

Average :

$$\text{Avg} = \frac{\text{Sum of Observation}}{\text{Total No. of Observation}}$$

Consecutive No.:

$$x, x+1, x+2, x+3, \dots$$

10, 11, 12, 13, 14

Consecutive Odd No.:

$$x, x+2, x+4, x+6, \dots$$

1, 3, 5, 7, 9

Consecutive Even No.:

$$x, x+2, x+4, x+6, \dots$$

2, 4, 6, 8, 10

\downarrow

Avg

$$1. 1, 3, 5, 7, 9 \Rightarrow 5$$

$$2. 26, 28, 30, 32, 34 \Rightarrow 30$$

$$3. 96, 97, 98, 99, 100 \Rightarrow 98$$

$$4. 101, 102, 103, 104 \Rightarrow 102.5$$

$$5. 52, 54, 56, 58 \Rightarrow 55$$

1. The average age of A, B and C is 26 years, if the average age of A and C is 29 years, what is the age of B in years?

$$\begin{aligned} \frac{A+B+C}{3} &= 26 \\ A+B+C &= 78 \end{aligned} \quad \left| \begin{array}{l} \frac{A+C}{2} = 29 \\ A+C = 58 \end{array} \right.$$

$$A+C+B = 78$$

$$58+B = 78$$

$$B = 78 - 58$$

$$\boxed{B = 20}$$

2. The average of 7 numbers is 5. If the average of first six of these numbers is 4, the seventh no. is?

$$\text{Total } 7 \times 5 = 35$$

$$1-6 \Rightarrow 24 (6 \times 4)$$

$$\Rightarrow 35 - 24$$

$\Rightarrow 11 \Rightarrow 7^{\text{th}}$ Number

3. The average of 10 numbers is 7. What will be the new average if each of the numbers is multiplied by 8?

$$10 \text{ No.'s total} = 10 \times 7 = 70$$

If all the numbers are multiplied by 8.

$$\text{Then, } 70 \times 8 = 560$$

$$\begin{aligned} \text{Avg} &= \frac{560}{10} \\ &= 56 \end{aligned}$$

The average of five consecutive even numbers starting with 4 is

$$\underline{4} \quad \underline{6} \quad \underline{8} \quad \underline{10} \quad \underline{12}$$

$$\text{Avg} = 8$$

A, B, C and D are four consecutive even no. respectively and their average is 65. What is the product of A and D?

$$\begin{array}{cccccc} A & B & \boxed{C} & D \\ \underline{62} & \underline{64} & \underline{65} & \underline{66} & \underline{68} \end{array}$$

$$A \times D \Rightarrow 62 \times 68$$

$$\Rightarrow 4216$$

A, B, C and D are four consecutive odd no. and their average is 42. What is the product of B and D.

$$\begin{array}{cccc} A & B & \downarrow & C & D \\ 39 & 41 & 42 & 43 & 45 \end{array}$$

$$B \times D = 41 \times 45 \\ = 1845$$

of the three numbers. The first is twice the second and the second is thrice the third. If the average of the three numbers is 10. The numbers are:

$$\text{Third} = x \Rightarrow 3$$

$$\text{Second} = 3x \Rightarrow 9$$

$$\text{First} = 6x \Rightarrow 18$$

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

Numbers are:

The sum of five numbers is 555. The average of the first two numbers is 75 and third number is 115. What is the average of the last two numbers?

$$a + b + c + d + e = 555$$

$$\frac{a+b}{2} = 75 \Rightarrow a + b = 150$$

$$c = 115$$

$$150 + 115 + d + e = 555$$

$$d + e = 555 - 265$$

$$d + e = 290$$

$$\text{Avg} \Rightarrow d + e = \frac{290}{2}$$

$$d + e = 145$$

The average expenditure of a man for the first five months is Rs. 3600 and for next seven months it is Rs. 3900. If he saves Rs. 8700 during the year, his average income per month is?

