Mathematics
CLASS – VI

Chapter – 26 (MEAN and MEDIAN)

Ex-26(A)

1. i) Find the mean of 11, 13, 17, 19, 23.

Solution:—

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

$$= \frac{11+13+17+19+23}{5}$$

$$= \frac{83}{5} = 16.6 \quad \text{(Answer).}$$

1. iv) Find the mean of 6.5, 8.2, 9.4, 4.6, 7.8, 4.9

Solution:—

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

$$= \frac{6.5+8.2+9.4+4.6+7.8+4.9}{6}$$

$$= \frac{41.4}{6} = 6.9 \quad \text{(Answer).}$$

1. iii) Find the mean :- $\frac{1}{4}, 3\frac{1}{4}, 4\frac{3}{4}, 5\frac{1}{4}, 7\frac{1}{2}$

Solution :—

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

$$= \frac{\frac{1}{4} + 3\frac{1}{4} + 4\frac{3}{4} + 5\frac{1}{4} + 7\frac{1}{2}}{5}$$

$$= \frac{\frac{1}{4} + \frac{13}{4} + \frac{19}{4} + \frac{21}{4} + \frac{15}{2}}{5}$$

$$= \frac{\frac{1+13+19+21+30}{4}}{5}$$

$$= \frac{\frac{84}{4}^{21}}{5}$$

$$= \frac{21}{5}$$

$$= 4\frac{1}{5} \quad \text{(Answer)}.$$

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End of Ex – 26(A)

2. i) Find the mean of First eight natural numbers.

Solution:— First eight natural numbers = 1, 2, 3, 4, 5, 6, 7, 8

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

$$= \frac{1+2+3+4+5+6+7+8}{8}$$

$$= \frac{36}{8} = 4.5 \quad \text{(Answer).}$$

4. The following are the number of books issued in a school library during a week: 105, 216, 322, 167, 273, 405, 346. Find the mean number of books issued per day.

Solution:— Given observations = 105, 216, 322, 167, 273, 405, 346.

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

$$= \frac{105+216+322+167+273+405+346}{7}$$

$$= \frac{1834}{7} = 262$$

6. The mean of 9, 14, x, 16, 7 and 18 is 11.5. Find the value of x.

Solution:- Given observations:-

9, 14, x, 16, 7, 18

Mean = 11.5

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

$$\Rightarrow 11.5 = \frac{9+14+x+16+7+18}{6}$$

$$\Rightarrow 11.5 \times 6 = 64 + x$$

$$\Rightarrow 69 = 64 + x$$

$$\Rightarrow x = 69 - 64$$

$$\Rightarrow \boxed{x = 5}.$$ (Answer)

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Ex-26(B)

Median = After arranging data in ascending or descending order of magnitudes, the value of the middle term.

1. i) Find the median of 7, 11, 20, 6, 3, 16, 15, 23, 12

Solution:—

In ascending order = 3, 6, 7, 11, (12), 15, 16, 20, 23

No. of terms = 9. i.e odd. i.e $n = 9$.

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

$= \left(\frac{9+1}{2}\right)^{th}$ term.

$= \left(\frac{10}{2}\right)^{th}$ term

$= 5^{th}$ term

$= 12$ (Answer).

1. iv) 122, 127, 109, 118, 125, 108

Solution:— In ascending order = 108, 109, 118, 122, 125, 12

No. of Terms = 6, $\therefore$ 3rd & 4th terms are the two middle terms

$\therefore$ Median = Mean of 3rd and 4th terms

$= \frac{1}{2}(118+122) = \frac{1}{2}\overset{120}{\cancel{2}}(240) = 120$ (Answer).

3. The runs scored by 11 members of a cricket team are,
15, 29, 43, 13, 31, 50, 20, 0, 27, 56, 34

Solution:-

In ascending order = 0, 13, 15, 20, 27, 29, 31, 34, 43, 50,

Number of terms = 11. i.e $n = 11$ (odd)

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

$= \left(\frac{11+1}{2}\right)^{th}$ term

$= 6^{th}$ term $= 29$ (Answer).

4. The weights (in Kg) of 8 children are:-
13.4, 10.6, 12.7, 17.2, 14.3, 15, 16.5, 9.8

Solution:- In ascending order the weights are:-

9.8, 10.6, 12.7, 13.4, 14.3, 15, 16.5, 17.2

Number of terms = 8

So, 4th and 5th terms are the two middle terms.

