

## {Average}

\* Average Concept.

\* Average Speed.

\* Weighted Average.

\* Miscellaneous.

Average  $\rightarrow$  It is mean value of a set of numbers.

$\rightarrow$  It is central tendency of a set of numbers.

12, 13, 17, 18, 20

$$\text{Average} = \frac{\text{Sum of all observations.}}{\text{Total no of observations}} = \frac{12+13+17+18+20}{5} = \frac{80}{5} = 16.$$

12, 13, 17, 18, 20

$$\begin{array}{r} 16 & 16 & 16 & 16 & 16 \\ \hline -4 & -3 & 1 & 2 & 4 \\ \hline -7 & +1 & = 0 \end{array}$$

A Batsman

10 Matches

0, 11, 29, 41, 43, 50, 100, 79, 99, 51

Rule : Smallest observation  $\leq$  Average  $\leq$  Largest observation

$$\begin{array}{c} AA = 50 \\ + .3 \\ \hline \underline{50.3} \end{array} \quad \begin{array}{c} -50 -39 -31 -9 -7 0 50 39 49 1 \\ \hline -10 \\ \hline \end{array} \quad \begin{array}{c} 3 \\ 10 \\ \hline = + .3 \end{array}$$

(10), 12, 17, 19, 29, (31), 25, 15, 13, 31

$$\begin{array}{c} AA - 22 \\ -12 -10 -5 -7 9 / 3 -7 -9 / 9 \\ \hline -3 \\ \hline -18 \\ \hline 10 = -1.8 \end{array} \quad \begin{array}{c} 20.2 \\ \hline \end{array}$$

$$\begin{array}{c} 20.2 \\ -7 -3 / \cancel{X} X 14 16 10 0 -2 \cancel{X} 16 \\ \hline -1 \\ \hline 10 \\ \hline 52 \\ \hline 10 = + 5.2 \end{array}$$

1. A student was asked to find the arithmetic mean of the following 12 numbers :  
3, 11, 7, 9, 15, 13, 8, 19, 17, 21, 14 and x  
He found the mean to be 12. The

$$\begin{array}{c} \cancel{3} \cancel{11} \cancel{7} \cancel{9} \cancel{15} \cancel{13} \cancel{8} \cancel{19} \cancel{17} \cancel{21} \cancel{14} + x = 144 \\ 137 + x = 144 \\ x = 7 \end{array}$$

61. The average age of 30 students of a class is 14 years 4 months. After admission of 5 new students in the class the average becomes 13 years 9 months. The youngest one of the five new students is 9 years 11 months old. The average age of the remaining 4 new students is

- (1) 11 years 2 months  
(2) 13 years 6 months  
(3) 12 years 4 months  
(4) 10 years 4 months

Arithmetic mean of the following

12 numbers :  
3, 11, 7, 9, 15, 13, 8, 19, 17,  
21, 14 and x

He found the mean to be 12. The  
value of x will be :

- (1) 3      (2) 7  
(3) 17     (4) 31

$$137 + x = 144$$

$$x = 7$$

8. The average weight of five persons sitting in a boat is 38 kg.  
The average weight of the boat and the persons sitting in the boat is 52 kg. What is the weight of the boat ?

- (1) 228 kg    (2) 122 kg  
(3) 232 kg    (4) 242 kg

old obs      No  $\times$  Avg  $\longrightarrow$  Total.  
 old Avg      5  $\times$  38 = 190.

New obs      No  $\times$  New Avg  $\longrightarrow$  Total.  
 6  $\times$  52 = 312

$$\text{Boat} = 312 - 190 = 122 \text{ Kg.}$$

$$\text{New Avg} + (\text{change in Avg}) \times \text{old obs.}$$

$$52 + 14 \times 5 = 52 + 70$$

24 students      No  $\times$  Teacher's age  
 24s + T      24  $\times$  25 = 24 + 1

$$25 + (1)24 = 25 + 24 = \underline{\underline{49}}$$

14. The average of x numbers is  $y^2$  and the average of y numbers is  $x^2$ . So the average of all the numbers taken together is

- (1)  $\frac{x^3 + y^3}{x + y}$     (2)  $xy$   
 (3)  $\frac{x^2 + y^2}{x + y}$     (4)  $xy^2 + yx^2$

$$\begin{array}{r} x - y^2 - xy^2 \\ y - x^2 - yx^2 \\ \hline xy(y+x) \end{array} \quad \frac{xy^2 + yx^2}{x+y}$$

13. The average of x numbers is  $y$  and average of  $y$  numbers is  $x$ . Then the average of all the numbers taken together is

- (1)  $\frac{x+y}{2xy}$     (2)  $\frac{2xy}{x+y}$   
 (3)  $\frac{x^2 + y^2}{x + y}$     (4)  $\frac{xy}{x + y}$

$$\begin{array}{r} x - y \rightarrow xy \\ y - x \rightarrow xy \\ \hline x+y \end{array} \quad \frac{2xy}{x+y}$$

2. The average of the marks obtained in an examination by 8 students was 51 and by 9 other students was 68. The average marks of all 17 students was :

- (1) 59      (2) 59.5  
(3) 60      (4) 60.5

$$\begin{array}{r} 8 - 51 = 408 \\ 9 - 68 = 612 \\ \hline 17 \end{array} \quad \frac{1020}{17} = 60$$

(SSC CGL Prelim Exam. 11.05.2003

(First Sitting)

5. If the average weight of 6 students is 50 kg; that of 2 students is 51 kg; and that of other 2 students is 55 kg; then the average weight of all students is  
 (1) 61 kg    (2) 51.5 kg  
(3) 52 kg    (4) 51.2 kg

10. Total weekly emoluments of the workers of a factory is ₹ 1534. Average weekly emolument of a worker is ₹ 118. The number of workers in the factory is :

- (1) 16      (2) 14  
(3) 13      (4) 12

(SSC CHSL DEO & LDC

354

$$\begin{array}{r} 13 \\ 1534 \\ \hline 178 \end{array}$$

No  $\times$  Avg  $\rightarrow$  Total

$$\begin{array}{r}
 \text{No} \times \text{Avg} \rightarrow \text{Total} \\
 6 \times 50 \rightarrow 300 \\
 2 \times 51 \rightarrow 102 \\
 2 \times 55 \rightarrow \underline{110} \\
 \hline
 10 \downarrow \\
 \underline{\underline{512}} \\
 \hline
 \underline{\underline{512}} \\
 \hline
 \end{array}$$