$$5 \times 3600 \Rightarrow 18000 \quad (\text{Expend})$$

$$7 \times 3900 \Rightarrow 27300$$

$$\frac{8700}{(\text{Savings})} \\ (\text{1 year in}) \quad \underline{\underline{54000}}$$

$$\frac{54000}{12 \text{ (12 Months)}} \Rightarrow 4500$$

The sum of three numbers is 98. If the ratio between first and second be 2:3 and between second and third be 5:8, then the second number is:

$$a + b + c = 98 \quad \textcircled{1}$$

$$a:b = 2:3 \Rightarrow \frac{a}{b} = \frac{2}{3}$$

$$b:c = 5:8 \Rightarrow \frac{b}{c} = \frac{5}{8}$$

$$a = \frac{2b}{3}$$

$$c = \frac{8b}{5}$$

Sub in \textcircled{1}

$$\frac{2b}{3} + b + \frac{8b}{5} = 98$$

$$\frac{10b + 15b + 24b}{15} = 98$$

$$\frac{49b}{15} = 98$$

$$b = 30$$

of a
months
at seven
of the,
the
one per

ispend)
savings

number is
first
and
third
and

$\frac{2}{3}$
 $\frac{5}{4}$

+ 7 + A

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The average of marks obtained by 120 candidates was 35. If the average of marks of passed candidates was 39 and that of failed candidates was 15, the number of candidates who passed the examination is:

$$120 \times 35 = 4200 \quad (\text{Total marks})$$

$$\begin{array}{c} 120 \\ / \quad \backslash \\ x \quad 120-x \\ \text{Pass} \quad \text{Fail} \end{array}$$

$$4200 = (x \times 39) + ((120-x) \times 15)$$

$$4200 = 39x + 1800 - 15x$$

$$4200 - 1800 = 39x - 15x$$

$$2400 = 24x$$

$$x = 100$$

$$\text{Pass} = 100$$

$$\text{Fail} = 120 - 100 = 20$$

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 the students is 7 years, then the number of students is:

$$\text{Teachers} = 12 \times 40 = 480$$

$$\text{Je} \downarrow \text{Student} \quad (12+x) \times 7 = (x \times 6) + (480)$$

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

$$84 + x = 480$$

$$x = 480 - 84$$

$$x = 396$$

$$\text{stu} = x$$

The average monthly salary of all the employees in an industry is Rs. 12000. The average salary of male employee is Rs. 15000 and that of female employee is Rs. 8000. What is the ratio of male employee to female employee?

$$\text{Male} = x$$

$$\text{Female} = y$$

$$(x+y) \times 12000 = (x) \times 15000 + y \times 8000$$

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

$$12x + 12y = 15x + 8y$$

$$12y - 8y = 15x - 12x$$

$$4y = 3x$$

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

$$\text{Ratio} = 4 : 3$$

In a school with 600 students the avg age of the boys is 12 years and that of the girls is 11 years. If the average age of the school is 11 years and a months, then the number of girls in the school.

$$\begin{array}{c} 600 \\ / \quad \backslash \\ x \quad \frac{600-x}{\text{boys}} \quad \text{girls} \end{array}$$

$$600 \times 11 \text{ yrs } 9 \text{ mon} = x \times 12 + (600-x) \times 11$$

$$600 \times 11 \frac{9}{12} \text{ Month} = 12x + 6600 - 11x$$

$$600 \times 11 \frac{9}{12} = 12x + 6600 - 11x$$

$$600 \times 11 \frac{3}{4} = 12x + 6600 - 11x$$

$$600 \times \frac{47}{4} = 12x + 6600 - 11x$$

$$150 \times 47 = 12x + 6600 - 11x$$

$\Rightarrow 7050$

$$7050 = x + 6600$$

$$7050 - 6600 = x$$

$$\boxed{x = 450}$$

$$\text{Boys} = 450$$

$$\text{Girls} = 600 - 450 = 150$$

The average salary of all the staff in an office of a corporate house is Rs. 5000. The average salary of the officers is Rs. 14000 and that of the rest is Rs. 4000. If the total number of staff is 500, the number of officers?

$$500 \times 5000 = x \times 14000 + (500-x)4000$$

$$500 \times 5 = 14x + (2000 - 4x)$$

$$2500 = 14x + 2000 - 4x$$

$$500 = 10x$$

$$\boxed{x = 50}$$

Jane / False Average:

1. The mean of the marks obtained by 100 students is 60. If the marks obtained by one of the students was incorrectly calculated as 75, whereas the actual marks obtained by him was 65, what is the correct mean of the marks obtained by the students?

