Average Speed :-

* Avg. Speed = $\frac{\text{Total Distance}}{\text{Total Time}}$

10. A person covers 18Km/hr at 6Km/hr, 16Km at 8Km/hr and 30Km at 6Km/hr. Then find average speed.

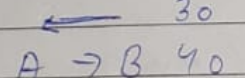
⇒ Avg. Speed = $\frac{18 + 16 + 30}{3 + 2 + 5}$

$= \frac{64}{10} \Rightarrow 6.4 \text{ Km/hr}$

Imp.

11. A constant distance from A to B is covered by a man at 40Km/hr. The person rides back the same distance at 30Km/hr. Find avg. speed during the whole journey.

⇒



$\Rightarrow \frac{2S_1S_2}{S_1 + S_2} = \frac{2 \times 30 \times 40}{70}$ [This will only go to two distance equal ho

$= \frac{2400}{70}$

$= 34.28 \text{ Km/hr}$

⇒ $40 \times 163 = 6520$

$37 \times 169 = 5994$

$\therefore A + B + C = 6520 - 5994$

$x + x + x - 2 = 526$

$3x - 2 = 526$

$3x = 528$

$\boxed{x = 176}$

21. Out of three numbers, the first is twice the second and is half of the third. If average of three numbers is 56, the three numbers in order are:

⇒ $I = 2II = \frac{1}{2} III$

$\therefore$ Ans ⇒ 48, 24, 96

22. The average age of A and B is 20 years. If C were to replace A the average would be 19 and if C were to replace B the average would be 21. What are ages of A, B and C respectively?

⇒ $A + B = 40$

$B + C = 38$

$A + C = 42$

$\therefore 2(A + B + C) = 120$

$\therefore A + B + C = 60$

$40 + C = 60$

$\boxed{C = 20}$

$\boxed{B = 18}$

$A = 42 - 20$

$\boxed{A = 22}$

14. A car turns t_1 hours at v_1 Km/hr, t_2 hours at v_2 Km/hr. What is the average speed.

⇒ Avg. Speed = $\frac{\text{Total Distance}}{\text{Total Time}}$

$$S = \frac{D}{T}$$

$$D = S \times T$$

$$= \frac{v_1 t_1 + t_2 v_2}{t_1 + t_2}$$

mcq

. A person runs the first $1/4^{th}$ of the distance of 8 Km/hr the next $3/5^{th}$ at 6 Km/hr and remaining distance at 10 Km/hr. Find his average speed.

⇒ $\frac{1}{4} \to 8 \quad \frac{3}{5} \to 6 \quad R = 10$

$TD = 480$

$\frac{1}{4} \times 480 = 120$	8	15
$\frac{3}{5} \times 480 = 288$	6	48
72	10	7.2

Avg. Speed = $\frac{480}{15 + 48 + 7.2} = \frac{480}{70.2} \Rightarrow 6.98$

Averages

1. If a, b, c, d are five consecutive odd integers, then what is their average?

(a) a+4 (b) (abcde)/5 (c) 5(a+b+c+d+e)

(d) (4) a+8 (e) None of these

⇒ 1, 3, 5, 7, 9

$$\text{Avg} = \frac{\text{Sum of obs.}}{\text{No. of obs}} = \frac{25}{5} = 5$$

∴ a+4 Ans

2. The average of 8 numbers is 14. If 2 is subtracted from each given number, what will be the new average?

(a) 12 (b) 10 (c) 16 (d) 18 (e) None of these

⇒ +, −, ×, ÷

A+, A−, A×, A÷

∴ Ans ⇒ 14 − 2 = 12

23. The average temperature of Monday, Tuesday and Wed was 40°. The avg of Tuesday, Wednesday and Thursday was 41°C. That for Thursday being 49°C, what was temperature of Monday?

⇒ $M + T + W = 120$
$-\ T + W + Th = 123$
$M - Th = -3.$

$\therefore M - 49 = -3$
$M = 39°C$

24. The average of Suresh's marks in English and History is 55. His average of marks in English and Science is 65. What is difference obtained b/w History and Science?

⇒ $E + H = 110$
$E + S = 130$
$H - S = 20$

25. The average salary of the entire staff in a office is Rs 120 per month. The avg salary of officers is Rs 540 and that of non-officers is Rs 114. If the number of officers is 16, find the number of non-officers.

⇒ A N_1 $\bar{x}_1$
B N_2 $\bar{x}_2$
C N_3 $\bar{x}_3$
D N_4 $\bar{x}_4$

$\Rightarrow \quad \bar{x} = \frac{S}{N} \quad \left(\text{Avg} = \frac{\text{Sum}}{\text{No. of observations}}\right)$

$S = \bar{x} N$

$6 \times 22 = 132$

$\therefore 132 - (6 \times 7) \Rightarrow 132 - 42$

$= 90$

$\therefore \frac{90}{5} = 18 \text{ years}$

(AMCAT)

19. The average age of husband and wife was 23 years when they were married 5 years ago. The average age of the husband, the wife and a child who was born during the interval is 20 years now. How old is child now?

