

## 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

$$\begin{aligned} &= \frac{43 + 51 + 50 + 57 + 54}{5} \\ &= \frac{255}{5} \\ &= 51 \end{aligned}$$

#### Solution 2:

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

The mean of first six natural numbers

$$\begin{aligned} &= \frac{1 + 2 + 3 + 4 + 5 + 6}{6} \\ &= \frac{21}{6} \\ &= 3.5 \end{aligned}$$

#### 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

$$\begin{aligned} &= \frac{1 + 3 + 5 + 7 + 9 + 11 + 13 + 15 + 17 + 19}{10} \\ &= \frac{100}{10} \\ &= 10 \end{aligned}$$

**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  $x+3, x+5, x+7, x+9, x+11$

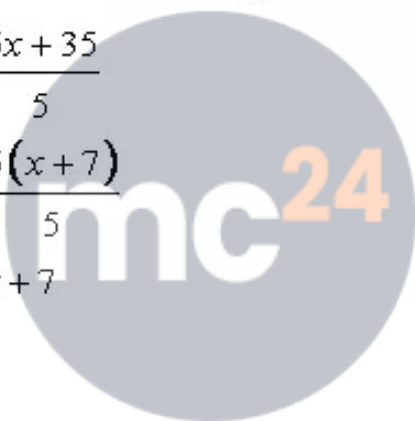
The mean of the values are

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

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

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

$$= x+7$$



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**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

$$\begin{aligned} \bar{x} &= \frac{x_1 + x_2 + x_3 + x_4 + x_5 + \dots + x_n}{n} \\ &= \frac{9.8 + 5.4 + 3.7 + 1.7 + 1.8 + 2.6 + 2.8 + 8.6 + 10.5 + 11.1}{10} \\ &= 5.8 \end{aligned}$$

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

We know that

$$\sum_{i=1}^n (x_i - \bar{x}) = (x_1 - \bar{x}) + (x_2 - \bar{x}) + \dots + (x_n - \bar{x}) = 0$$

Here

$$\bar{x} = 5.8$$

Therefore

$$\begin{aligned} &\sum_{i=1}^{10} (x_i - \bar{x}) \\ &= (9.8 - 5.8) + (5.4 - 5.8) + (3.7 - 5.8) + (1.7 - 5.8) + (1.8 - 5.8) \\ &\quad + (2.6 - 5.8) + (2.8 - 5.8) + (8.6 - 5.8) + (10.5 - 5.8) + (11.1 - 5.8) \\ &= 4 - 4 - 2.1 - 4.1 - 4 - 3.2 - 3 + 2.8 + 4.7 + 5.3 \\ &= 0 \end{aligned}$$



**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%

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

$$= 32 - 6.4$$

$$= 25.6$$

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**Solution 8:**

Given the mean of 5 numbers is 18

Total sum of 5 numbers

$$= 18 \times 5$$

$$= 90$$

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

$$= 16 \times 4$$

$$= 64$$

Therefore sum of remaining 4 observations

$$= \text{total of 5 observations} - \text{total of 4 observations}$$

$$= 90 - 64$$

$$= 26$$

**Solution 9:**

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

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

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

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

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

$$x = 7$$

(ii) The mean of first three observations are

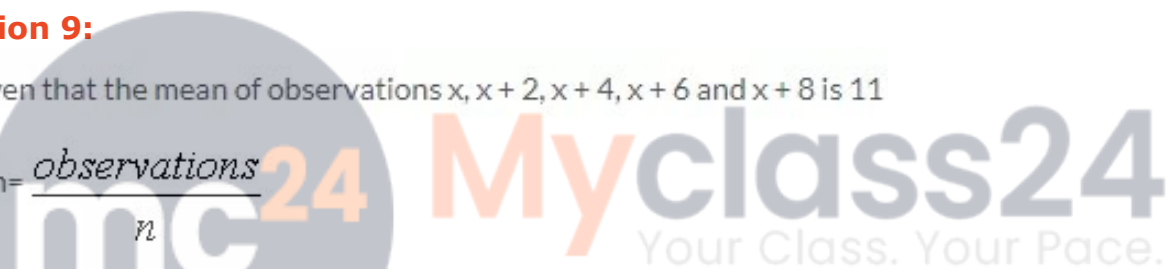
$$= \frac{x + x + 2 + x + 4}{3}$$

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

$$= \frac{3 \times 7 + 6}{3} \quad [\text{since } x=7]$$

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

$$= 9$$



**Solution 10:**

Given the mean of 100 observations is 40.

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

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

$$\Rightarrow x = 40 * 100$$

$$\Rightarrow x = 4000$$

Incorrect value of  $x=4000$

Correct value of  $x = \text{Incorrect value of } x - \text{Incorrect observation} + \text{correct observation}$

$$= 4000 - 83 + 53$$

$$= 3970$$

Correct mean

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

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

$$= 39.7$$

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**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

$$\Rightarrow \text{Sum of 45 numbers} = 18 \times 45 = 810$$

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

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

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

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

**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.