$$100 \times 60 = 6000 \text{ (Total Marks)}$$

$$\text{Actual mark: } 65$$

$$\text{Wrong mark: } 75$$

$$6000 - 10$$

$$5990 \rightarrow \text{Total}$$

$$\begin{aligned} \text{Avg} &= \frac{5990}{100} \\ &= 59.9 \end{aligned}$$

A Maths Teacher calculated the marks secured by 35 students of 8th class. The avg of their marks was 72. If the marks secured by Reema was written as 36 instead of 86 then the correct average marks up to two decimal places.

$$35 \times 72 = 2520 \text{ (Total)}$$

Reema

$$A.M = 86$$

$$N.M \Rightarrow 36$$

$$2520 + 50$$

$$\Rightarrow \frac{2570}{35} \Rightarrow 73.43$$

The average
Students
 $\frac{71}{11}$. But it
the marks
been written
instead of
as $\frac{74}{11}$ in
The correct

$$14 \times 71 =$$

$$EM = 42$$

$$AC = 56$$

A

The avg
of a class
If the
were mis
of the
then wh
correct

$$20 \times 68$$

$$EM : 7$$

$$AM : 4$$

Average:

The marks obtained by the students was 65, correct mean of 14 obtained by the

(Total Marks)

- 10

Calculated and by the class marks was secured written as when the marks up to

D (Total)

.43

The average of marks of 14 students 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 avg is:

$$14 \times 71 = 994 + 14 - 42$$

$$\begin{array}{l} EM = 42 \downarrow -14 \\ AC = 56 \end{array} \quad \left| \begin{array}{l} EM: 74 \downarrow -42 \\ AC: 32 \end{array} \right.$$
$$= 994 - 28$$
$$A = \frac{996}{14}$$
$$= 69$$

The avg marks in science of a class of 20 students is 68. If the marks of two students were misread as 48 and 65 of the actual marks 72 and 61, then what would be the correct average?

$$20 \times 68 \Rightarrow 1360 + 24 - 4$$

$$\begin{array}{l} EM: 72 \downarrow +24 \quad 61 \downarrow -4 \\ AM: 48 \quad 65 \end{array}$$
$$\Rightarrow \frac{1380}{20}$$
$$= 69$$

The average marks in English subject of a class of 24 students is 56. If the marks of three students were misread as 44, 45 and 61, of the actual marks 48, 59 and 67, respectively then what would be the correct average.

$$\begin{array}{l} EM: 44 \downarrow +45 \downarrow +61 \downarrow +6 \\ AM: 48 \quad 59 \quad 67 \end{array}$$
$$24 \times 56 = 1344 + 4 + 14 + 6$$
$$= \frac{1368}{24}$$
$$= 57$$

Replacing a Person:

1. The avg age of a committee of 8 mem is 40 years. A mem aged 55 years, retired and he was replaced by a mem aged 39 years. The avg age of the present committee is:

$$8 \times 40 = 320$$

$$\text{Total Years} = 320 - 55 + 39$$

(R)

$$\begin{aligned} &= \frac{304}{8} \\ &= 38 \end{aligned}$$

The avg weight of 3 men
A, B, C is 84 Kg, another man,
D, joins the group, and the
average weight becomes 80 Kg.
if another man E, whose weight
3 Kg more than that of D, replace
A, then average weight of B, C, P
and E becomes 79 Kg. The weight
of A is?

$$\frac{A+B+C}{3} = 84 \text{ Kgs}$$

$$A+B+C = 252 \quad \text{---(1)}$$

$$\frac{A+B+C+D}{4} = 80$$

$$A+B+C+D = 320 \quad \text{---(2)}$$

$$252 + D = 320$$

$$D = 320 - 252$$

$$E = D + 3$$

$$E = 320 + 3$$

$$D = 68 \text{ Kg}$$

$$E = D + 3$$

$$E = 68 + 3$$

$$E = 71$$

$$\frac{B+C+D+E}{4} = 79$$

$$B+C+D+E = 316$$

$$B+C+68+71 = 316$$

$$B+C = 117 \text{ in (1)}$$

$$A+117 = 252$$

$$A = 252 - 117$$

$$A = 75$$

Including and excluding:

The avg weight of 21 boys
was recorded as 64 Kg. If the
weight

AVERAGE : LESSON-6 INCLUDING/EXCLUDING

$$\begin{array}{ll} \text{Boys} & \text{Boys+Teacher} \\ (21 \times 64) & \sim (22 \times 65) \end{array}$$

$$1344 \sim 1430$$

$$\boxed{86\text{kg}}$$



The average weight of 21 boys was recorded as 64kg. If the weight of the teacher was added the average increased by one Kg. What was the teachers age?

