Chapter one

Averages, Sums and products

- To find the average of three numbers, we first add them together and divide our answer by 3.
- To find the average of two numbers, /we add these two numbers up and divide the answer by 2
- Lastly to find the average of six numbers, we first add up these six numbers and divide our answer by 6.

Q1. Find the average of the following

numbers: 20 and 10.

Soln.

The average = $\frac{20+10}{2} = \frac{30}{2} = 15.$

Q2. Find the average of 6,4 and 2.

Soln.

The average $= \frac{6+4+2}{3} = \frac{12}{3} = 4.$

Q3. Find the average of 30, 10 and 20.

Soln.

The average $= \frac{30+10+20}{3} = \frac{60}{3} = 20.$

Q4. Calculate the average of 10,20,8 and 2.

Soln.

The average = $\frac{10+20+8+2}{4} = \frac{40}{4} = 10.$

Q5. The average of two numbers is 6.

If one of these numbers is 7, find the other one.

Soln.

Let x = the other number.

Then the average of 7 and x is equal to 6.

$\therefore \frac{7 + x}{2} = 6,$

=>7+ x = 2 x 6, => 7+x = 12, => x = 12 – 7, => x = 5.

Q6. The average of two numbers is 3. If one of these numbers is 2, find the other one.

Soln.

Let x = the other number. Then the average of 2 and x = 3,

$\Longrightarrow \frac{2 + x}{2} = 3,$

=>2 + x = 2 x 3, =>2 + x = 6,

=> x = 6 – 2, => x = 4.

Q7. The average of three numbers is 5.

If two of these numbers are 8 and 3, find the third one.

Soln.

Let x = the third number. Then the average of 8, 3 and x = 5,$\Longrightarrow \frac{8+3+x}{3}$ = 5,$\Longrightarrow$ 8+3+ x = 3 x 5,

=> 11 +x = 15,=>x = 15 – 11 = 4.

$\therefore$ The third number = 4.

Q8. A boy calculated the average of four numbers and had 5 as the average. If 2, 4 and 8 are three of the numbers, find the fourth one.

Soln.

Let x = the unknown or the fourth number.

Then the average of x, 2, 4 and 8 = 5,

$\therefore \frac{x+2+4+8}{4} = 5, \Longrightarrow$ x +2+4+8 = 4 x 5,

=> x + 14 = 20.

$\therefore x$ = 20 – 14 = 6, =>the fourth number = 6.

Q9. The average of two numbers is 4. If these two numbers are the same or equal, find these numbers.

Soln.

Let x = one of the numbers. Since the two numbers are the same, then the other one is equal to x.

But since the average of these two numbers = 4,

$\Longrightarrow \frac{x+x}{2} = 4, \Longrightarrow \frac{2x}{2} = 4,$

$\therefore$ 2x = 2 x 4 $\Longrightarrow$ 2x = 8,

$\therefore x = \frac{8}{2} = 4.$

The number is 4.

Q10. A class teacher calculated the average age of five students, and had 2 years as their average age. If the ages of four of the boys are 1 year, 2 years, 1 year and 4 years, determine the age of the last boy.

Soln.

Let x = the age of the last boy.

Since the average age of the five boys = 2, then $\frac{1+2+1+4+x}{5} = 2$,

=>1+2 + 1 + 4+x = 2 x 5,

$\Longrightarrow$ 8 + x = 10, =>x = 10 – 8 = 2.

The last boy is 2yrs old.

Q11. The average of 2 numbers is $\frac{1}{2}$. If one these numbers is 4, determine the other one.

Soln.

Let x = the other number.

Then the average of x and 4 = ½,

$\frac{x+4}{2} = \frac{1}{2}, \Longrightarrow 2(x+4) =$ 1 x 2,

=>2x + 8 = 2, =>2x = 2 – 8 = - 6,

$\therefore x = \frac{-6}{2} = -3.$

The other number = -3.

Q12. The average of three numbers is $\frac{2}{3}$. If two of these numbers are 2 and 4, determine the third one.

Soln.

Let x = the third number. Then

$\frac{2+4+x}{3} = \frac{2}{3}, \Longrightarrow 3(6+x) = 3$ x 2,

$\Longrightarrow$ 18 + 3x = 6, =>3x = 6 – 18 = -12,

$\therefore x = \frac{-12}{3} = -4.$

The third number = - 4.

Q13. The averages age of five pupils in a class is

2 years. Determine their total age.

Soln.

Total age = 2 x 5 = 10years.

Q14. The average mark scored by 10 students in an examination is 3. Determine their total marks.

Soln.

Their total mark = 3 x 10 = 30 marks.

Q15. Find the average of the following: 2*x*, 3*x* and 4*x*.

Soln.

Average = $\frac{2x + 3x + 4x}{3} = \frac{9x}{3} = 3x$.

Q16. The average age of three boys is 4 years. If one of them is 8 years old and the other two are of the same age, find the ages of the other two boys.

Soln.

Let *x* = the age of each of the other two boys.

Since the average age of these three boys is 4, then $\frac{8 + x + x}{3} = 4, \Longrightarrow \frac{8 + 2x}{3} = 4,$

$\Longrightarrow 8 + 2x = 3$ x 4,

$\therefore$ 8 + 2*x* = 12, => 2*x* = 12 – 8 = 4,

=> x = $\frac{4}{2} = 2.$

Each of the other boys is 2yrs old.