Chapter 19. Mean and Median (For Ungrouped Data Only)

Exercise 19(A)

Solution 1:

The numbers given are $43, 51, 50, 57, 54$

The mean of the given numbers will be

$$= \frac{43+51+50+57+54}{5}$$

$$= \frac{255}{5}$$

$$= 51$$

Solution 2:

The first six natural numbers are $1, 2, 3, 4, 5, 6$

The mean of first six natural numbers

$$= \frac{1+2+3+4+5+6}{3}$$

$$= \frac{21}{3}$$

$$= 3.5$$

Solution 3:

The first ten odd natural numbers are $1, 3, 5, 7, 9, 11, 13, 15, 17, 19$

The mean of first ten odd numbers

$$= \frac{1+3+5+7+9+11+13+15+17+19}{10}$$

$$= \frac{100}{10}$$

$$= 10$$

Solution 4:

The all factors of 10 are $1,2,5,10$

The mean of all factors of 10 are

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

$$= \frac{18}{4}$$

$$= 4.5$$

Solution 5:

The given values are $x+3, x+5, x+7, x+9, x+11$

The mean of the values are

$$= \frac{x+3+x+5+x+7+x+9+x+11}{5}$$

$$= \frac{5x+35}{5}$$

$$= \frac{5(x+7)}{5}$$

$$= x+7$$

Solution 6:

(i)The given numbers are $9.8, 5.4, 3.7, 1.7, 1.8, 2.6, 2.8, 8.6, 10.5, 11.1$

$$\bar{x} = \frac{x1 + x2 + x3 + x4 + x5 + \ldots\ldots + xn}{n}$$

$$= \frac{9.8 + 5.4 + 3.7 + 1.7 + 1.8 + 2.6 + 2.8 + 8.6 + 10.5 + 11.1}{10}$$

$$= 5.8$$

(ii) The value of $\sum_{i=1}^{10}\left(x_i - \bar{x}\right)$

We know that

$$\sum_{i=1}^{n}\left(xi - \bar{x}\right) = \left(x1 - \bar{x}\right) + \left(x2 - \bar{x}\right)\ldots\ldots + \left(xn - \bar{x}\right) = 0$$

Here

$$\bar{x} = 5.8$$

Therefore

$$\sum_{i=1}^{10}\left(x_i - \bar{x}\right)$$

$$= (9.8 - 5.8) + (5.4 - 5.8) + (3.7 - 5.8) + (1.7 - 5.8) + (1.8 - 5.8)$$
$$+ (2.6 - 5.8) + (2.8 - 5.8) + (8.6 - 5.8) + (10.5 - 5.8) + (11.1 - 5.8)$$
$$= 4 - .4 - 2.1 - 4.1 - 4 - 3.2 - 3 + 2.8 + 4.7 + 5.3$$
$$= 0$$

Solution 7:

Given that the mean of 15 observations is 32

(i)resulting mean increased by 3

=32 + 3

=35

(ii)resulting mean decreased by 7

=32 - 7

= 25

(iii)resulting mean multiplied by 2

=32*2

=64

(iv)resulting mean divide by 0.5

$$= \frac{32}{.5}$$

$$= 64$$

(v)resulting mean increased by 60%

$$= 32 + \frac{60}{100} \times 32$$

$$= 32 + 19.2$$

$$= 51.2$$

(vi)resulting mean decreased by 20%

$$= 32 - \frac{20}{100} \times 32$$

$$= 32 - 6.4$$

$$= 25.6$$

Solution 8:

Given the mean of 5 numbers is 18

Total sum of 5 numbers

=18*5

=90

On excluding an observation, the mean of remaining 4 observation is 16

=16*4

=64

Therefore sum of remaining 4 observations

= total of 5 observations-total of 4 observations

= 90 - 64

= 26

Solution 9:

(i)Given that the mean of observations x, x + 2, x + 4, x + 6 and x + 8 is 11

Mean= $\frac{observations}{n}$

$$11 = \frac{x+x+2+x+4+x+6+x+8}{5}$$

$$11 = \frac{5x+20}{5}$$

$$x = \frac{35}{7}$$

$$x = 7$$

(ii)The mean of first three observations are

$$= \frac{x+x+2+x+4}{3}$$

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

$$= \frac{3*7+6}{3} \qquad [\text{since } x=7]$$

$$= \frac{21+6}{3}$$

$$= 9$$

Solution 10:

Given the mean of 100 observations is 40.

$$\frac{\sum x}{n} = \bar{x}$$

$$\Rightarrow \frac{\sum x}{n} = 40$$

$$\Rightarrow \quad x = 40 * 100$$

$$\Rightarrow \quad x = 4000$$

Incorrect value of x=4000

Correct value of x=Incorrect value of x-Incorrect observation + correct observation

=4000-83+53

=3970

Correct mean

$$= \frac{\text{correct value of } \sum x}{n}$$

$$= \frac{3970}{100}$$

$$= 39.7$$

Solution 11:

Given that the mean of 200 items was 50.

$$\text{Mean} = \frac{\sum x}{n}$$

$$\Rightarrow 50 = \frac{\sum x}{200}$$

$$\Rightarrow x = 10000$$

Incorrect value of $\sum x = 10000$

Correct value of

$$\sum x = 10000 - (92 + 8) + (192 + 88)$$

$$= 10000 - 100 + 280$$

$$= 10180$$

Correct mean

$$= \frac{\text{correct value of } \sum x}{n}$$

$$= \frac{10180}{200}$$

$$= 50.9$$

Solution 12:

Mean of 45 numbers = 18

$\Rightarrow$ Sum of 45 numbers = $18 \times 45 = 810$

Mean of remaining (75 - 45) 30 numbers = 13

$\Rightarrow$ Sum of remaining 30 numbers = $13 \times 30 = 390$

$\Rightarrow$ Sum of all the 75 numbers = $810 + 390 = 1200$

$\Rightarrow$ Mean of all the 75 numbers = $\frac{1200}{75} = 16$

Solution 13:

Mean weight of 120 students = 52.75 kg

$\Rightarrow$ Sum of the weight of 120 students = $120 \times 52.75 = 6330$ kg

Mean weight of 50 students = 51 kg

$\Rightarrow$ Sum of the weight of 50 students = $50 \times 51 = 2550$ kg

$\Rightarrow$ Sum of the weight of remaining (120 - 50) 70 students

= Sum of the weight of 120 students - Sum of the weight of 50 students

= (6330 - 2550) kg

= 3780 kg

$\Rightarrow$ Mean weight of remaining 70 students $= \frac{3780}{70} = 54$ kg

Solution 14:

Let the number of boys and girls be x and y respectively.

Now,

Given, Mean marks of x boys in the examination = 70

$\Rightarrow$ Sum of marks of x boys in the examination = 70x

Given, Mean marks of y girls in the examination = 73

$\Rightarrow$ Sum of marks of y girls in the examination = 73y

Given, Mean marks of all students (x + y) in the examination = 71

$\Rightarrow$ Sum of marks of all students (x + y) students in the examination = 71(x + y)

Now, Sum of marks of all students (x + y) students in the examination

= Sum of marks of x boys in the examination

+ Sum of marks of y girls in the examination

$\Rightarrow 71(x + y) = 70x + 73y$

$\Rightarrow 71x + 71y = 70x + 73y$

$\Rightarrow x = 2y$

$\Rightarrow \frac{x}{y} = \frac{2}{1}$

$\Rightarrow x : y = 2 : 1$

Thus, the ratio of number of boys to the number of girls is 2 : 1.