Chapter-17
Data Handling

WHAT WE HAVE LEARNT....

1. Find the mean of first 10 whole numbers.

Solution:

$$\text{Mean} = \frac{\text{Sum of 10 whole numbers}}{10}$$

$$= \frac{0+1+2+3+4+5+6+7+8+9}{10}$$

$$= \frac{45}{10} = 4.5$$

2. Find the mean of first 5 multiples of 4.

Solution:

First 5 multiples of 4 are: 4, 8, 12, 16, 20

$$\text{Mean} = \frac{4+8+12+16+20}{5}$$

$$= \frac{60}{5} = 12$$

3. The ages of 25 students in a coaching institute are given below :

Age (In years)	15	16	17	18	19
No. of students	4	8	5	3	5

Find the mean age.

Solution:

Age (in years)	No. of Students	Age × No. of Students
15	4	60
16	8	128
17	5	85
18	3	54
19	5	95
Total	25	422

Mean age = $\dfrac{\text{Sum of } 60, 120, 85, 54, 95}{\text{No. of Students}}$

$= \dfrac{422}{25} = 16.88$

4. Find the median of first 20 whole numbers.

Solution:

First 20 whole numbers are:

0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19

when $n = 20$

$$\frac{n}{2} = \frac{20}{2} = 10, \qquad \frac{n}{2} + 1 = 10 + 1 = 11$$

$$\therefore \text{Median} = \frac{10^{th} \text{ term} + 11^{th} \text{ term}}{2}$$

$$= \frac{9 + 10}{2} = \frac{19}{2} = 9.5$$

5. Find the median of the following data :
18, 10, 5, 3, 16, 4, 6, 15, 8, 12, 6

Solution:

Arranging the given data in ascending order, we have :

3, 4, 5, 6, 6, 8, 10, 12, 15, 16, 18

Here,

$$n = 11 \Rightarrow \frac{n+1}{2} = \frac{11+1}{2} = 6$$

∴ Median = Value of the 6th term = 8.

6. For what value of x, the mode of the following data is 6
4, 8, 6, 2, 5, 6, 4, x - 2, 5, 6, 3, 8.

Outcome	Frequency
2	1
3	1
4	2
5	2
6	3
8	2

Now

$$x - 2 = 6$$

$$\Rightarrow x = 8 \qquad \Rightarrow 8 - 2 = 6$$

Thus, value of x should be 8, so that the mode of the given data is 6.

EXERCISE 17.1

1. Temperature of Chennai (in °C) during a month is given below:

26.7,	28.7,	30,	25.9,	27.2,	30.2,	29.8,	27,	32.3,	28.4,
29.6,	26.5,	24.7,	26.8,	31.5,	27.8,	29.3,	24.5,	22.9,	29.2,
31.4,	28.3,	29.8,	30.6,	32.5,	33.2,	30.8,	25.4,	27.5,	26.9

Present the data in grouped frequency distribution table using class size of width 2, one of the class-intervals being 30 – 32.

Solution:

The highest value of the observation

$= 33.2$

The lowest observation is 22.9.

$\therefore$ Range $= 10.3$

Let us divide the data in intervals with class size $= 2$. We take the class intervals with $22-24, 24-26, 26-28, 28-30, 30-32, 32-34$. Using tally marks, we get the frequency distribution table as:

Temperature(°C)	Tally Marks	Frequency
22-24	I	1
24-26	IIII	4
26-28	IIII III	8
28-30	IIII III	8
30-32	IIII I	6
32-34	III	3
Total		30

2. A group of 50 students was writing a test paper in an examination hall. Maximum time allotted for the unit test was $2\frac{1}{2}$ hours. Time taken by them to solve the paper was recorded (in minutes) as :

140,	128,	130,	145,	150,	120,	135,	125,	120,	115,
110,	138,	136,	146,	125,	135,	142,	145,	118,	112,
132,	135,	100,	105,	128,	108,	124,	140,	145,	150,
123,	142,	110,	125,	138,	128,	138,	110,	120,	130,
143,	124,	115,	133,	143,	134,	148,	104,	118,	139.

Express the time taken by the examinees to solve the paper in the form of frequency distribution table in intervals like 100–105, and answer the following questions :

(i) How many students could complete it exactly in $2\frac{1}{2}$ hours ?

