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UNIT 12

INFORMATION HANDLING

EXERCISE 12.1

1. Read the following frequency table and give answers to the questions.

Class	Frequency
1 – 10	5
11 – 20	4
21 – 30	8
31 – 40	9
41 – 50	2
51 – 60	2
Total	30

(i) What is the total number of values in the data?

= 30

(ii) In which class interval 8th value of data lie?

(11 – 20)

(iii) What is number of values less than 21?

9

(iv) Which group contains highest number of values?

= (31 – 40)

(v) What is the lower limit of last class?

= 51

(vi) What is lower boundary of last class?

= 50.5

(vii) What is size of class interval?

= 10

(viii) Find class marks of all groups.

= 5.5, 15.5, 25.5, 35.5, 45.5, 55.5.

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2. The result of 80 students of class 10 in a model school in a mathematics test out of 100 marks are given below.

79, 60, 74, 59, 55, 98, 61, 67, 89, 71, 71, 46, 63, 66, 69, 42, 75, 62, 71, 77, 78, 65, 87, 57, 78, 91, 82, 73, 65, 94, 48, 87, 62, 81, 63, 66, 65, 49, 45, 51, 69, 56, 84, 93, 63, 60, 68, 51, 73, 54, 50, 88, 76, 93, 48, 70, 40, 76, 95, 57, 63, 94, 82, 54, 89, 64, 77, 94, 72, 69, 51, 56, 67, 88, 81, 70, 81, 54, 65, 87.

(i) Prepare a frequency table to represent the above data using the classes 40 – 49, 50 – 59 etc.

Groups	Frequency
40 – 49	7
50 – 59	13
60 – 69	22
70 – 79	17
80 – 89	13
90 – 99	8
Total	80

(ii) How many students secured less than 70 marks?
= 42

(iii) How many students secured marks between 60 and 90?
= 52

(iv) What percent of students got less than 50 marks?
$\frac{7}{80} \times 50 = 8.75\%$

(v) Which group has greatest frequency?
(60 – 69)

(vi) What is size of class interval?
= 10

3. The number of children born to 45 women in a certain locality up to the age of 40 years is given as

0, 2, 1, 0, 1, 2, 3, 5, 6, 3, 2, 1, 3, 4, 2, 6, 1, 5, 2, 4, 3, 0, 1, 2, 3, 0, 0, 2, 3, 4, 1, 5, 6, 2, 4, 5, 1, 3, 4, 6, 2, 3, 1, 2, 5

Prepare a frequency distribution.

x	0	1	2	3	4	5	6
f	5	8	10	8	5	5	4

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| ADAN Math For Class 8 | 320 | Information Handling |

4. *The goals scored by 30 football teams in a tournament given below.*

Number of goals (x)	0	1	2	3	4	5
Number of teams (f)	4	6	9	5	4	2

Draw a histogram to represent the data.
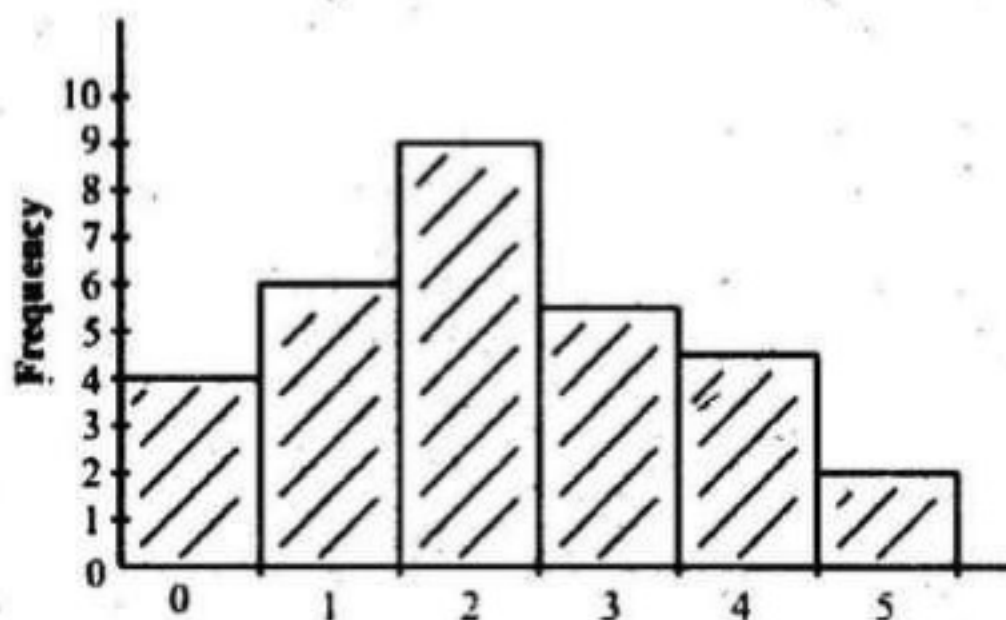
5. *Represent the following data by a histogram.*