11. 12 kg of rice costing ₹ 30 per kg is mixed with 8 kg of rice costing ₹ 40 per kg. The average per kg price of mixed rice is  
 (1) ₹ 38      (2) ₹ 37  
 (3) ₹ 35      (4) ₹ 34

16. A man bought 13 articles at ₹ 70 each, 15 at ₹ 60 each and 12 at ₹ 65 each. The average price per article is  
 (1) ₹ 60.25      (2) ₹ 64.75  
 (3) ₹ 65.75      (4) ₹ 62.25

$$\frac{12 \times 30 + 8 \times 40}{20} = \frac{360 + 320}{20} = \frac{680}{20} = 34$$

$$\begin{aligned}
 & \frac{13 \times 70 + 15 \times 60 + 12 \times 65}{40} = \frac{910 + 900 + 780}{40} \\
 & \frac{2590}{40} = 64.75
 \end{aligned}$$

### {Concept of Weighted Average}

<u>Class</u>	$\times$	A	B	C	D
No	$\Rightarrow$	$60 n_1$	$65 n_2$	$70 n_3$	$40 n_4$
<u>Maths Test</u>	<u>Avg Math</u>	$50 A_1$	$40 A_2$	$60 A_3$	$70 A_4$
<u>Total</u>					
$\frac{n_1 A_1 + n_2 A_2 + n_3 A_3 + n_4 A_4}{n_1 + n_2 + n_3 + n_4} = W.A$					
$\frac{3000 + 2600 + 4200 + 2800}{235} = 53.617 = 53.62$					

17. A library has an average number of 510 visitors on Sunday and 240 on other days. The average number of visitors per day in a month of 30 days beginning with Sunday is :  
 (1) 285      (2) 295  
 (3) 300      (4) 290

$$\begin{aligned}
 & \frac{510 \times 5 \text{ Sunday}}{240 \times 25} \\
 & \frac{510 \times 5 + 240 \times 25}{30} = \frac{2550 + 6000}{30} \\
 & \frac{8550}{30} = 285
 \end{aligned}$$

23. Six tables and twelve chairs were bought for ₹ 7,800. If the aver-

$$6 \times 750 + 12 \times x = 7800$$

23. Six tables and twelve chairs were bought for ₹ 7,800. If the average price of a table is ₹ 750, then the average price of a chair would be  
 (1) ₹ 250      (2) ₹ 275  
 (3) ₹ 150      (4) ₹ 175

$$6 \times 750 + 12 \times x = 7800$$

$$4500 + 12x = 7800$$

$$12x = \frac{3300}{275}$$

26. The average monthly salary of all the employees in an industry is ₹ 12,000. The average salary of male employees is ₹ 15,000 and that of female employees is ₹ 8,000. What is the ratio of male employees to female employees ?  
 (1) 5 : 2      (2) 3 : 4  
 (3) 4 : 3      (4) 2 : 5

$$\frac{x}{y} = \frac{4}{3}$$

$$\begin{aligned} \text{No of male} &= x \\ \text{No of female} &= y. \end{aligned}$$

$$\frac{15000x + 8000y}{x+y} = 12000.$$

$$15000x + 8000y = 12000x + 12000y$$

$$3000x = 4000y$$

$$3x = 4y.$$

21. Find the average of 1.11, 0.01, 0.101, 0.001, 0.11  
 (1) 0.2664      (2) 0.2554  
 (3) 0.1264      (4) 0.1164

$$\frac{1.11 + 0.01 + 0.101 + 0.001 + 0.11}{5}$$

$$\begin{array}{ccccccc} 12 & 13 & 17 & 18 & 20 & \text{Avg} = 16 & \times 2 \\ \times 2 & & \\ 24 & 26 & 34 & 36 & 40 & \frac{160}{\cancel{5}} & 32 \end{array}$$

\* If each observation is being added / Subtracted / multiplied or / divided by x Average also gets added / subtracted / multiplied or / divided by x.

34. The average weight of first 11 persons among 12 persons is 95 kg. The weight of 12th person is 33 kg more than the average weight of all the 12 persons. The weight of the 12th person is  
 (1) 128.75 kg      (2) 128 kg  
 (3) 131 kg      (4) 97.45 kg

$$12 - \textcircled{x} - 12x.$$

$$11 - 95 - 1045$$

$$12^{\text{th}} \quad \frac{x+33}{\rightarrow} = 12x - 1045 \quad \leftarrow$$

$$1078 = 11x$$

$$98 + 33 = \underline{\underline{13}}$$

$$\begin{aligned} \frac{1^2 + 2^2 + 3^2 + 4^2 + 5^2 + 6^2 + 7^2}{28} &= \frac{1+4+9+16+25+36+49}{28} \\ &= \frac{149}{5} \end{aligned}$$

28

28

$$= \frac{140}{28} \underline{\underline{5}}$$

51. If the difference between the average of  $x, y$  and  $y, z$  is 12, then the difference between  $x$  and  $z$  is :

- (1) 24      (2) 48  
 (3) 12      (4) 6

$$\frac{x+y}{2} - \frac{y+z}{2} = 12$$

$$\frac{x+y-y-z}{2} = 12$$

$$x-z = 24$$

The average of prime numbers between 1 and 20 is

- (1) 9      (2)  $9\frac{5}{8}$   
 (3)  $10\frac{1}{8}$       (4) 8

$$\frac{2, 3, 5, 7, 11, 13, 17, 19}{8} = \frac{77}{8}$$

### TYPE-II

1. The average of 9 numbers is 30. The average of first 5 numbers is 25 and that of the last 3 numbers is 35. What is the 6th number?

- (1) 20      (2) 30  
 (3) 40      (4) 50

$$9 - 30 — 270$$

$$8 \left\{ \begin{array}{l} 5 - 25 — 125 \\ 3 - 35 — 105 \end{array} \right\} 230$$

$$6^{th} — 40$$

$$\begin{array}{r} 4 - 37 — 148 \\ 4 - 41 — 164 \\ 7. — 39 — 273 \end{array} > 312$$

$$312 - 273 =$$



7. In a certain year, the average monthly income of a person was ₹ 3,400. For the first eight months of the year, his average monthly income was ₹ 3,160 and for the last five months, it was ₹ 4,120. His income in the eighth month of the year was

- (1) ₹ 3,160      (2) ₹ 5,080  
 (3) ₹ 15,520      (4) ₹ 5,520

$$\begin{array}{r} 12 - 3400 — 40800 \\ 8 - 3160 — 25280 \\ 5 - 4120 — 20600 \end{array} > 45880$$

$$8^{th} — 5080$$

14. Out of four numbers, the average of the first three is 15 and that of the last three is 16. If the last number is 19, the first is