$\Rightarrow \quad H + W = 46 \qquad 46 + 10$

$\therefore H + W + C = 60$

$56 + C = 60$

$\therefore \boxed{C = 4}$

ube

. The avg height of 40 students is 163 cm. On a particular day, three students A, B, C were absent and the average of remaining 37 students was found to be 162 cm. If A, B have equal heights and height of C be less than 2 cm of A, find the height of A.

$$\bar{x}_c = \frac{N_1\bar{x}_1 + N_2\bar{x}_2}{N_1 + N_2}$$

$$130 = \frac{16 \times 540 + x(114)}{16 + x}$$

$$\therefore x = 410$$

26. A batsman in his 19 innings, missed a century by 2 runs and thereby increases his average by 3. What is his average after 19 innings.

$$\Rightarrow \quad x + 3 = \frac{18x + 1 \times 98}{19}$$

$1 \rightarrow 98$
$18 \rightarrow x$
$\bar{x}_c = x + 3$

$$19x + 57 = 18x + 98$$

$$x = 41$$

$\therefore$ Ans $\Rightarrow 41 + 3 = 44$

27. In a coconut grove, $(x+2)$ trees yield 60 nuts per year per tree, x trees yield 120 nuts per year per tree and $(x-2)$ trees yield 180 nuts per year per tree. If the average yield per year per tree be 100, find x.

$$\Rightarrow \quad 100 = \frac{60(x+2) + 120x + 180(x-2)}{x+2+x+x-2}$$

$$\boxed{x = 4}$$

12. A person divides his total route of journey into three equal parts and decide to travel the three parts with speeds of 20, 15, 10 Km/hr. Find the avg speed.

⇒

60	20	3 hrs
60	15	4 hr
60	10	6 hr

$\therefore$ Avg. Speed $= \frac{180}{13} \Rightarrow 13\frac{11}{13}$ Km/hr

* Formula for 3 equal distances $\Rightarrow \frac{3S_1S_2S_3}{S_1S_2 + S_2S_3 + S_1S_3}$

E-Likhs

13. An aeroplane covers the four sides of square fields at speed of 200, 400, 600, 800 Km/hr. Then what is average speed.

⇒

2400	200	12
2400	400	6
2400	600	4
2400	800	3

Avg Speed $= \frac{4 \times 2400}{25}$

$= 384$ Km/hr

16. The average age of three boys is 15 years. Their ages are in the ratio 3:5:7. Then the age of oldest is :

⇒ 3 : (5) 7 (×3)

9 15 21 ; Ans ⇒ 21 years

17. The population of town increased by 20% during the first year, by 25% during next year and 44% during third year. Find the average rate of increase during 3 years.

⇒ 100 120 25% × 120 150 216

$= \frac{25}{100} \times 120 = 30$

$40 + 4 = 4(10) + 4(1)$ [10% of 150 & 1% of 150]

$\Rightarrow 4(15) + 4(1.5) = 60 + 6 \Rightarrow 66$

∴ Ans ⇒ $\frac{116}{3} = 38(2/3)\%$

mp

8. The average age of a family of 6 members is 22 years. If the age of the youngest be 7 years, the average age of the family at the birth of youngest members was :

3. The average of x numbers is 3x. If x-1 is subtracted from each given numbers, what will be the new average?

⇒ $3x - (x-1)$

$\Rightarrow 3x - x + 1$

$= 2x + 1$

4. The average of 40 numbers is 405. If each of the number is divided by 15, find the average of new set of numbers?

⇒ $\frac{405}{15} = 27$

5. The average of 8 numbers is 121. If each number is multiplied by 8, find the average of new set of numbers?

⇒ $21 \times 8 = 168$

6. The average age of 24 students and the class teacher is 16 years. If the teacher's age is excluded, the average reduces by 1 year. What is the age of class teacher?

⇒ $5 + T = 16$

$16\ 16\ 16 \quad T$

$24 \times 1 = 24 \longrightarrow 16$

$\therefore 24 + 16 \Rightarrow 40$ years

7. The average age of 34 boys in a class is 14 years. If the teacher's age is included the average age of boys and the teacher becomes 15 years. What is the teacher's age?

⇒ 34 → 14

34 + 15 ⇒ 49 years

8. The avg. weight of 8 persons increases by 1.5kg. If a person whose weight is 65kg is replaced by a new person, what could be the weight of new persons?

⇒ 1.5 × 8 = 12

∴ Weight = 65 + 12 = 77

9. In a class there are 24 boys whose avg. age is decreased by 3 months, when 1 boy aged 20 years is replaced by a new boy. Find the age of new boy

⇒ 24 × 3 = 72 ⇒ 6 years
12

∴ +20 − 6 = 14 years