Class interval	1 – 10	10 – 20	20 – 30	30 – 40	40 – 50
Frequency	5	12	16	10	2
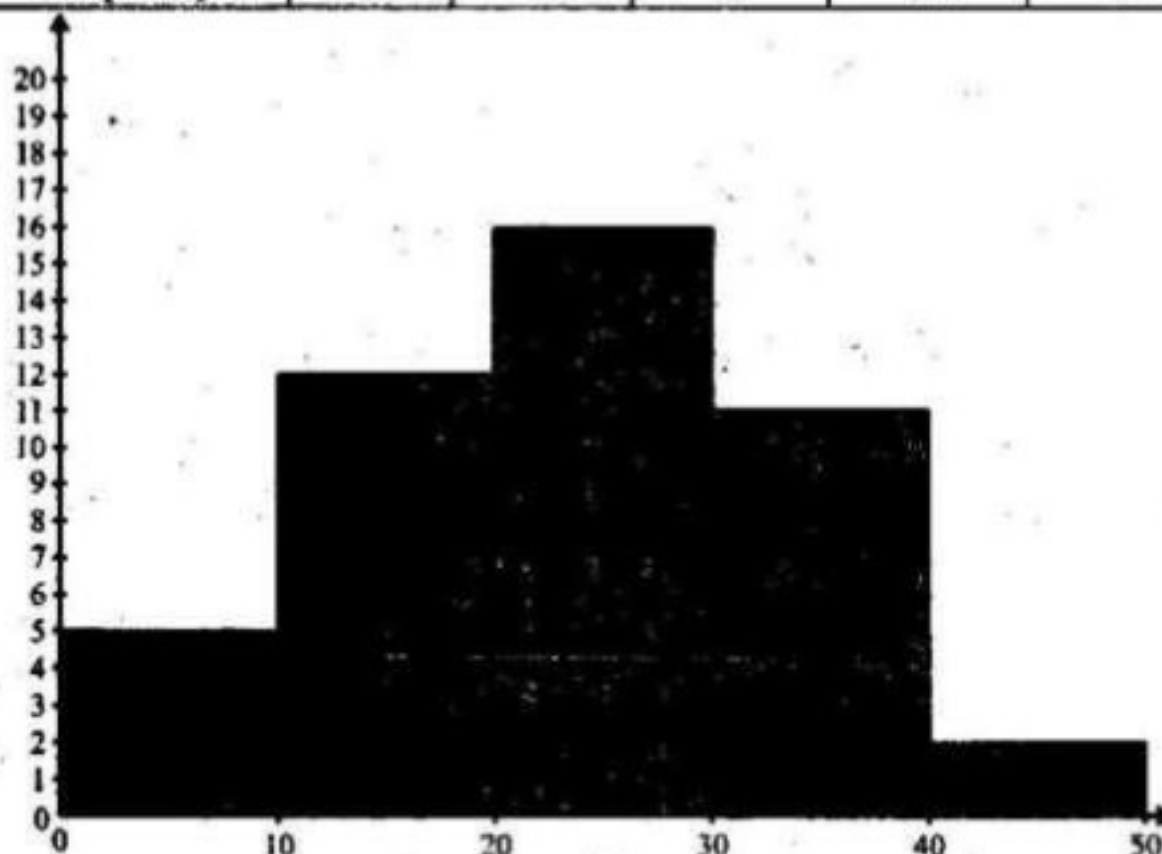
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6. **Title: A histogram showing the monthly rent of some houses in a sector of Islamabad.**
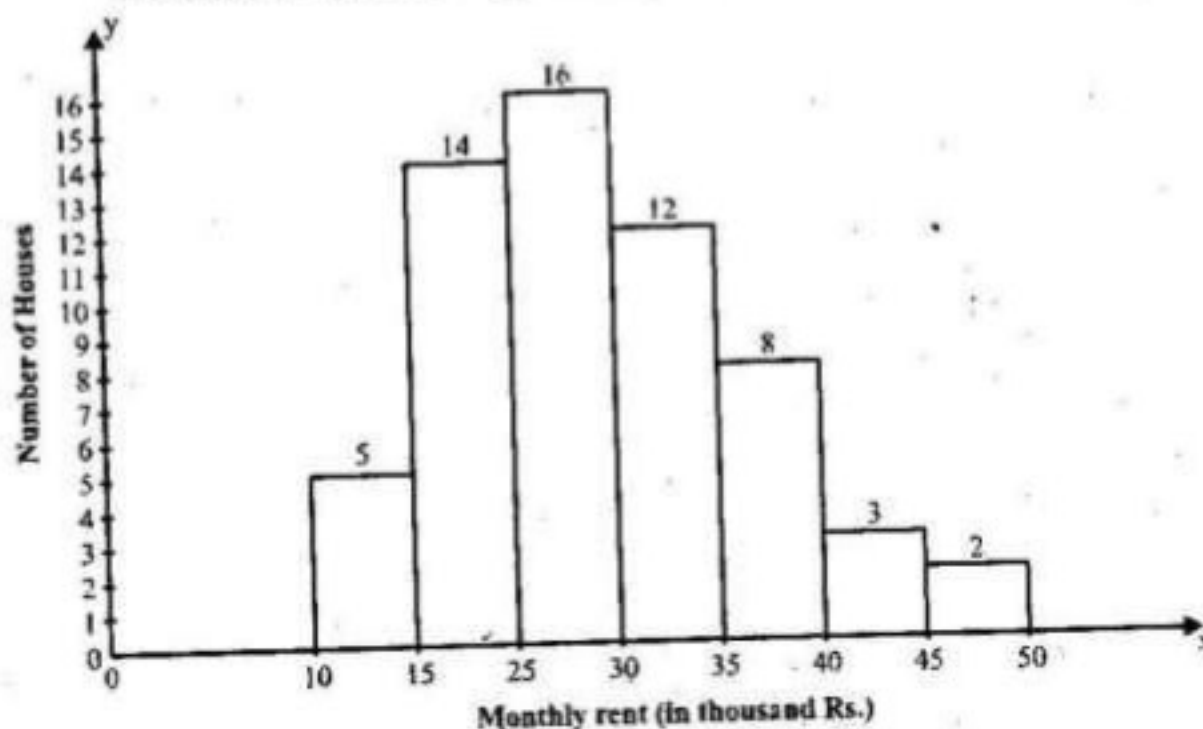
(i) **What is the total number of houses?**
   = 60