- (1) 19      (2) 15  
 (3) 16      (4) 18

$$\begin{array}{r} 4 \\ 3 - 15 — 45 \\ 3 - 16 — 48 \end{array} > 3$$

19

the last number is 19, the first is

- (1) 19      (2) 15  
 (3) 16      (4) 18

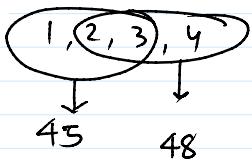
1 2 3 4  
 $x \quad y \quad z \quad k$

$$x+y+z \quad y+z+k$$

$$\downarrow \quad \downarrow$$

$$45 \quad 48$$

$$3 - 16 - 48 \rightarrow 19$$



$$k-x = 3 \quad 19-x = 3$$

$$x = 16$$

10. The average of eight successive numbers is 6.5. The average of the smallest and the greatest numbers among them will be :

- (1) 4      (2) 6.5  
 (3) 7.5      (4) 9

$$\frac{x, x+1, x+2, x+3, x+4, x+5, x+6, x+7}{8} = 6.5$$

$$\frac{8x+28}{8} = 52$$

$$8x = 243$$

$$\begin{matrix} 1 & 2 & 3 & 4 & 5 \\ \swarrow & \swarrow & \swarrow & \swarrow & \swarrow \\ 1 & 1 & 1 & 1 \end{matrix} / \begin{matrix} 2 & 4 & 6 & 8 & 10 \\ \searrow & \searrow & \searrow & \searrow & \searrow \end{matrix}$$

natural no / whole no / odd / even / Multiplication Table

find Average of 7 multiples of 9.

9, 18, 27, 36, 45, 54, 63.

$$\frac{9+18+27+36+45+54+63}{7} = \text{Avg.} = \frac{252}{7} = 36$$

$$\frac{F+L}{2} = \text{Avg} \quad \frac{9+63}{2} = \frac{72}{2} = 36$$

Avg is your middle observation.

18. The average of the largest and smallest 3 digit numbers formed by 0, 2 and 4 would be

- (1) 312      (2) 213  
 (3) 222      (4) 303

$$\frac{204 + 420}{2} = \frac{624}{2}$$

8. The average of three consecutive odd numbers is 12 more than one third of the first of these numbers. What is the last of the three numbers?

- (1) 15  
 (2) 17  
 (3) 19  
 (4) Data inadequate

$$15 \quad 17 \quad 19$$

$$x \quad x+2 \quad x+4$$

$$\frac{3x+6}{3} - 12 = \frac{x}{3}$$

$$\frac{3x+6-x}{3} = 12$$

$$\frac{2x+6}{3} - 12 \rightarrow 2x+6 = 36$$

(4) Data inadequate

$$\frac{2n+6}{3} = 12 \quad \frac{2n+6}{3} = 36$$
$$2n+6 = 36 \rightarrow n = 15$$

2. The average of first nine prime numbers is

- (1) 9      (2) 11  
(3)  $11\frac{2}{9}$       (4)  $11\frac{1}{9}$

$2, 3, 5, 7, 11, 13, 17, 19, 23$

$$\underline{2+3+5+7+11+13+17+19+23}$$

$$\frac{100}{9} = 11\frac{1}{9} \checkmark$$

12.  $a, b, c, d, e, f, g$  are consecutive even numbers.  $j, k, l, m, n$  are consecutive odd numbers. The average of all the numbers is

- (1)  $3\left(\frac{a+n}{2}\right)$   
(2)  $\left(\frac{l+d}{2}\right) \frac{d+l}{2}$   
(3)  $\frac{a+b+m+n}{4}$   
(4)  $\frac{j+c+n+g}{4}$

(c)

$$\frac{a+e}{2}$$

$$\frac{a+b+c+d+e}{5}$$

$$\underline{\underline{a+4}}$$

30. The average of 25 consecutive odd integers is 55. The highest of these integers is

- (1) 79      (2) 105  
(3) 155      (4) 109

$$\begin{aligned}a &= a \\b &= a+2 \\c &= a+4 \\d &= a+6 \\e &= a+8\end{aligned}$$

14. The average of 5 consecutive integers starting with 'm' is n. What is the average of 6 consecutive integers starting with  $(m+2)$ ?

- (1)  $\frac{2n+5}{2}$       (2)  $(n+2)$   
(3)  $(n+3)$       (4)  $\frac{2n+9}{2}$

$$\frac{6n+15}{6} \quad \underline{\underline{\beta(2n+5)}} \quad \frac{82}{82}$$

$$\frac{m, m+1, m+2, m+3, m+4}{5} = n$$

$$5m + 10 = 5n$$

$$\frac{5m}{m} = \frac{5n-10}{n-2}$$

$$\underline{\underline{m+2, m+3, m+4, m+5, m+6, m+7}}$$

$$\begin{aligned}\frac{6m+27}{6} &= \frac{6(n-2)+27}{6} \\&= \frac{6n-12+27}{6}\end{aligned}$$

$$\frac{6(2n+5)}{82}$$

$$= \frac{6n - 12 + 27}{6}$$

1. The average monthly income of A and B is ₹ 14000, that of B and C is ₹ 15600 and A and C is ₹ 14400. The monthly income of C is  
 (1) ₹ 16000 (2) ₹ 15000  
 (3) ₹ 14000 (4) ₹ 15500

$$\frac{A+B}{2} = 14000 \Rightarrow A+B = 28000$$

$$\frac{A+C}{2} = 14400 \Rightarrow A+C = 28800$$

$$\frac{B+C}{2} = 15600 \Rightarrow B+C = 31200$$

$$\begin{array}{r} \cancel{2(A+B+C)} = \cancel{88000} 44000 \\ \cancel{A+B} = \cancel{-28000} \\ C = 16000 \end{array}$$

7. A man spends ₹ 1800 monthly on an average for the first four months and ₹ 2000 monthly for the next eight months and saves ₹ 5600 a year. His average monthly income is  
 (1) ₹ 2000 (2) ₹ 2200  
 (3) ₹ 2400 (4) ₹ 2600

$$\begin{array}{r} 1800 \times 4 + 2000 \times 8 + 5600 \\ 12 \qquad \qquad \qquad 2400 \\ 7200 + 16000 + 5600 = \frac{28800}{12} \end{array}$$

