

**RD SHARMA**

**Solutions**

**Class 7 Maths**

**Chapter 23**

**Ex 23.1**

**Q1) Ashish studies for 4 hours, 5 hours and 3 hours on three consecutive days. How many hours does he study daily on an average?**

**Solution:**

$$\text{Average number of study hours} = (4 + 5 + 3) \div 3$$

$$= 12 \div 3$$

$$= 4 \text{ hours}$$

Thus, Ashish studies for 4 hours on an average.

**Q2) A cricketer scores the following runs in 8 innings: 58, 76, 40, 35, 48, 45, 0, 100.**

**Find the mean score.**

**Solution:**

We have:

$$\text{The mean score} = (58 + 76 + 40 + 35 + 48 + 45 + 0 + 100) \div 8$$

$$= 402 \div 8$$

$$= 50.25 \text{ runs.}$$

**Q3) The marks (out of 100) obtained by a group of students in science test are 85, 76, 90, 84, 39, 48, 56, 95, 81 and 75. Find the**

**(i) highest and the lowest marks obtained by the students.**

**(ii) range of marks obtained.**

**(iii) mean marks obtained by the group.**

**Solution:**

In order to find the highest and lowest marks, let us arrange the marks in ascending order as follows:

$$39, 48, 56, 75, 76, 81, 84, 85, 90, 95$$

(i) Clearly, the highest mark is 95 and the lowest is 39.

(ii) The range of the marks obtained is:  $(95 - 39) = 56$ .

(iii) We have:

$$\text{Mean marks} = \text{Sum of the marks} \div \text{Total number of students}$$

$$\Rightarrow \text{Mean marks} = (39 + 48 + 56 + 75 + 76 + 81 + 84 + 85 + 90 + 95) \div 10$$

$$= 729 \div 10$$

$$= 72.9.$$

Hence, the mean mark of the students is 72.9.

**Q4) The enrolment of a school during six consecutive years was as follows:**

**1555, 1670, 1750, 2019, 2540, 2820**

**Find the mean enrollment of the school for this period.**

**Solution:**

The mean enrolment = Sum of the enrolments in each year  $\div$  Total number of years

$$\text{The mean enrolment} = (1555 + 1670 + 1750 + 2019 + 2540 + 2820) \div 6$$

$$= 12354 \div 6$$

$$= 2059.$$

Thus, the mean enrolment of the school for the given period is 2059.

**Q5) The rainfall (in mm) in a city on 7 days of a certain week was recorded as follows:**

Day	Mon	Tue	Wed	Thu	Fri	Sat	Sun
Rainfall (in mm)	0.0	12.2	2.1	0.0	20.5	5.3	1.0

**(i) Find the range of the rainfall from the above data.**

**(ii) Find the mean rainfall for the week.**

**(iii) On how many days was the rainfall less than the mean rainfall.**

**Solution:**

(i) The range of the rainfall = Maximum rainfall – Minimum rainfall

$$= 20.5 - 0.0$$

$$= 20.5 \text{ mm.}$$

(ii) The mean rainfall =  $(0.0 + 12.2 + 2.1 + 0.0 + 20.5 + 5.3 + 1.0) \div 7$

$$= 41.1 \div 7$$

$$= 5.87 \text{ mm.}$$

(iii) Clearly, there are 5 days (Mon, Wed, Thu, Sat and Sun), when the rainfall was less than the mean, i.e., 5.87 mm.

**Q6) If the heights of 5 persons are 140 cm, 150 cm, 152 cm, 158 cm and 161 cm respectively, find the mean height.**

**Solution:**

The mean height = Sum of the heights  $\div$  Total number of persons

$$= (140 + 150 + 152 + 158 + 161) \div 5$$

$$= 761 \div 5$$

$$= 152.2 \text{ cm.}$$

**Q7) Find the mean of 994, 996, 998, 1002 and 1000.**

**Solution:**

Mean = Sum of the observations  $\div$  Total number of observations

$$\text{Mean} = (994 + 996 + 998 + 1002 + 1000) \div 5$$

$$= 4990 \div 5$$

$$= 998.$$

**Q8) Find the mean of first five natural numbers.**

**Solution:**

The first five natural numbers are 1, 2, 3, 4 and 5.

Let  $\bar{X}$  denote their arithmetic mean. Then,

$$\bar{X} = (1 + 2 + 3 + 4 + 5) \div 5$$

$$= 15 \div 5$$

$$= 3.$$

**Q9) Find the mean of all factors of 10.**

**Solution:**

The factors of 10 are 1, 2, 5 and 10.

Let  $\bar{X}$  denote their arithmetic mean. Then,

$$\bar{X} = (1 + 2 + 5 + 10) \div 4$$

$$= 18 \div 4$$

$$= 4.5.$$

**Q10) Find the mean of first 10 even natural numbers.**

**Solution:**

The first 10 even natural numbers are 2, 4, 6, 8, 10, 12, 14, 16, 18 and 20.