(ii) How many of them could finish the paper in less than 2 hours ?

(iii) Find the number of students who finished the paper during last 10 minutes?

Solution:

The highest value of the observation
= 100

The lowest value of the observation = 150

∴ Range = 50

Let us divide the data in intervals with
Class size = 5.

Using tally marks, we get the frequency
distribution table as:

Time (in minutes)	Tally Marks	Frequency
100 – 105	II	2
105 – 110	II	2
110 – 115	IIII	4
115 – 120	IIII	4
120 – 125	IIII I	6
125 – 130	IIII I	6
130 – 135	IIII	5
135 – 140	IIII III	8
140 – 145	IIII I	6
145 – 150	IIII II	7
Total	.	50

(i) From the given data, 2 Students Could complete it exactly $2\frac{1}{2}$ hours $= 150$ minutes

(ii) Number of students who could finish the paper in less than 2 hours $= 2+2+4+4$
$$= 12$$

(iii) Now, find the number of Students who finished the paper between 141 min to 150 minutes $= 11$

3. 20 players started running a race along a track of 400 m. Time taken by each to reach the final point is given below in minutes. Construct a frequency distribution table showing number of players reaching the final target point during every interval of one minute after the first player touching the target, i.e, between 4-5 minutes, 5-6 minutes, 7-8 minutes, ... In how many intervals the data will be divided?

10 min,	8 min 56 sec,	8 min 30 sec,	9 min 10 sec,	9 min 50 sec,
8 min 50 sec,	9 min 20 sec,	10 min 10 sec,	10 min 15 sec,	6 min 50 sec,
5 min,	4 min,	5 min 30 sec,	4 min 50 sec,	7 min 10 sec,
7 min 30 sec,	8 min 10 sec,	6 min 20 sec,	4 min 10 sec,	4 min 5 sec.

Solution:

The highest value of the observation =

10 min 15 sec.

The lowest value of the observation.
= 4 min

∴ The data will be divided in the following class intervals:

Class Interval	Tally Marks	Frequency
4-5	||||	4
5-6	||	2
6-7	||	2
7-8	||	2
8-9	||||	4
9-10	|||	3
10-11	|||	3
Total		20

4. A questionnaire containing 100 multiple choice questions was solved by 30 students. Number of questions attempted by them were :

85,	58,	76,	65,	93,	72,	77,	83,	55,	48,
84,	67,	56,	59,	47,	66,	68,	74,	56,	65,
45,	73,	95,	74,	62,	86,	49,	61,	56,	82.

Arrange the given data in a frequency table with suitable width and answer the following questions :

(i) How many students attempted more than 80% questions ?

(ii) How many students could attempt more than 60% questions ?

(iii) What is the number of students who had attempted questions less than 50%?

Solution: The hightest value of the observation
$$= 95$$

The Lowest value of the observation $= 45$
Let us divide the data in interrvals with
Class size $= 10$

No. of questions	Tally marks	Frequency
40 – 50	IIII	4
50 – 60	IIII I	6
60 – 70	IIII II	7
70 – 80	IIII I	6
80 – 90	IIII	5
90 – 100	II	2
Total		30

(i) Number of students attempted more than 80% questions = 5 + 2 = 7

(ii) Number of Students could attempt more than 60% questions = 7 + 6 + 5 + 2 = 20

(iii) The number of students who had attempted questions less than 50% = 4

5. A hotel has 100 rooms. During off season, number of rooms occupied during a period of one month was recorded as :

28,	35,	32,	45,	62,	18,	15,	36,	52,	40,	34,	10,
15,	42,	38,	54,	26,	51,	63,	25,	43,	53,	23,	52,
64,	75,	57,	24,	62,	36.						

Prepare a frequency table with class intervals like 10 – 20, 20 – 30, ...

Solution:

Class-Interval	Tally Marks	Frequency
10 – 20	IIII	4
20 – 30	IIII	5
30 – 40	IIII I	6
40 – 50	IIII	4
50 – 60	IIII I	6
60 – 70	IIII	4
70 – 80	I	1
Total		30

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6. A traffic police van was recording the speeds of the cars while passing over a flyover. A challan of ₹ 600 was levied against the drivers who were driving at a speed more than 50 km/hr. Following is the record of the speeds (in km/h) of 60 cars that passed through the flyover in a gap of 10 minutes. Present the data in frequency table using class intervals 20 – 30, 30.– 40,.... Also calculate the amount of penalty collected from challans.