9. The average salary of all the workers in a workshop is ₹ 8000. The average salary of 7 technicians is ₹ 12,000 and the average salary of the rest is ₹ 6,000. The total number of workers in the workshop is  
 (1) 20 (2) 21  
 (3) 22 (4) 23

$$8000 = \frac{7 \times 12000 + x \times 6000}{7+x}$$

$$W.A = \frac{n_1 A_1 + n_2 A_2}{n_1 + n_2}$$

$$\begin{array}{r} 56000 + 8000x = 84000 + 6000x \\ 2000x = 28000 \qquad \qquad \qquad \underline{\underline{14}} \end{array}$$

11. The average daily income of 7 men, 11 women and 2 boys is Rs. 257.50. If the average daily income of the men is Rs. 10 more than that of women and the average daily income of the women is Rs. 10 more than that of boys, the average daily income of a man is  
 (1) Rs. 277.5 (2) Rs. 250  
 (3) Rs. 265 (4) Rs. 257

$$\begin{array}{ccc} 7M & 11W & 2B \\ 265 & 255 & 245 \\ \cancel{x+20} & \cancel{x+10} & \cancel{x} \end{array}$$

$$\frac{7x+140 + 11x+110 + 2x}{20} = 257.50$$

$$\frac{20x + 250}{20} = \frac{25750}{100}$$

$$\frac{x(10x+125)}{2} = 2575.$$

$$\begin{array}{cccc} 1 & 2 & 3 \\ 2x & x & 3y & \textcircled{1} \\ \hline 6x & 3x & 1a \end{array}$$

$$\frac{10a}{3} = 16 \qquad a = 3.$$

$$\frac{2}{\cancel{3}} \qquad \frac{6:3:1}{\cancel{1}}$$

$$\frac{(6x+3x+x)}{3} = 10$$

$$3^{\text{rd}} = 3$$

$$2^{\text{nd}} = 9$$

$$3^{\text{rd}} = 18$$

$$x = 3$$

$$6x = 6 \times 3$$

$$3x = 18 \quad x=3 \quad \frac{6x+3x+x}{3} = 10$$

$$6x = 6 \times 3 = 18$$

8. The average of first three numbers is double of the fourth number. If the average of all the four numbers is 12, find the 4th number.

- (1) 16      (2)  $\frac{48}{7}$   
 (3) 20      (4)  $\frac{18}{7}$

$$\begin{array}{cccc} a & b & c & d \\ \frac{a+b+c}{3} & = 2d & d & = \frac{48}{7} \checkmark \\ \underline{a+b+c} & = 6d. & & \end{array}$$

$$\frac{7d}{4} = 12$$

1. The average of marks of 14 student was calculated as 71. But it was later found that the marks of one student had been wrongly entered as 42 instead of 56 and of another as 74 instead of 32. The correct average is :

- (1) 67      (2) 68  
 (3) 69      (4) 71

$$\begin{array}{r} 994 \\ -74 \\ \hline 920 \\ -42 \\ \hline 878 \end{array} \quad \begin{array}{r} 878 \\ -56 \\ \hline 32 \\ -32 \\ \hline 0 \end{array}$$

$$\begin{array}{c} 14 \times 71 \\ \text{---} \\ 42 \quad 56 \\ 74 \quad 32 \\ \hline 116 - 88 \\ \text{---} \\ 28 \\ \text{---} \\ 14 \\ \text{---} \\ 28 \\ \text{---} \\ +2 \\ \hline \end{array}$$

$$71 - 2 = 69$$

$$14 \times 71 = \frac{994 - 42 - 74 + 56 + 32}{14} = 69$$

2. The average weight of three men A, B and C is 84 kg. D joins them and the average weight of the four becomes 80 kg. If E whose weight is 3 kg more than that of D, replaces A, the average weight of B, C, D and E becomes 79 kg. The weight of A is

- (1) 65 kg.      (2) 70 kg.  
 (3) 75 kg.      (4) 80 kg.

$$\begin{array}{r} 316 \\ -139 \\ \hline 177 \end{array}$$

$$\begin{array}{l} A+B+C = 252 \Rightarrow A+177 = 252 \\ A+B+C+D = 320 \\ B+C+D+E = 316 \\ \hline B+C+68+71 = 316 \\ B+C = 177 \end{array}$$

$$D = 68$$

$$E = 71$$

~~$$A+B+C = 84 \times 3 = 252$$~~

~~$$A+B+C+D = 80 \times 4 = 320$$~~

~~$$B+C+D+E = 79 \times 4 = 316$$~~

$$A - E = 4$$

$$A - 71 = 4$$

$$\underline{A = 75}$$

$$64 + 28 = 92$$

$$46 + 82 = 128$$

$$124 - 2 = \underline{\underline{122}}$$

$$\begin{array}{r} 36 \\ \hline 18 \\ \text{---} \\ +2 \\ \hline \end{array}$$

8. The average of 18 observations is recorded as 124. Later it was found that two observations with values 64 and 28 were entered wrongly as 46 and 82. Find the correct average of the 18 observations.

- (1)  $111\frac{7}{9}$       (2) 122

- (3) 123      (4)  $137\frac{3}{n}$

8. The average of 18 observations is recorded as 124. Later it was found that two observations with values 64 and 28 were entered wrongly as 46 and 82. Find the correct average of the 18 observations.

- (1)  $111\frac{7}{9}$     (2)  $\cancel{122}$   
 (3) 123                (4)  $137\frac{3}{9}$

$$\begin{aligned} 64 + 28 &= 92 \\ 46 + 82 &= 128 \\ 124 - 2 &= \underline{\underline{122}} \end{aligned}$$

$\frac{36}{18} (+2)$

5. The average weight of 15 students in a class increases by 1.5 kg when one of the students weighing  $\cancel{40}$  kg is replaced by a new student. What is the weight (in kg) of the new student?  
 (1) 64.5 kg.    (2)  $\cancel{56}$  kg.  
 (3) 60 kg.    (4)  $\cancel{62.5}$  kg.

$$\begin{array}{c} 15 - x = 15x \\ 15 - (x+1.5) = 15x + 22.5 \end{array}$$

$$40 \uparrow \quad \downarrow 62.5$$

22. 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 took the exam~~ was  
 (1) 200                (2) 210  
 (3) 240                (4) 180

$$\begin{array}{l} x - 60 = 60x \\ x - 45 = 45x \end{array}$$

$$15x = \frac{2}{30} \times 100$$

$$x = \underline{\underline{200}}$$

28. There are 50 students in a class. One of them weighing 50 kg goes away and a new student joins. By this the average weight of the

class increases by  $\frac{1}{2}$  kg. The

weight of the new student is :