Let  $\bar{X}$  denote their arithmetic mean. Then,

$$\bar{X} = (2 + 4 + 6 + 8 + 10 + 12 + 14 + 16 + 18 + 20) \div 10$$

$$= 110 \div 10$$

$$= 11.$$

**Q11) Find the mean of  $x, x + 2, x + 4, x + 6, x + 8$**

**Solution:**

Mean = Sum of observations  $\div$  Number of observations

$$\Rightarrow \text{Mean} = (x + x + 2 + x + 4 + x + 6 + x + 8) \div 5$$

$$\Rightarrow \text{Mean} = (5x + 20) \div 5$$

$$\Rightarrow \text{Mean} = \frac{5(x+4)}{5}$$

$$\Rightarrow \text{Mean} = x + 4$$

**Q12) Find the mean of first five multiples of 3.**

**Solution:**

The first five multiples of 3 are 3, 6, 9, 12 and 15.

Let  $\bar{X}$  denote their arithmetic mean. Then,

$$\bar{X} = (3 + 6 + 9 + 12 + 15) \div 5$$

$$= 45 \div 5$$

$$= 9.$$

**Q13) Following are the weights (in kg) of 10 new born babies in a hospital on a particular day: 3.4, 3.6, 4.2, 4.5, 3.9, 4.1, 3.8, 4.5, 4.4, 3.6 Find the mean  $\bar{X}$ .**

**Solution:**

We have:

$$\bar{X} = \frac{\text{Sum of observations}}{\text{Number of observations}}$$
$$\Rightarrow \bar{X} = \frac{3.4+3.6+4.2+4.5+3.9+4.1+3.8+4.5+4.4+3.6}{10}$$

$$\Rightarrow \bar{X} = \frac{40}{10}$$

$$\Rightarrow \bar{X} = 4 \text{ kg.}$$

**Q14) The percentage of marks obtained by students of a class in mathematics are:**

**64, 36, 47, 23, 0, 19, 81, 93, 72, 35, 3, 1 Find their mean.**

**Solution:**

We have:

$$\text{Mean} = \frac{\text{Sum of the marks obtained}}{\text{Total number of students}}$$

$$\Rightarrow \text{Mean} = \frac{64+36+47+23+0+19+81+93+72+35+3+1}{12}$$

$$\Rightarrow \text{Mean} = \frac{474}{12} = 39.5 \%$$

**Q15) The numbers of children in 10 families of a locality are:**

**2, 4, 3, 4, 2, 3, 5, 1, 1, 5 Find the mean number of children per family.**

**Solution:**

$$\text{The mean number of children per family} = \frac{\text{Sum of the total number of children}}{\text{Total number of families}}$$

$$\text{Mean} = \frac{2+4+3+4+2+3+5+1+1+5}{10}$$

$$= \frac{30}{10}$$

$$= 3.$$

Thus, on an average there are 3 children per family in the locality.

**Q16) The mean of marks scored by 100 students was found to be 40. Later on it was discovered that a score of 53 was misread as 83. Find the correct mean.**

**Solution:**

We have:

$n =$  The number of observations = 100, Mean = 40

$$\text{Mean} = \frac{\text{Sum of the observations}}{\text{Total number of observations}}$$

$$\Rightarrow 40 = \frac{\text{Sum of the observations}}{100}$$

$\Rightarrow$  Sum of the observations =  $40 \times 100$

Thus, the incorrect sum of the observations =  $40 \times 100 = 4000$ .

Now,

The correct sum of the observations = Incorrect sum of the observations – Incorrect observation +

Correct observation

$\Rightarrow$  The correct sum of the observations =  $4000 - 83 + 53$

$\Rightarrow$  The correct sum of the observations =  $4000 - 30 = 3970$

$$\therefore \text{Correct mean} = \frac{\text{Correct sum of the observations}}{\text{Number of observations}} = \frac{3970}{100} = 39.7$$

**Q17) The mean of five numbers is 27. If one number is excluded, their mean is 25. Find the excluded number.**

**Solution:**

We have:

$$\text{Mean} = \frac{\text{sum of the five numbers}}{5} = 27$$

So, sum of the five numbers =  $5 \times 27 = 135$ .

Now,

$$\text{The mean of four numbers} = \frac{\text{sum of the four numbers}}{4} = 25$$

So, sum of the four numbers =  $4 \times 25 = 100$ .

Therefore, the excluded number = Sum of the five number – Sum of the four numbers

$\Rightarrow$  The excluded number =  $135 - 100 = 35$ .

**Q18) The mean weight per student in a group of 7 students is 55 kg. The individual weights of 6 of them (in kg) are 52, 54, 55, 53, 56 and 54. Find the weight of the seventh student.**

**Solution:**

We have:

$$\text{Mean} = \frac{\text{sum of the weights of the students}}{\text{Number of students}}$$

Let the weight of the seventh student be  $x$  kg.

$$\text{Mean} = \frac{52+54+55+53+56+54+x}{7}$$

$$55 = \frac{52+54+55+53+56+54+x}{7}$$

$\Rightarrow 385 = 324 + x$

$\Rightarrow x = 385 - 324$

$\Rightarrow x = 61$  kg.