(ii) **What is number of houses whose rent is between Rs. 30,000 to Rs. 40,000?**
   = 20

(iii) **What percent of houses had rent between Rs. 10,000 to 30,000?**
   = 58.33%

(iv) **In which group the greatest numbers of houses lie?**
   = 25 – 30

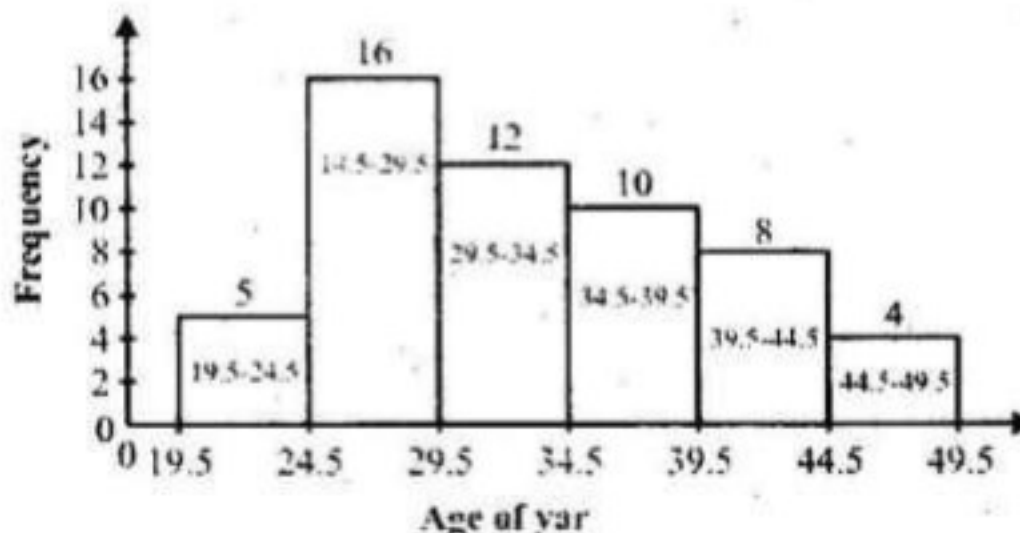7. **The ages of workers in a factory were recorded as below.**