- (1) 70 kg    (2) 72 kg  
 (3)  $\cancel{75}$  kg    (4) 76 kg

$$\begin{array}{ccc} \text{No.} & \text{Avg} & \text{Total} \\ 50 & x & 50x \\ 50 & \underline{\underline{x+0.5}} & 50x + \cancel{25} \end{array}$$

$$50 + 25 = \underline{\underline{75}}$$

$$(49+1)$$

$$\begin{array}{r} 6 - 20 = 120 \\ 5 - 15 = -75 \\ \hline 45 \end{array}$$

$$\begin{array}{r} 5 - 15 \\ 6 - \cancel{20} \end{array}$$

$$20 + 5 \times 5$$

$$20 + 25 = \underline{\underline{45}}$$

$$64 - x = 64x$$

$$65 - \frac{64x}{65} = 64x$$

4. A cricketer had a 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 of runs is

- 65th innings, he is bowled out for no score on his part. This brings down his average by 2 runs. His new average of runs is  
 (1) 130      (2) 128  
 (3) 70      (4) 68

$$\begin{array}{c} \text{X} \\ \times 5 \\ \hline 64 - 130 = 8320 \\ 65 \quad 1664 \\ \hline 8320 \\ 65 \\ \hline 128 \quad 130 \end{array}$$

$$65 - \frac{64x}{65} = 64x$$

$$x - \frac{64x}{65} = 2$$

$$65x - 64x = 2 \times 65$$

$$x = \underline{130}$$

3. The bowling average of a cricketer was 12.4. He improves his bowling average by 0.2 points when he takes 5 wickets for 26 runs in his last match. The number of wickets taken by him before the last match was  
 (1) 125      (2) 150  
 (3) 175      (4) 200

$$12.4, \quad 12.2$$

$$\frac{12.4x + 26}{x+5} = 12.2$$

$$12.4x + 26 = 12.2x + 61$$

$$12.4x - 12.2x = 61 - 26$$

$$0.2x = 35$$

$$x = \underline{175}$$

2. The average of runs of a cricket player of 10 innings was 32. How many runs must he make in his next inning so as to increase his average of runs by 4 ?  
 (1) 76      (2) 70  
 (3) 4      (4) 2

$$\begin{array}{r} 10 \times 32 \\ 10 \times 36 \end{array} \xrightarrow{\quad +4 \quad} \begin{array}{r} 320 \\ 396 \end{array} \xrightarrow{\quad 76 \quad}$$

$$\frac{24.85x + 52}{x+5} = 24$$

$$0.85x = 68$$

$$x = \frac{68 \times 100}{85.8} = \underline{80}$$

No	Avg	Total
28	50	1400
8	37.5	300
20	55	1100

$$\begin{array}{r} 300 \\ 8 \\ \hline 150 \\ 4 \\ \hline 75 \\ 2 \end{array}$$

$$\begin{array}{r} 5 \quad 140 \quad 700 \\ 4 \quad 130 \quad 520 \\ \hline 180 \end{array}$$

9. The average of five numbers is 140. If one number is excluded, the average of the remaining four numbers is 130. The excluded number is :  
 (1) 134      (2) 134  
 (3) 180      (4) 150

10. The average of five numbers is 7. When three new numbers are included, the average of the eight numbers becomes 8.5. The average of the three new numbers is  
 (1) 9      (2) 10.5  
 (3) 11      (4) 11.5

$$\begin{array}{c} \text{No} & \text{Avg} & \text{Total} \\ 5 & 7 & 35 \\ 8 & 8.5 & 68 \\ & \frac{3}{3} & 11 \end{array}$$

11. The average of six numbers is 32. If each of the first three numbers is increased by 2 and each of the remaining three numbers is decreased by 4, then the new average is  
 (1) 35      (2) 34  
 (3) 31      (4) 30

$$\begin{array}{r} 6 - 32 \\ 3 \rightarrow +2 = +6 \\ 3 - -4 = -12 \end{array} \quad \begin{array}{r} +6 \\ -12 \\ \hline -6 \end{array} \quad \begin{array}{r} -4 \\ -1 \\ \hline -1 \end{array}$$

7. There were 35 students in a hostel. If the number of students is increased by 7 the expenditure on food increases by ₹ 42 per day while the average expenditure of students is reduced by ₹ 1. What was the initial expenditure on food per day?  
 (1) ₹ 400      (2) ₹ 432  
 (3) ₹ 442      (4) ₹ 420

$$\begin{aligned} \frac{x}{35} - 1 &= \frac{x+42}{42} \\ \frac{x-35}{35} &= \frac{x+42}{42} \\ 6x - 210 &= 5x + 210 \\ x &= 420 \end{aligned}$$

8. The average of 6 observations is 45.5. If one new observation is added to the previous observations, then the new average becomes 47. The new observation is  
 (1) 58      (2) 56  
 (3) 50      (4) 46

$$\begin{array}{r} 6 - 45.5 = 273.0 \\ 7 - 47 = 329 \end{array}$$

$$47 + 1.5 \times 6 = 47 + 9 = 56$$

$$329 - 273 = 56$$

14. The average weight of 40 children of a class is 36.2 kg. When three more children with weight 42.3 kg, 39.7 kg and 39.5 kg join the class, the average weight of the 43 children in the class is  
 (1) 39.2 kg      (2) 36.5 kg  
 (3) 38.35 kg      (4) 37.3 kg

$$\begin{array}{r} 40 - 36.2 = 144.8 \\ 42.3 \\ 39.7 \\ + 39.5 \\ \hline 1569.5 \\ 43 \end{array}$$

15. In a class, the average score of girls in an examination is 73 and that of boys is 71. The average score for the whole class is 71.8. Find the percentage of girls.  
 (1) 40%      (2) 50%  
 (3) 55%      (4) 60%

$$\frac{2}{5} = 40\%$$

No. of Boys  $\rightarrow x$   
 No. of girls  $\rightarrow y$

$$\begin{array}{c} G: 73 \\ B: 71 \\ \text{Avg: } 71.8 \\ 2 : 3 \end{array}$$

$$\begin{aligned} \frac{71x + 73y}{x+y} &= 71.8 \\ 71x + 73y &= 71.8x + 71.8y \\ 16y &= 8x \\ \frac{3}{2} &= \frac{x}{y} \end{aligned}$$

$$\begin{array}{r} x = 71 \\ y = 73 \end{array}$$

4. The average age of 8 men is increased by 2 years when two of them whose age are 21 and 23 years replaced by two new men. The average age of the two new men is