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AVERAGE : LESSON-6 INCLUDING / EXCLUDING

$$\begin{array}{rcl} \text{Girls + Teacher} & & \text{Girls} \\ (15 \times 15) & \sim & (14 \times 14) \end{array}$$

$$225 \sim 196$$

[29 age]



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The average age of 14 girls and their teacher's age is 15yr. If the teacher's age is excluded then the average reduced by 1 . What is the teacher's age?

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AVERAGE : LESSON-6 INCLUDING/EXCLUDING

Family
 (5×25) (6×35)

$$25 + \frac{25 \times 10}{100}$$



The average age of 5 members of a family is 25 yr. If the servant of the family is included the average age increased by 40%. What is the age of the servant?

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AVERAGE : LESSON-6

INCLUDING/EXCLUDING

Family (5×25)

$F+S$ (6×35)

$125 \sim 210$

85 age



The average age of 5 members of a family is 25 yr. If the servant of the family is included the average age increased by 40%. What is the age of the servant?

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AVERAGE : LESSON-6 INCLUDING/EXCLUDING

Family
 $4 \times 25 = 100$

$$\frac{1}{5} + \frac{25}{100} \times \frac{26}{4}$$

The average age of 4 members of a family is 25yr.If head of the family is included in this group then average age increased by 20%.Find out the age of the head?

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AVERAGE : LESSON-6 INCLUDING/EXCLUDING

$$\begin{array}{ll} \text{Family} & \text{F+ Head} \\ (4 \times 25) & (5 \times 30) \\ \underline{(100)} & \sim \underline{150} \\ & \boxed{50 \text{ age}} \end{array}$$



The average age of 4 members of a family is 25yr.If head of the family is included in this group then average age increased by 20%.Find out the age of the head?

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AVERAGE : LESSON-6 INCLUDING/X/EXCLUDING

$$\frac{x \times 35 + 6 \times 33}{x+6} = 35 - 0.5$$

$$35x + 198 = 34.5(x+6)$$

$$35x + 198 = 34.5x + 207$$

$$0.5x = 9 \\ x = 90/5 \Rightarrow 18$$

The average age of the class is 35yr.6 new students with an average age of 33yr joined in that class, thereby decreasing the average by half year. The original strength of the class was ?

AVERAGE : LESSON-7

AVERAGE SPEED

If the Certain distance is Covered at the Speed of x Km/hr and the Same distance is Covered at y Km/hr, then the average speed during entire journey = $\left(\frac{2xy}{x+y}\right)$ Km/hr.



A man goes to a certain place at a speed of 30km\hr and returns to original place at a speed of 20km\hr,Find out the average speed during the entire journey

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AVERAGE : LESSON-7

AVERAGE SPEED

If the Certain distance is Covered at the Speed of x Km/hr and the Same distance is Covered at y Km/hr, then the average speed during entire journey = $\left(\frac{2xy}{x+y}\right)$ Km/hr.

$$= \frac{2 \times 30 \times 20}{50}$$
$$\Rightarrow \underline{\underline{24 \text{ km/hr}}}$$



A man goes to a certain place at a speed of 30km\hr and returns to original place at a speed of 20km\hr,Find out the average speed during the entire journey

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AVERAGE : LESSON-7

AVERAGE SPEED

If the certain distance is covered at the speed of x km/hr and the same distance is covered at y km/hr, then the average speed during entire journey = $\left(\frac{2xy}{x+y} \right)$ km/hr.

$$\left(\frac{3xyz}{xy+yz+zx} \right)$$

A train covers the first 160km at a speed of 120km\hr , another 160km at 140km\hr and last 160km at 80km\hr. Find out the average speed of the train for entire journey

AVERAGE : LESSON-7

AVERAGE SPEED

The person covers A Km at a speed of x km/hr, B Km at a speed of y km/hr and C Km at a speed of Z km/hr. Find out avg speed of entire journey.

$$\left(\frac{A+B+C}{\frac{A}{x} + \frac{B}{y} + \frac{C}{z}} \right) \text{ Km/hr.}$$

$$\left(\frac{9+25+30}{\frac{9}{3} + \frac{25}{5} + \frac{30}{10}} \right)$$



A person covers 9km at a speed of 3km\hr, 25km at a speed of 5km\hr and 30km at a speed of 10km\hr. Find out the average speed of the entire journey?

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