Age in years	Number of workers	Classes
20 – 24	5	19.5 – 24.5
25 – 29	16	24.5 – 29.5
30 – 34	12	29.5 – 34.5
35 – 39	10	34.5 – 39.5

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40 – 44	8	39.5 – 44.5
45 – 49	4	44.5 – 49.5

Draw a histogram to represent the data.

EXERCISE 12.2

1. *Define measure of central tendency and state its types.*

Ans. **Measure of Central Tendency**

The average of a data is called measure of tendency because it tends to lie at the center of data. There are four types Arithmetic mean, median, made and weighted means.

2. *Define arithmetic mean, median and mode.*

Ans. **(a) Arithmetic Mean:**

Arithmetic mean is measure of central tendency, obtained by dividing the sum of values of the data by number of values of the data.

$$\text{A. mean} = \frac{\text{Sum of values}}{\text{Number of values}} = \pi = \frac{\Sigma x}{n}$$

(b) **Median**

The middle most value of an arranged data is called its median.

$$\text{Median} = \frac{n+1}{2} \quad \text{if } (n = \text{odd})$$

$$= \frac{1}{2}\left(\frac{n\text{th}}{2} \text{ value} + \frac{n+2^{th}}{2} \text{ value}\right) \Rightarrow \quad \text{if } n = \text{even}$$

(c) **Mode**

The most repeated of frequent value of data is called mode of the data.

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(i) *2, 4, 6, 8, 10, 12*

Sum of values $= \Sigma x = 2 + 4 + 6 + 8 + 10 + 12 = 42$

No. of values $= 6$

Ans.

A. Mean $= \dfrac{\Sigma x}{n} = \dfrac{42}{6} = 7$

(ii) *3, 4, −1, 7, −8, −5, 0*

Sum of values $= \Sigma x = 3 + 4 - 1 + 7 - 8 - 5 + 0 = 0$

No. of values $= 7$

Ans.

A. Mean $= \dfrac{\Sigma x}{n} = \dfrac{0}{6} = 0$

(iii) *0, 4, 8, 12, 16, 20, 24, 28*

Sum of values $= \Sigma x = 0 + 4 + 8 + 12 + 16 + 20 + 24 + 28 = 112$

No. of values $= 8$

Ans.

A.M. $= \dfrac{\Sigma x}{n} = \dfrac{112}{7} = 16$

(iv) *3.1, 4.2, 5.3, 6.4, 7.5, 8.6, 9.7, 10.8*

Sum of values $= \Sigma x = 3.1 + 4.2 + 5.3 + 6.4$
$+ 7.5 + 8.6 + 9.7 + 10.8 = 55.6$

No. of values $= 8$

Ans.

A. Mean $= \dfrac{\Sigma x}{n} = \dfrac{55.6}{8} = 6.95$

(v) *5, 5, 5, 5, 5, 5, 5, 5*

Sum of values $= \Sigma x = 5 + 5 + 5 + 5 + 5 + 5 + 5 + 5 = 40$

No. of values $= 8$

Ans.

A. Mean $= \dfrac{\Sigma x}{n} = \dfrac{40}{8} = 5$

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4. The monthly incomes in rupees of ten families of a certain locality are given below.

8500, 7000, 1000, 7500, 50000, 800, 4200, 25000, 4000, 3600.

Ans.

Find arithmetic mean of the income.

Sum of income = 8500 + 7000 + 1000 + 7500 + 50000 + 800 + 4200 + 25000 + 4000 + 3600 = 111,600

No. of families = 10

$$A.M. = \frac{\text{Sum of income}}{\text{No. of families}} = \frac{111600}{10} = 11,160$$

5. The following are the scores made by two batsman A and B in a series of innings:

A	12	15	6	73	7	19	199	36	84	29
B	47	12	76	48	4	51	37	48	13	0

Find arithmetic mean of scores of both players and state who is better as run getter?