- (1) 22 years (2) 24 years  
(3) 28 years (4) 30 years

$$\begin{array}{r} 60 \\ + 30 \\ \hline 21 + 23 + 16 \\ \hline 2 \end{array}$$

$$8 \xrightarrow{x} 8x$$

$$8 \xrightarrow{x+2} 8x + 16$$

$$8x - 21 - 23 +$$

$$21 + 23 + 16$$

$$\begin{array}{r} 60 \\ + \\ \hline 7 \end{array}$$

~~10~~  
~~8~~  
13  
15

$$10 \quad 10 \quad 10 \quad 10 \quad 10 \quad 10 \quad 21 \uparrow \quad 23 \uparrow$$

$$\boxed{10 + 10 + 10 + 10 + 10 + 10} + x + y = 120$$

$$\frac{x+y}{2} = \frac{60}{2} = 30$$

$$17 + 20 - 22 \text{ months}$$

$$\frac{35 + 2 \text{ months}}{2} \quad 17 + 7 \text{ months}$$

$$\begin{array}{r} 4 \quad 12 \\ 5 \quad 17 \end{array}$$

$$17 + (5 \times 4) = 17 + 20 = 37$$

$$\begin{array}{r} 5 \quad 12 \quad 60 \\ 3 \quad 16 \quad 48 \\ \hline 8 \quad \cancel{108} \quad 108 \\ \cancel{8} \end{array}$$

$$13.5$$

No	Avg	Total
40	18	720
20	?	390

$$60 \xrightarrow{\cancel{10}} \frac{18.5}{10} \xrightarrow{\cancel{10}} 11.0$$

$$\frac{390}{20} \quad 19.5 \quad 19.5 \text{ yrs 6 months}$$

5. The average age of eleven players of a cricket team decreases by 2 months when two new players are included in the team replacing two players of age 17 years and 20 years. The average age of new player is

- (1) 17 years 1 month  
(2) 17 years 7 months  
(3) 17 years 11 months  
(4) 18 years 3 months

2. The average age of four brothers is 12 years. If the age of their mother is also included, the average is increased by 5 years. The age of the mother (in years) is :

- (1) 37 years (2) 43 years  
(3) 48 years (4) 53 years

8. The average age of 5 boys is 12 years. The average age of 3 others is 16 years. The average age of all the 8 boys is :

- (1)  $13\frac{1}{2}$  years (2) 14 years  
(3)  $12\frac{1}{2}$  years (4) 13 years

12. The average age of 40 students of a class is 18 years. When 20 new students are admitted to the same class, the average age of the students of the class is increased by 6 months. The average age of newly admitted student is

- (1) 19 years  
(2) 19 years 6 months  
(3) 20 years  
(4) 20 years 6 months

11. The present average age of a family of four members is 36 years. If the present age of the youngest member of the family be 12

$$4 \xrightarrow{36} 144$$

youngest member  $\rightarrow 12 \text{ yrs.}$

ily of four members is 36 years. If the present age of the youngest member of the family be 12 years, the average age of the family at the birth of the youngest member was

- (1) 48 years (2) 40 years  
(3) 32 years (4) 24 years

$$\text{Youngest member} \rightarrow 12 \text{ yrs.}$$

$$144 - 48$$

$$\frac{96}{3} = 32 \text{ yrs}$$

9. Out of 10 teachers of a school, one teacher retires and at his place a new teacher of age 25 years joins. As a result of it, the average age of the teachers is reduced by 3 years. The age of the retired teacher is

- (1) 60 years (2) 58 years  
(3) 56 years (4) 55 years

$$10 - x - (x-3) = 10x - 30.$$

$$? \uparrow + (-3) \times 10 = 25$$

$$? \uparrow = 25 + 30 = 55.$$

19. The average age of a husband and his wife was 23 years at the beginning of their marriage. After five years they have a one-year old child. The average age of the family of three, when the child was born, was

- (1) 23 years (2) 24 years  
(3) 18 years (4) 20 years

20. Two years ago the average age of a family of 8 members was 18 years. After the addition of a baby, the average age of the family is same today. What is the age of the baby?

- (1) 2 years (2)  $1\frac{1}{2}$  years  
(3) 1 year (4)  $2\frac{1}{2}$  years

$$H+W = 46 \quad @ \text{ Marriage.}$$

$$H+W = 54$$

$$H+W =$$

$$\frac{54}{2} = 18$$

	No.	Avg	Total.
2 yrs ago	8	18	144
Today	9	18	162
Baby	8	20	<u>-160</u>
			2 yrs

23. The average age of A and B is 20 years. If A is to be replaced by C, the average would be 19 years. The average age of C and A is 21 years. The ages of A, B and C in order (in years) are

- (X) 18, 22, 20 (X) 18, 20, 22  
(3) 22, 18, 20 (X) 22, 20, 18

29. Average age of 6 sons of a family is 8 years. Average age of sons together with their parents is 22 years. If the father is older than the mother by 8 years, the age of mother (in years) is :

- (1) 44 (2) 52  
(3) 60 (4) 68

$$\frac{A+B}{2} = 20 \Rightarrow A+B = 40 \checkmark$$

$$\frac{B+C}{2} = 19 \Rightarrow B+C = 38 \checkmark$$

$$\frac{A+C}{2} = 21 \Rightarrow A+C = 42 \checkmark$$

$$(A+B+C) = 120 \checkmark$$

$$A = 60 - 38 = 22$$

$$B = 60 - 42 = 18$$

$$C = 60 - 40 = 20$$

$$6 - 8 - 48$$

$$8 - 22 - 176$$

$$M+8 + M+8 = 176$$

✓... - 176 - 176

$$M+8 + M+48 = 176$$

$$2M + 56 = 176$$

$$2M = 120 \quad \underline{60}$$

27. The average age of 30 boys in a class is 15 years. One boy, aged 20 years, left the class, but two new boys came in his place whose age differ by 5 years. If the average age of all the boys now in the class becomes 15 years, the age of the younger newcomer is :  
 (1) 20 years    (2) 15 years  
 (3) 10 years    (4) 8 years

15    20.