Thus, the weight of the seventh student is 61 kg.

**Q19) The mean weight of 8 numbers is 15 kg. If each number is multiplied by 2, what will be the new mean?**

**Solution:**

Let  $X_1, X_2, X_3 \dots X_8$  be the eight numbers whose mean is 15 kg. Then,

$$15 = \frac{x_1 + x_2 + x_3 + \dots + x_8}{8}$$

$$x_1 + x_2 + x_3 + \dots + x_8 = 15 \times 8$$

$$\Rightarrow x_1 + x_2 + x_3 + \dots + x_8 = 120.$$

Let the new numbers be  $2x_1, 2x_2, 2x_3 \dots 2x_8$ . Let M be the arithmetic mean of the new numbers.

Then,

$$M = \frac{2x_1 + 2x_2 + 2x_3 + \dots + 2x_8}{8}$$

$$\Rightarrow M = \frac{2(x_1 + x_2 + x_3 + \dots + x_8)}{8}$$

$$\Rightarrow M = \frac{2 \times 120}{8}$$

$$\Rightarrow M = 30$$

**Q20) The mean of 5 numbers is 18. If one number is excluded, their mean is 16. Find the excluded number.**

**Solution:**

Let  $x_1, x_2, x_3, x_4$  and  $x_5$  be five numbers whose mean is 18. Then,

$$18 = \text{Sum of five numbers} \div 5$$

$$\therefore \text{Sum of five numbers} = 18 \times 5 = 90$$

Now, if one number is excluded, then their mean is 16.

So,

$$16 = \text{Sum of four numbers} \div 4$$

$$\therefore \text{Sum of four numbers} = 16 \times 4 = 64.$$

The excluded number = Sum of five observations – Sum of four observations

$$\therefore \text{The excluded number} = 90 - 64$$

$$\therefore \text{The excluded number} = 26.$$

**Q21) The mean of 200 items was 50. Later on, it was discovered that the two items were misread as 92 and 8 instead of 192 and 88. Find the correct mean.**

**Solution:**

$$n = \text{Number of observations} = 200$$

$$\text{Mean} = \frac{\text{Sum of the observations}}{\text{Number of observations}}$$

$$\Rightarrow 50 = \frac{\text{Sum of the observations}}{200}$$

$$\Rightarrow \text{Sum of the observations} = 50 \times 200 = 10,000.$$

Thus, the incorrect sum of the observations =  $50 \times 200$

Now,

The correct sum of the observations = Incorrect sum of the observations – Incorrect observations + Correct observations

$$\Rightarrow \text{Correct sum of the observations} = 10,000 - (92 + 8) + (192 + 88)$$

$$\Rightarrow \text{Correct sum of the observations} = 10,000 - 100 + 280$$

$$\Rightarrow \text{Correct sum of the observations} = 9900 + 280$$

$$\Rightarrow \text{Correct sum of the observations} = 10,180.$$

$$\therefore \text{Correct Mean} = \frac{\text{Correct sum of the observations}}{\text{Number of observations}} = \frac{10180}{200} = 50.9$$

**Q22) The mean of 5 numbers is 27. If one more number is included, then the mean is 25. Find the included number.**

**Solution:**

We have:

$$\text{Mean} = \text{Sum of five numbers} \div 5$$

$$\Rightarrow \text{Sum of the five numbers} = 27 \times 5 = 135.$$

Now, New mean = 25

$$25 = \text{Sum of six numbers} \div 6$$

$$\Rightarrow \text{Sum of the six numbers} = 25 \times 6 = 150.$$

The included number = Sum of the six numbers – Sum of the five numbers

$$\Rightarrow \text{The included number} = 150 - 135$$

$$\Rightarrow \text{The included number} = 15.$$

**Q23) The mean of 75 numbers is 35. If each number is multiplied by 4, find the new mean.**

**Solution:**

Let  $x_1, x_2, x_3, \dots, x_{75}$  be 75 numbers with their mean equal to 35. Then,

$$\Rightarrow 35 = \frac{x_1 + x_2 + x_3 + \dots + x_{75}}{75}$$

$$x_1 + x_2 + x_3 + \dots + x_{75} = 35 \times 75$$

$$\Rightarrow x_1 + x_2 + x_3 + \dots + x_{75} = 2625$$

The new numbers are  $4x_1, 4x_2, 4x_3, \dots, 4x_{75}$ . Let M be the arithmetic mean of the new numbers. Then,

$$M = \frac{4x_1 + 4x_2 + 4x_3 + \dots + 4x_{75}}{75}$$

$$\Rightarrow M = \frac{4(x_1 + x_2 + x_3 + \dots + x_{75})}{75}$$

$$\Rightarrow M = \frac{4 \times 2625}{75}$$

$$\Rightarrow M = 140.$$