40, 50, 45, 70, 66, 35, 25, 60, 58, 75, 80, 56, 45, 46, 38, 54, 52, 40, 42, 48, 70, 28, 32, 68, 44, 54, 55, 69, 45, 46, 35, 26, 85, 52, 64, 57, 63, 36, 65, 48, 46, 30, 35, 40, 25, 55, 36, 70, 64, 46, 38, 28, 50, 55, 45, 43, 30, 65, 60, 40.

Solution:

Class Interval	Tally Marks	Frequency
20 – 30	ЖТ	5
30 – 40	ЖТ ЖТ	10
40 – 50	ЖТ ЖТ ЖТ 11	17
50 – 60	ЖТ ЖТ 11	12
60 – 70	ЖТ ЖТ	10
70 – 80	1111	4
80 – 90	11	2
Total		60

There were 28 cars whose speed was more than 50 km/hr.

∴ Penality Rate = ₹ 600 per car

∴ For 28 cars = ₹ 600 × 28 = ₹ 16,800.

7. Consumption of water (in litres) in 40 houses of an area is given.

200, 180, 100, 240, 150, 160, 320, 250, 280, 80, 120, 125, 85, 190, 300, 140, 160, 220, 260, 300, 145, 170, 180, 190, 180, 240, 200, 260, 320, 160, 210, 240, 270, 190, 110, 120, 130, 135, 165, 185.

Show the consumption of water in a frequency table with intervals of size 40.

Solution)

Class Interval	Tally Marks	Frequency
0-40		
40-80		
80-120	IIII	4
120-160	IIII III	8
160-200	IIII IIII II	12
200-240	IIII	4
240-280	IIII II	7
280-320	IIII	5
Total		40

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8. Given below is the frequency distribution table of 60 workers showing their daily earnings. Observe the table and answer the following questions :

(i) How many workers get less than ₹ 120 per day?

(ii) How many workers get equal to or more than ₹ 200 per day?
(iii) What is the size of class intervals?
(iv) Find the class marks of all the intervals?
(v) In which earning group do the maximum numbers of workers lie?

Daily earnings (in ₹)	Number of workers
80 – 100	10
100 – 120	12
120 – 140	8
140 – 160	9
160 – 180	6
180 – 200	7
200 – 220	6
240 – 240	2

Solution:

(i) Number of workers who less than ₹120 per day = 10 + 12 = 22

(ii) Number of workers who are getting equal to or more than ₹200 per day = 6 + 2 = 8

(iii) Class Size = upper limit − lower limit
= 100 − 80
= 20

(iv)

$$\text{Class mark} = \frac{\text{Lower limit} + \text{Upper limit}}{2}$$

Thus,

For 80–100, class-mark = $\frac{80+100}{2} = 90$

For 100–120, class mark = $\frac{100+120}{2} = 110$

For 120–140, class-mark = $\frac{120+140}{2} = 130$

For 140–160, class mark = $\frac{140+160}{2} = 150$

For 160–180, class mark = $\frac{160+180}{2} = 170$

For 180–200, class mark = $\frac{180+200}{2} = 190$

For 200–220, class mark = $\frac{200+220}{2} = 210$

For 220–240, class mark = $\frac{220+240}{2} = 230$

(V) Maximum number of workers lie in 100-120 group.

9. First class interval of a data is 0-8. Write next three class intervals of the data.

Solution:

Here, class size = 8-0 = 8

Thus, the next three class intervals are

8-16, 16-24, 24-32

10. Write the lower limit, upper limit and the class marks of the class intervals given below :

(i) 6 – 12 (ii) 100 – 200 (iii) 0 – 50
(iv) 120 – 180 (v) 70 – 75 (vi) 30.5 – 35.5