33. When the average age of a husband and wife and their son was 42 years, the son got married and a child was born just one year after the marriage. When child turned to be five years then the average age of family became 36 years. What was the age of daughter-in-law at the time of marriage ?  
 (1) 26 years    (2) 25 years  
 (3) 24 years    (4) 23 years

47. In a school, the average age of students is 6 years, and the average age of 12 teachers is 40 years. If the average age of the combined group of all the teachers and students is 7 years, then the number of students is :  
 (1) 396    (2) 400  
 (3) 408    (4) 416

(47)

$$\frac{x \times 6 + 12 \times 40}{x + 12} = 7$$

$$6x + 480 = 7x + 84$$

$$396 = x$$

$$\begin{array}{r} 30 - 15 = 450 \\ -1 \quad \quad \quad -20 \\ +1 \quad \quad \quad x \\ +1 \quad \quad \quad x+5 \\ \hline 31 - 15 = 465 \end{array}$$

$$435 + 2x = 465$$

$$\rightarrow 2x = 36 \quad 15$$

$$\text{Today } H + W + S = 42 \times 3 = 126.$$

$$\text{After 1 yr. } H + W + S + DIL + C$$

$$\text{After 6 yrs. } \frac{H + W + S + DIL + 5}{5} = 36$$

$$H + W + S + DIL + 5 = 180.$$

$$144 + DIL + 5 = 180$$

$$149 + DIL = 180$$

$$\underline{DIL} \quad \underline{31 - 6} = 25$$

53. The frequency distribution data is given below. If the average age is 17 years, the value of  $m$  is

Age (in years) : 8    20    26    29

Number of people : 3    2     $m$     1

- (1) 1    (2) 2  
 (3) 3    (4) 4

(SSC CGL Tier-II Exam. 21.09.2014)

(53)

$$17 = \frac{8 \times 3 + 20 \times 2 + 26 \times m + 29 \times 1}{6 + m}$$

$$102 + 17m = 24 + 40 + 26m + 29$$

$$102 - 93 = 9m$$

$$19 = 9m$$

61. The average age of 30 students of a class is 14 years 4 months. After admission of 5 new students in the class the average becomes 13 years 9 months. The youngest one of the five new students is 9 years 11 months old. The average age of the remaining 4 new

$$30 - 14 \text{ yrs 4 months} - 420 \text{ yrs} + \frac{120 \text{ months}}{12}$$

$$30 \longrightarrow 430$$

$$35 - 13 \text{ yrs 9 months} - 455 + \frac{315 \text{ months}}{12}$$

one of the five new students is 9 years 11 months old. The average age of the remaining 4 new students is

- (1) 11 years 2 months
- (2) 13 years 6 months
- (3) 12 years 4 months
- (4) ~~10 years 4 months~~

10 yrs 4 months

$$35 \text{ --- } 13 \text{ yrs } 9 \text{ months } - 455 + \frac{315}{12} \text{ months}$$

$$48 \text{ yrs } 3 \text{ months}$$

$$\begin{array}{r} 50 \\ 51 \text{ yrs } 3 \text{ months} \\ 9 \quad 11 \text{ months} \\ \hline 41 \text{ yrs } 4 \text{ months} \\ 4 \end{array}$$

$$\frac{3x \times 18 + 2x \times 12}{5x}$$

$$\frac{54x + 24x}{5x} = \frac{78x}{5x}$$

$$15.6$$

79. The average age of the boys in a class is 18 years. The average age of the girls in that class is 12 years. If the ratio of the number of boys and girls in that class is 3 : 2, then the average age of the class is :
- (1) ~~15.6 years~~
  - (2) ~~16.5 years~~
  - (3) 15 years
  - (4) 16 years

1. A company produces an average of 4000 items per month for the first 3 months. How much items, it must produce on an average per month over the next 9 months to average 4375 items per month over the whole year?

- (1) 4500
- (2) 4600
- (3) 4680
- (4) 4710

$$\begin{array}{r} 3 \text{ --- } 4000 \text{ --- } 12000 \\ 9 \text{ --- } ? \text{ --- } 40500 \\ 12 \text{ --- } 4375 \text{ --- } 52500 \end{array}$$

$$\frac{40500}{9} \quad \frac{4500}{9}$$

$$8000 = \frac{7 \times 12000 + x \times 6000}{7+x}$$

$$56000 + 8000x = 84000 + 6000x$$

$$\cancel{76000}x = \cancel{28000} \quad 14.$$

$$7+14=21$$

$$\frac{A}{8 \times 15} \quad \frac{M}{6 \times x} = 10.8$$

$$120 + 6x = 10.8x + 86.4$$

$$\begin{array}{r} 33.6 \\ 7 \cancel{84} \quad \cancel{336} \\ \hline 12 \quad 48 \end{array} = x$$

$$\frac{11y @}{y} \quad \frac{s}{T}$$

$$\frac{11y \times s + y \times T}{12y} = \frac{(11s+T)@}{12@}$$

9. The average monthly income (in ₹) of certain agricultural workers is S and that of other workers is T. The number of agricultural workers is 11 times that of other workers. Then, the average monthly income (in ₹) of all the workers is :

- (1)  $\frac{S+11T}{12}$
- (2)  $\frac{S+T}{12}$

9. The average monthly income (in ₹) of certain agricultural workers is S and that of other workers is T. The number of agricultural workers is 11 times that of other workers. Then, the average monthly income (in ₹) of all the workers is :

$$(1) \frac{S+11T}{12} \quad (2) \frac{S+T}{12}$$

$$(3) \frac{11S+T}{12} \quad (4) \frac{1}{11S} + T$$

12. The average pocket money of 3 friends A, B, C is ₹80 in a particular month. If B spends double and C spends triple of what A spends during that month and if the average of their unspent pocket money is ₹ 60, then A spends (in ₹)

$$(1) ₹ 10 \quad (2) ₹ 20 \\ (3) ₹ 30 \quad (4) ₹ 40$$

16. The average expenditure of a man for the first five months of a year is ₹ 5,000 and for the next seven months it is ₹ 5,400. He saves ₹ 2,300 during the year. His average monthly income is :

$$(1) ₹ 5,425 \quad (2) ₹ 5,500 \\ (3) ₹ 5,446 \quad (4) ₹ 5,600$$

21. The average salary of all staff of a school is ₹ 10,000. The average salary of 20 teaching staff is ₹ 12,000 and that of non-teaching staff is ₹ 5000, the number of non-teaching staff will be

$$(1) 7 \quad (2) 8 \\ (3) 10 \quad (4) 12$$

22. B was born when A was 4 years 7 months old and C was born when B was 3 years 4 months old. When C was 5 years 2 months old, then their average age was

$$(1) 8 \text{ years } 9 \text{ months} \\ (2) 7 \text{ years } 3 \text{ months} \\ (3) 8 \text{ years } 7 \text{ months} \\ (4) 8 \text{ years } 11 \text{ months}$$