$\therefore$ Median = Mean of 4th and 5th terms

$= \frac{1}{2}(13.4 + 14.3)$ Kg

$= \frac{27.7}{2}$ Kg

$= 13.85$ Kg. (Answer)

End of Ex-26(B)

Class – VI
Mathematics

Chapter – 7 (Sets)

Set = A well defined collection of objects is called sets.
The objects in a set are called its members or elements

Different Types to describe a set:–

i) Roster Method or Tabular form:–
e.g:– $A = \{2, 4, 6, 8, 10, 12, 14\}$

ii) Description Method:–
e.g:– $A = \{$Multiples of 2 less than 15$\}$

iii) Rule Method or Set builder Method:–
e.g:– $A = \{x : x \text{ is a multiple of } 2,\ x < 15\}$

Some Special types of Sets:–

i) Equal sets:– Two sets are said to be equal if every element of two sets are same.

ii) Empty Sets:– A set having no elements at all is called an empty set or null set. ϕ

iii) Non empty Sets:– A set containing at least one element is called a non-empty set.

iv) Singleton Set:– A set containing exactly one element is called a singleton set.

v) Finite Set:– A set which either empty or contains only finite numbers of elements is called a finite set.

vi) Infinite set:– A non empty set having endless elements.

vii) Equivalent sets:— Two finite sets are said to be equivalent if they have same number of elements.

Cardinal Number :— The number of elements present in a set is called cardinal number of a set. It is denoted by (n).

e.g:— $A = \{1, 2, 4, 6, 8\}$

∴ Cardinal number is $n(A) = 5$

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Ex — 7(A)

1. i) All persons on earth

⇒ It is well defined, so it is a set

ii) All male teachers of your school.

⇒ It is well defined, so it is a set.

v) All fat boys of your locality.

⇒ The term 'fat' is not well defined so it is not a set.

vi) All planets in our solar system.

= All planets in our solar system is well defined, so it is a set.

viii) All 3-digit natural numbers.

= All 3 digit natural numbers are well defined, so it is a se

2. i) $A = \{x : x \text{ is a natural number}, 5 < x < 14\}$

In Roster form $A = \{6, 7, 8, 9, 10, 11, 12, 13\}$

ii) $B = \{x : x \text{ is a factor of } 18\}$

$\therefore B = \{1, 2, 3, 6, 9, 18\}$

iv) $D = \{x : x \text{ is a 2 digit number, the sum of whose digits is } 8\}$

$\therefore D = \{17, 26, 35, 44, 53, 62, 71, 80\}$

v) $E = \{x : x \text{ is a natural number, } x \text{ is a multiple of } 7, x < 60\}$

$E = \{7, 14, 21, 28, 35, 42, 49, 56\}$

viii) $H = \{x : x \text{ is an odd natural number}, 50 < x < 60\}$

$H = \{51, 53, 55, 57, 59\}$

3. i) $A = \{16, 18, 20, 22, 24, 26, 28\}$

In set builder form,

$A = \{x : x \text{ is an even natural number}, 15 < x < 29\}$

3. iii) $C = \{1, 3, 5, 9, 15, 45\}$

In Set builder form, $C = \{x : x \text{ is a natural number}, x \text{ is a factor of } 45\}$

3. v) $E = \{6, 12, 18, 24, 30, 36, 42, 48\}$

In Set builder form, $E = \{x : x \text{ is a multiple of } 6, x < 50\}$

3. vii) $G = \{0, 1, 4, 9, 16, 25, 36, 49\}$

In set builder form,

$G = \{x : x = n^2, n \text{ is a whole number}, 0 \leq n \leq 7\}$

4. Given, $A = \{5, 7, 11, 13, 17, 19, 23, 29\}$

ii) $9 \notin A$ iv) $15 \notin A$ v) $17 \in A$

vi) $25 \notin A$ viii) $31 \notin A$

$\in$ = Belongs to

$\notin$ = does not belongs to

5. $B = \{2, 4, 6, 8, 10, \ldots\ldots 74, 76, 78, 80\}$

i) $26 \in B$ iii) $70 \in B$ vi) $53 \notin B$

viii) $34 \in B$

6. ii) $-5 \in \{x : x \text{ is an integer}, -4 < x < 4\}$ = False

In Roster form = $\{-3, -2, -1, 0, 1, 2, 3\}$

iv) $2 \in \{x : x \text{ is a prime number}, 3 < x < 6\}$ = False.

Roster form = $\{5\}$

v) $83 \in \{x : x \text{ is a prime number}, x < 100\}$ = True.

