EXERCISE 19A

1. Find the mean of 43, 51, 50, 57 and 54.
Solution:

Numbers given are 43, 51, 50, 57 and 54.
Mean of given numbers

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

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

= 51

2. Find the mean of first six natural numbers.
Solution:

First six natural numbers are 1, 2, 3, 4, 5, 6.
Mean of first six natural numbers

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

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

= 3.5

3. Find the mean of first ten odd natural number.
Solution:

First ten odd natural numbers are 1, 3, 5, 7, 9, 11, 13, 15, 17, 19
Mean of first ten odd numbers

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

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

4. Find the mean of all factors of 10.
Solution:

All factors of 10 are 1, 2, 5, 10
Mean of all factors of 10

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

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

= 4.5

5. Find the mean of x + 3, x + 5, x + 7, x + 9 and x + 11.
Solution:

Values given are x + 3, x + 5, x + 7, x + 9 and x + 11
Mean of the values

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

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

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

= x + 7

6. If the different values of variable x are 9.8, 5.4, 3.7, 1.7, 1.8, 2.6, 2.8, 8.6, 10.5 and 11.1; find

(i) the mean $\overline{x}$

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

Solution:

(i) Numbers given are 9.8, 5.4, 3.7, 1.7, 1.8, 2.6, 2.8, 8.6, 10.5 and 11.1

$$\overline{x} = \frac{x_1 + x_2 + x_3 + x_4 + x_5 + ... + x_n}{n}$$

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

= 5.8

(ii)

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

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

$\overline{x} = 5.8$

$$\sum_{i=1}^{10}(x_i - \overline{x})$$

= (9.8 – 5.8) + (5.4 – 5.8) + (3.7 – 5.8) + (1.7 – 5.8) + (1.8 – 5.8) + (2.6 – 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

7. The mean of 15 observations is 32. Find the resulting mean, if each observation is:
(i) Increased by 3
(ii) Decreased by 7
(iii) Multiplied by 2
(iv) Divided by 0.5
(v) Increased by 60%
(vi) Decreased by 20%
Solution:

It is given that
Mean of 15 observations is 32

(i) Resulting mean if each observation is increased by 3 = 32 + 3 = 35

(ii) Resulting mean if each observation is decreased by 7 = 32 – 7 = 25

(iii) Resulting mean if each observation is multiplied by 2 = 32 × 2 = 64

(iv) Resulting mean if each observation is divided by 0.5 = 32/0.5 = 64

(v) Resulting mean if each observation is increased by 60% = 32 + 60/100 × 32
= 32 + 19.2
= 51.2

(vi) Resulting mean if each observation is decreased by 20% = 32 – 20/100 × 32
= 32 – 6.4
= 25.6

8. The mean of 5 numbers is 18. If one number is excluded, the mean of remaining number becomes 16. Find the excluded number.
Solution:

It is given that
Mean of 5 numbers is 18
Total sum of 5 numbers = 18 × 5 = 90

Excluding an observation, the mean of the remaining 4 number becomes 16 = 16 × 4 = 64
Sum of remaining 4 observations = Total of 5 observations – Total of 4 observations
= 90 – 64
= 26

9. If the mean of observations x, x + 2, x + 4, x + 6 and x + 8 is 11, find:
(i) The value of x;
(ii) The mean of first three observations.
Solution:

(i) It is given that
Mean of observations x, x + 2, x + 4, x + 6 and x + 8 is 11
We know that

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

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

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

By taking out 5 as common
11 = [5 (x + 4)]/5
11 = x + 4
By transposing we get
x = 11 – 4
x = 7

(ii) Mean of first three observations

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

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

$$= \frac{3(7) + 6}{3} [As\ x = 7]$$

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

= 9

10. The mean of 100 observations is 40. It is found that an observation 53 was misread as 83. Find the correct mean.
Solution:

It is given that

Mean of 100 observations is 40

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

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

x = 40 × 100 = 4000

Here the incorrect value of x = 4000
So the correct value of x = Incorrect value of x – Incorrect observation + Correct observation
Substituting the values
= 4000 – 83 + 53
= 3970

We know that

$$Correct\ mean = \frac{Correct\ value\ of \sum x}{n}$$

= 3970/100
= 39.7