28. While purchasing one item costing ₹400, one has to pay sales tax at 7% and on another costing ₹ 6400, the sales tax was 9%. The per cent of sales tax one has to pay, taking these items together on an average is :

$$(1) 8\frac{13}{17} \quad (2) 8\frac{15}{17}$$

$$\frac{11y}{y} = \frac{S}{T}$$

$$\frac{11y \times S + y \times T}{12y} = \frac{(11S+T)}{12}$$

$$A+B+C = 80 \times 3 = 240.$$

$$\begin{array}{c} 10 \\ x \\ \hline 20 \\ 2x \\ \hline 30 \\ 3x \end{array}$$

$$240 - 6x = 180$$

$$60 = 6x \quad 60 \times 3 = 180$$

$$\frac{5 \times 5000 + 7 \times 5400 + 2300}{12}$$

$$\frac{25000 + 37800 + 2300}{12}$$

$$\frac{65100}{12} = 5425$$

$$10000 = \frac{20 \times 12000 + x \times 5000}{20+x}$$

$$200000 + 10000x = 240000 + 5000x$$

$$5000x = 40000$$

$$x = 8$$

A 4 yrs 7 months	B 0. 3 yrs 4 m.	C 6
---------------------	-----------------------	--------

$$\frac{13 \text{ yrs } 1 \text{ month} + 8 \text{ yrs } 6 \text{ months} + 5 \text{ yrs } 2 \text{ months}}{3}$$

$$\frac{26 \text{ yrs } 9 \text{ months}}{3}$$

$$8 \text{ yrs } 11 \text{ months}$$

$$\frac{400 \times 7}{100} = 28.$$

$$\frac{6400 \times 9}{100} = 576$$

$$6800 \times x = 604.$$

er on an average is :

(1)  $8\frac{13}{17}$       ~~(2)~~  $8\frac{15}{17}$

(3)  $8\frac{1}{2}$       (4) 8

104

$$6800 \times \frac{x}{100} = 604.$$

$$x = \frac{151}{17} \frac{604 \times 100}{6800}$$

$$8\frac{15}{17}$$

$$\frac{3^{30} + 3^{60} + 3^{90}}{3} = 3 \left( \frac{3^{29} + 3^{59} + 3^{89}}{3} \right)$$

$$a^m \times a^n = a^{m+n}.$$

$$a^{30} = a^1 \times a^{29}$$

44. The mean of 100 observations was calculated as 40. It was found later on that one of the observations was misread as 83 instead of 53. The correct mean is :

(1) 39      ~~(2)~~ 39.7  
(3) 40.3      (4) 42.7

(SSC CGL Tier-I (CBE)

Exam. 28.08.2016) (IInd Sitting)

45. Visitors to a show were charged Rs. 15 each on the first day, Rs. 7.50 on the second day, Rs. 2.50 on the third day and total attendance on three days were in the ratio 2 : 5 : 13 respectively. The average charge per person for the entire three days is

~~(1)~~ Rs. 5      (2) Rs. 5.50  
(3) Rs. 6      (4) Rs. 7

$$\begin{array}{r} 100 - 40 - 4000 \\ \quad \quad \quad - 83 \\ \quad \quad \quad + 53 \\ \hline 3970 \\ \overline{100} \\ \underline{3970} \\ 39.7 \end{array}$$

$$\begin{array}{r} 15 \quad 7.5 \quad 2.5 \quad 100 \\ 20 \quad 50 \quad 130 \quad 200 \\ \hline 300 \quad + 375 \quad + 325 \\ \underline{\underline{5}} \end{array}$$

1. Find the average of 1, 2, 3, .....50? 25.5

$$\frac{1+50}{2} = \frac{51}{2} = 25.5$$

2. Find the average of all even numbers from 1-100 50

$$2, 4, 6, 8, \dots, 100 \quad \frac{2+100}{2} = \frac{102}{2} = 51$$

3. Find the average of all odd numbers from 1-100? 50

$$\frac{1+99}{2} = \frac{100}{2} = 50$$

4. Find the average of first 6 multiples of 8? 28

$$8, 16, 24, 32, 40, 48$$

$$\frac{8+48}{2} = \frac{56}{2} = 28$$

$$(7) 14, 21, 28, 35, 42, 49, 56, 63$$

$$\frac{7+63}{2} = \frac{70}{2} = 35$$

6. Find the average of all the multiples of 7 from 1-100? 52.5

$$\frac{7+98}{2} = \frac{105}{2} = 52.5$$

7. Find the average of all the multiples of 9 from 1-100? 54

$$\frac{9+99}{2} = \frac{108}{2} = 54$$

8. If the average of first 6 multiples of a number is 28 then find the number? 8

$$\frac{x+6x}{2} = 28 \quad \frac{7x}{2} = 28 \quad 7x = 56 \quad 8$$

9. If the average of first 8 multiples of a number is 54 then find the number? 12

$$\frac{x+8x}{2} = 54 \quad \frac{9x}{2} = 54 \quad 9x = 108 \quad 12$$

10. If the average of first 6 multiples of a

$$x+6x = 21.6 \quad \frac{7x}{2} = 21.6 \quad 7x = 43.2$$

number is 54 then find the number? 12

10. If the average of first 6 multiples of a number is 31.5 then find the number? 9

11. If the average of 5 consecutive natural numbers is 37 then find the highest number? 39

12. If the average of 7 consecutive natural numbers is 52 then find the product of first & last? 2695

13. If the average of 6 consecutive natural no. is 23.5, find the first number? 21

14. If the average of 4 consecutive even no. is 25 then find the last number?

15. If the average of 5 consecutive odd numbers is 37 then fins the highest number? 41

$$\frac{x+8x}{2} = 54 \quad 9x = 108 - 12$$

$$\frac{x+6x}{2} = 31.5 \quad 7x = 63 - 9$$

$$1, 2, 3, 4, 5 \quad x \ x+1 \ x+2 \ x+3 \ x+4$$

35 36 37 38 39

→ 49      52      55      ↓      37      39

$$49 \times 55$$

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

$$\frac{x+x+5}{2} = 23.5 \quad 2x+5 = 47$$

$$2x = 42 - 21.$$

$$x \ x+2 \ x+4 \ x+6 \quad \frac{2x+6}{2} = 25$$

$2x+6 = 50$   
 $x = 49 - 22$   
 $22+6 = 28$

#### Inclusion & Exclusion: -

1. The average age of 11 players in the team is 25 years; if the age of coach is included the average becomes 27 years find the age of coach? 49

$$11 \longrightarrow 25$$
$$12 \longrightarrow 27$$

$$27 + 2 \times 11 = 27 + 22 = 49$$

$$(17) \longrightarrow 56 \rightarrow$$
$$18 \longrightarrow 56$$

$$56 + (+6) \times 17$$

$$56 + 102 = \underline{\underline{158}}$$

$$6 - 65 \rightarrow$$
$$7 - 62$$

$$62 + (-3) \times 6$$

$$62 - 18 = \underline{\underline{44}}$$