Ex-7(B)

1. i) $A = \{x : x \in W, \ x < 6\}$

Roster Form = $\{0, 1, 2, 3, 4, 5\}$

Cardinal Number $(n) = 6$

1. iii) $C = \{x : x \in N, x \text{ is a perfect square}, x < 30\}$

Roster form = $\{1, 4, 9, 16, 25\}$

Cardinal number $(n) = 5$

1. v) $E = \{x : x \text{ is an odd prime number}, x < 18\}$

Roster form = $\{3, 5, 7, 11, 13, 17\}$

Cardinal Number $(n) = 6$

1. vii) $G = \{x : x \text{ is a letter in the word 'ALLAHABAD'}\}$

Roster form = $\{A, L, H, B, D\}$

Cardinal Number = 5.

2. $A = \{x : x \text{ is a letter in the word 'Increase'}\}$

Roster form = $\{I, N, C, R, E, A, S\}$

Cardinal no = 7

$B = \{x : x \text{ is a vowel in the word 'INCREASE'}\}$

Roster form = $\{A, E, I\}$

Cardinal number = 3.

$C = \{x : x \text{ is a consonant in the word 'INCREASE'}\}$

Roster form $= \{N, C, R, S\}$

Cardinal No $= 4$.

3. ii) $C = \{x : x \in W, x < 8\}$

$= \{0, 1, 2, 3, 4, 5, 6, 7\}$

$D = \{x : x \in N, x < 9\}$

$= \{1, 2, 3, 4, 5, 6, 7, 8\}$

As all the elements of C & D are not same

∴ They are not equal sets.

3. iii) $E = \{x : x \in N, x \text{ is odd}, x < 6\}$ and

$F = \{x : x \in N, x \text{ is a factor of } 15, x < 15\}$

$E = \{1, 3, 5\}$, $F = \{1, 3, 5\}$

As all the elements of E and F are same

∴ They are equal sets.

4. i) $A = \{x : x \in N, x+3 = 3\}$

$x \in N$ i.e. $x = 1, 2, 3, \ldots$

$\therefore 1+3 = 4$
$2+3 = 5$
$3+3 = 6$

$\therefore x+3$ never comes 3.

$\therefore$ It is a null set as no natural number satisfies the condition. $\therefore A = \phi$.

iii) $C = \{x : x \in N, x \text{ is even}, x \text{ is divisible by } 3\}$

$C = \{6, 12, 18, \ldots\}$

There are so many numbers which are even and divisible by 3. $\therefore C \neq \phi$

vi) $F = \{x : x \in N, 2x = 1\}$

$x = 1, 2, 3, 4, \ldots$

$2 \times 1 = 2$
$2 \times 2 = 4$
$2 \times 3 = 6$
$\vdots$

$\therefore 2x$ never comes 1.

$\therefore F = \phi$.

5. i) $A = \{x : x \in N, x < 100\}$

Natural numbers less than 100 are countable.

$\therefore$ It is a finite set.

5. iii) $C = \{x : x \in N ; x > 100\}$

Now greater than 100 there are uncountable endless natural numbers $\therefore$

C = Infinite Set.

5. v) $E = \{x : x \in N, x \text{ is a multiple of } 3\}$

$= \{3, 6, 9, 12, 15, \ldots\ldots\}$

$\therefore E$ = Infinite Set.

5. vii) $Cr = \{x : x \text{ is a point on an arc of a circle}\}$

Now on an arc there are uncountable points

$\therefore Cr$ = Infinite set

6. ii) Two equivalent sets are always equal = False

iv) Let $A = \{x : x \text{ is a letter in the word 'ENGINEER'}\}$

Then, $n(A) = 5$. $\Rightarrow$ True $\quad \therefore A = \{E, N, G, I, R\}$

vi) Let $C = \{x : x \in N, x \text{ is neither prime nor composite}\}$, Then

$n(C) = 1$ = True

viii) $\{x : x \in I, x \text{ is neither positive nor negative}\} = \phi$

= False.

7. Let $A = \{2, 4, 6, 8, 10\}$ and $B = \{x : x \in W, x < 5\}$

$\therefore A = \{2, 4, 6, 8, 10\}$, $B = \{0, 1, 2, 3, 4\}$

i) $n(A) = 5$, $n(B) = 5$

ii) As cardinal number of Set A and Set B is same i.e $n(A) = n(B) = 5$,

$\therefore$ They are equivalent sets.

End of Ex - 7(c)