EXERCISE 34 (B)

Question 1.

Find the median of

(i) 21, 21, 22, 23, 23, 24, 24, 24, 24, 25 and 25

(ii) 3.2, 4.8, 5.6, 5.6, 7.3, 8.9 and 91

(iii) 17, 23, 36, 12, 18, 23, 40 and 20

(iv) 26, 33, 41, 18, 30, 22, 36, 45 and 24

(v) 80, 48, 66, 61, 75, 52, 45 and 70

Solution:

(*i*) Given data = 21, 21, 22, 23, 23, 24, 24, 24, 24, 25 and 25

Clearly, middle term is 24

$\therefore$ Median = 24

(*ii*) Given data = 3·2, 4·8, 5·6, 5·6, 7·3, 8·9 and 9·1

Clearly, middle term is 5·6

$\therefore$ Median = 5·6

(*iii*) Arranging in ascending order, we get

12, 17, 18, 20, 23, 23, 36, 40

Here, number of terms = 8 which is even

$$\therefore \text{Median} = \frac{1}{2}\left\{\frac{n}{2}\text{th term} + \left(\frac{n}{2}+1\right)\text{th}\right\}$$

$$= \frac{1}{2}\left\{\frac{8}{2}\text{th term} + \left(\frac{8}{2}+1\right)\text{th term}\right\}$$

$$= \frac{1}{2}\{4\text{th term} + 5\text{th term}\}$$

$$= \frac{1}{2}\{20 + 23\}$$

$$= \frac{1}{2} \times 43 = 21{\cdot}5$$

(*iv*) Arranging in ascending order, we get

18, 22, 24, 26, 30, 33, 36, 41, 45

Here, number of terms (n) = 9 which is odd

$$\therefore \text{Median} = \frac{n+1}{2}\text{th term}$$

$$= \frac{9+1}{2} = 5\text{th term} = 30$$

(v) Arranging in ascending order, we get

45, 48, 52, 61, 66, 70, 75, 80

Here, number of terms = 8 which is even

$$= \frac{1}{2}\left\{\frac{n}{2}\text{th term} + \left(\frac{n}{2}+1\right)\text{th term}\right\}$$

$$= \frac{1}{2}\left\{\frac{8}{2}\text{th term} + \left(\frac{8}{2}+1\right)\text{th term}\right\}$$

$$= \frac{1}{2}\{4\text{th term} + 5\text{th term}\}$$

$$= \frac{1}{2}\{61 + 66\}$$

$$= \frac{1}{2} \times 127 = 63{\cdot}5$$

Question 2.

Find the mean and the median of :

(i) 1,3,4, 5, 9, 9 and 11

(ii) 10,12, 12, 15, 15, 17, 18, 18, 18 and 19

(iii) 2, 4, 5, 8, 10,13 and 14

(iv) 5, 8, 10, 11,13, 16, 19 and 20

(v) 1.2, 1.9, 2.2, 2.6 and 2.9

(vi) 0.5, 5.6, 3.8, 4.9, 2.7 and 4.4.

Solution:

(*i*) Given data = 1, 3, 4, 5, 9, 9 and 11

Clearly middle term = 5

$\therefore$ Median = 5

$$\text{Mean} = \frac{\text{Sum of observations}}{\text{Number of observations}} = \frac{1+3+4+5+9+9+11}{7} = \frac{42}{7} = 6$$

$\therefore$ Mean = 6

(*ii*) Given data = 10, 12, 12, 15, 15, 17, 18, 18, 18 and 19

Here, number of terms = 10 which is even

$$\therefore \text{Median} = \frac{1}{2}\left\{\frac{n}{2}\text{th term} + \left(\frac{n}{2}+1\right)\text{th term}\right\}$$

$$= \frac{1}{2}\left\{\frac{10}{2}\text{th term} + \left(\frac{10}{2}+1\right)\text{th term}\right\}$$

$$= \frac{1}{2}\{5\text{th term} + 6\text{th term}\}$$

$$= \frac{1}{2}\{15 + 17\}$$

$$= \frac{1}{2} \times 32 = 16$$

$\therefore$ Median = 16

$$\text{Mean} = \frac{\text{Sum of observations}}{\text{Number of observations}} = \frac{10+12+12+15+15+17+18+18+18+19}{10}$$

$$= \frac{154}{10} = 15{\cdot}4$$

(*iii*) Given data = 2, 4, 5, 8, 10, 13 and 14

Clearly, middle term is 8

$\therefore$ Median = 8

$$\therefore \text{Mean} = \frac{\text{Sum of observations}}{\text{Number of observations}} = \frac{2+4+5+8+10+13+14}{7} = \frac{56}{7} = 8$$

(*iv*) Given data = 5, 8, 10, 11, 13, 16, 19 and 20

Number of data = 8 which is even

$$\therefore \text{Median} = \frac{1}{2}\left\{\frac{n}{2}\text{th term} + \left(\frac{n}{2}+1\right)\text{th term}\right\}$$

$$= \frac{1}{2}\left\{\frac{8}{2}\text{th term} + \left(\frac{8}{2}+1\right)\text{th term}\right\}$$

$$= \frac{1}{2}\{4\text{th term} + 5\text{th term}\}$$

$$= \frac{1}{2}\{11 + 13\}$$

$$= \frac{1}{2} \times 24 = 12$$

$$\therefore \text{Mean} = \frac{\text{Sum of observations}}{\text{Number of observations}} = \frac{5+8+10+11+13+16+19+20}{8} = \frac{102}{8} = 17{\cdot}75$$

(*v*) 1·2, 1·9, 2·2, 2·6 and 2·9

Clearly, middle term is 2·2

$\therefore$ Median = 2·2

$$\therefore \text{Mean} = \frac{\text{Sum of observations}}{\text{Number of observations}} = \frac{1{\cdot}2+1{\cdot}9+2{\cdot}2+2{\cdot}6+2{\cdot}9}{5} = \frac{10{\cdot}8}{5} = 2{\cdot}16$$

(*vi*) Arranging in ascending order, we get

0·5, 2·7, 3·8, 4·4, 4·9, 5·6

Here, number of terms (n) = 6 which is even

$$\therefore \text{ Median} = \frac{1}{2}\left\{\frac{n}{2}\text{th term} + \left(\frac{n}{2}+1\right)\text{th term}\right\}$$

$$= \frac{1}{2}\left\{\frac{6}{2}\text{th term} + \left(\frac{6}{2}+1\right)\text{th term}\right\}$$

$$= \frac{1}{2}\{3\text{rd term} + 4\text{th term}\}$$

$$= \frac{1}{2}\{3.8 + 4.4\}$$

$$= \frac{1}{2} \times 8.2 = 4{\cdot}1$$

$$\therefore \text{ Mean} = \frac{\text{Sum of observations}}{\text{Number of observations}} = \frac{0{\cdot}5 + 2{\cdot}7 + 3{\cdot}8 + 4{\cdot}4 + 4{\cdot}9 + 5{\cdot}6}{6} = \frac{21{\cdot}9}{6} = 3{\cdot}65$$