg

increased of 2 runs avg (i.e 2 run increase in N teams)

$2N$ is also equal to $18+4$

$2N = 22$

$\boxed{N = 11}$

$\boxed{\text{No of innings is } 11}$

9) In a group of people, the oldest and the youngest have an age difference of 100 years. If these two are left out of counting, then avg age of remaining 40 people is 28. The average age of entire group being 30 - how old is eldest person?

Sol:-

Let youngest age = N

oldest age = N + 100

Avg of all 42 people $\Rightarrow 30 = \frac{S_{all}}{42} \rightarrow$ 40 + young + old

$$S_{all} = 1260 \text{ years}$$

Avg of 40 people $\rightarrow 28 = \frac{S_{40}}{40} \rightarrow$

$$S_{40} = 1120 \text{ years}$$

$S_{all} - S_{40}$

$1260 - 1120 = (N + N + 100) \rightarrow$ both age of old, young

$2N = 140 - 100$

$2N = 40$

$N = 20 \rightarrow$ youngest age

oldest $= N + 100$

$= 120$ age //

10) A batsman played 11 innings and has an certain average. This average increases by 2 runs when his 3 innings of 32 runs, 33 runs and 34 runs are replaced by 3 other innings. Find the average of these 3 new innings?

Soln: No of innings → 11 Total Avg ⇒ x

1st	2nd.
11 innings	3 innings of 11 replaced (earlier 32, 33, 34)
Avg → x	Avg → x + 2 → all 11 inings increased by 2

11 × 2 → 22 total runs in new

Avg of 3 replaced innings run (A) = $\frac{S}{T}$

$$A = \frac{\overbrace{32+33+34}^{\text{early runs}} + \overbrace{22}^{\text{new increased total runs}}}{3}$$

$$A = \frac{120}{3} \Rightarrow \boxed{A = 40 \text{ runs}}$$