Arithmetic mean of A =

Ans.

$$\text{Arithmetic} = \frac{12 + 15 + 6 + 73 + 7 + 19 + 199 + 36 + 84 + 29}{10}$$

$$= \frac{480}{10} = 48$$

$$\text{Mean of B} = \frac{47 + 12 + 76 + 48 + 4 + 51 + 37 + 48 + 13 + 0}{9}$$

$$= \frac{336}{9} = 33.6$$

A is better as run getter with 48 of arithmetic mean.

6. The arithmetic mean of 10 values is 35.5. If nine values are 20, 23, 37, 48, 29, 33, 45, 40, 45, find the tenth value.

Ans.

Value = 10

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$$\text{A.M.} = \frac{\text{Total value of value}}{\text{No. of value}}$$

$$\text{Total values} = \text{A.M.} \times \text{No. of values}$$

$$= 35.5 \times 10 = 355$$

$$\text{Value of numbers} = 20 + 23 + 37 + 48 + 29 + 45 + 40 + 33 + 45$$

$$= 320$$

$$\text{Value of } 10^{th} \text{ number} = 355 - 320 = 35$$

7. *Define median and find its value for the following data.*

(i) *1, 4, 2, 5, 3, 7, 6*

By giving order

Ans.

No. of values $= 7$

As $n = $ odd then

$$\frac{n+1}{2} = \frac{7+1}{2} = \frac{8}{2} = 4^{th} \text{ values} = 4$$

(ii) *0, 1, – 2, – 3, 4, 5, 6, 3*

By giving order

$$= -3, -2, 0, 1, 3, 4, 5, 6$$

No. of values $= 8$

As $n = $ odd then

$$= \frac{1}{2}\left\{\frac{nth}{2} + \frac{n+2^{th}}{2}\right\} = \frac{1}{2}\left\{\frac{8^{th}}{2} + \frac{8+2^{th}}{2}\right\}$$

$$= \frac{1}{2}\{4^{th} \text{ value} + 5^{th} \text{ value}\} = \frac{1}{2}\{1+3\} = \frac{1}{2}(4) = 2$$

(iii) *4, 3, 1, – 3, 2, – 3, 3, 4, 1*

By giving order

$$= -3, -3, 1, 1, 2, 3, 3, 4, 4$$

No. of values $= 1$

As $n = $ odd so,

$$= \frac{n+1th}{2} = \frac{9+1}{2} = 5^{th} \text{ values} = 2$$

(iv) *4, 4, 4, 4, 4, 4*

No. of values $= 6$

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| ASAN Math For Class 8th | 326 | Information Handling |

As n = even then

$$= \frac{1}{2}\left\{\frac{nth}{2} + \frac{n+2th}{2}\right\} = \frac{1}{2}\left\{\frac{6}{2} + \frac{6+2}{2}\right\}$$

$$= \frac{1}{2}\{3^{th} \text{ value} + 4^{th} \text{ value}\} = \frac{1}{2}\{4+4\} = \frac{1}{2}(8) = 4$$

8. *Define mode and find its value for the following data.*

Ans. *Mode*

The most repeated of frequent value of data is called mode of the data.

(i) *1, 2, 3, 4, 5, 6*

There is no mode.

(ii) *2, 4, 2, 3, 2, 5, 3, 2, 5, 4, 2*

= 2 is mode

(iii) *120, 130, 140, 225, 125, 225, 120*

= 120 and 225 are mode

(iv) *2, 4, 3, 5, 5, 3, 4, 2*

There is no mode

9. *If $x_1 = 12$, $x_2 = 11$, $x_3 = 7.5$, $x_4 = 2.9$, $x_5 = 3.1$, $x_6 = 5.5$ and $w_1 = 2$, $w_2 = 3$, $w_3 = 1$, $w_4 = 1$, $w_5 = 5$, $w_6 = 4$. Find weighted mean.*

Ans.

Weighted mean =

$$\frac{(x_1 \times w_1) + (x_2 \times w_2) + (x_3 \times w_3) + (x_4 \times w_4) + (x_5 \times w_5) + (x_6 \times w_6)}{w_1 + w_2 + w_3 + w_4 + w_5 + w_6}$$

$$= \frac{(12 \times 2) + (11 \times 3) + (7.5 \times 1) + (2.9 \times 1) + (3.4 \times 5) + (5.5 \times 4)}{2 + 3 + 1 + 1 + 5 + 4}$$

$$= \frac{24 + 33 + 7.5 + 2.9 + 17 + 22}{16}$$

$$= \frac{106.4}{16}$$

$$= 6.65$$

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