Solution:

|	Lower limit	Upper limit	Class mark
(i)	6	12	9
(ii)	100	200	150
(iii)	0	50	25
(iv)	120	180	150
(v)	70	75	72.5
(vi)	30.5	35.5	33
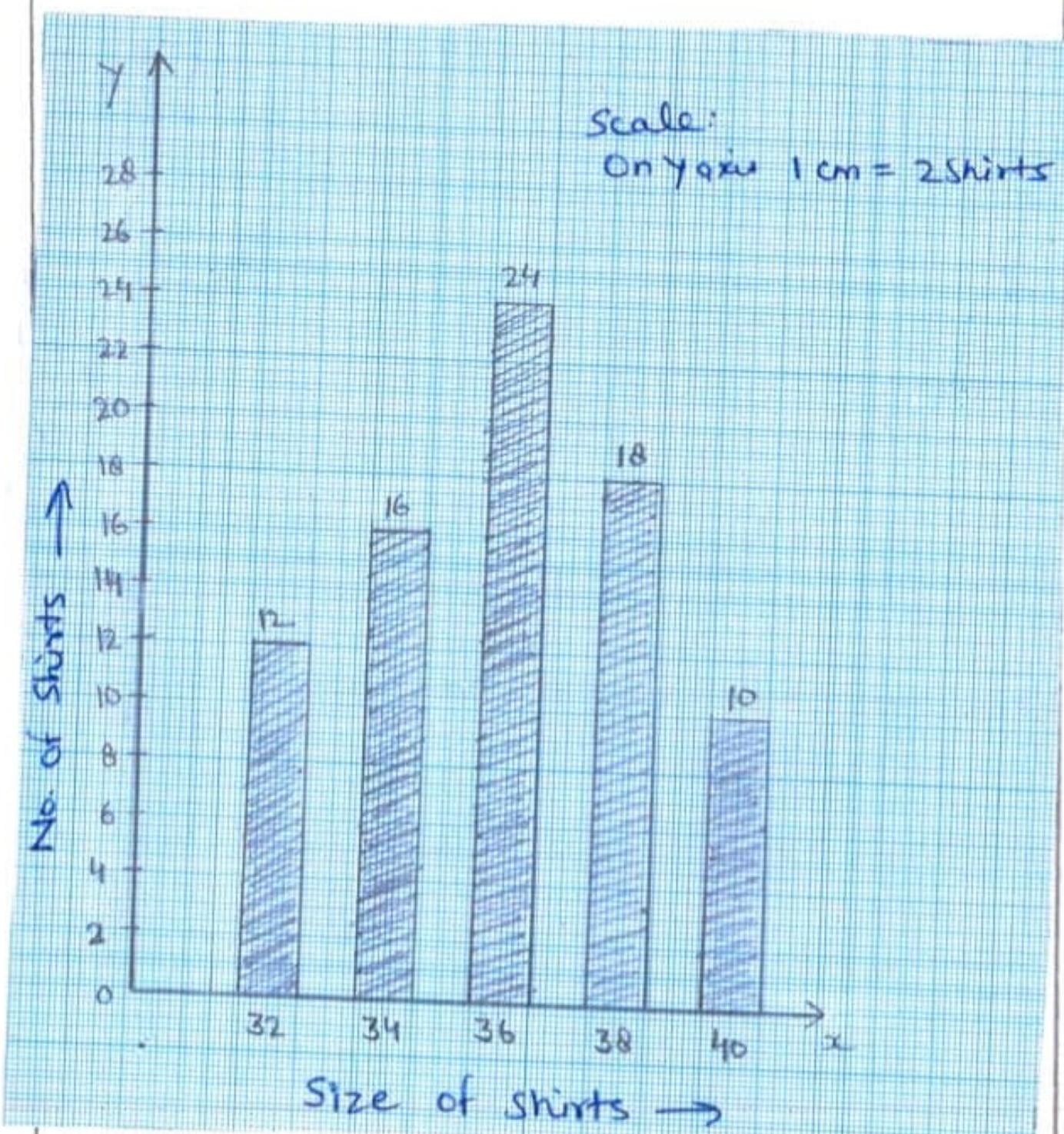
EXERCISE 17.2

1. Number of shirts sold by a shopkeeper on a particular day is given below. Show this by a bar graph.

Size of shirt	32	34	36	38	40
No. of shirts	12	16	24	18	10

Solution:

The bargraph for the given data is shown below:

Scale:
On y axis 1 cm = 2 shirts

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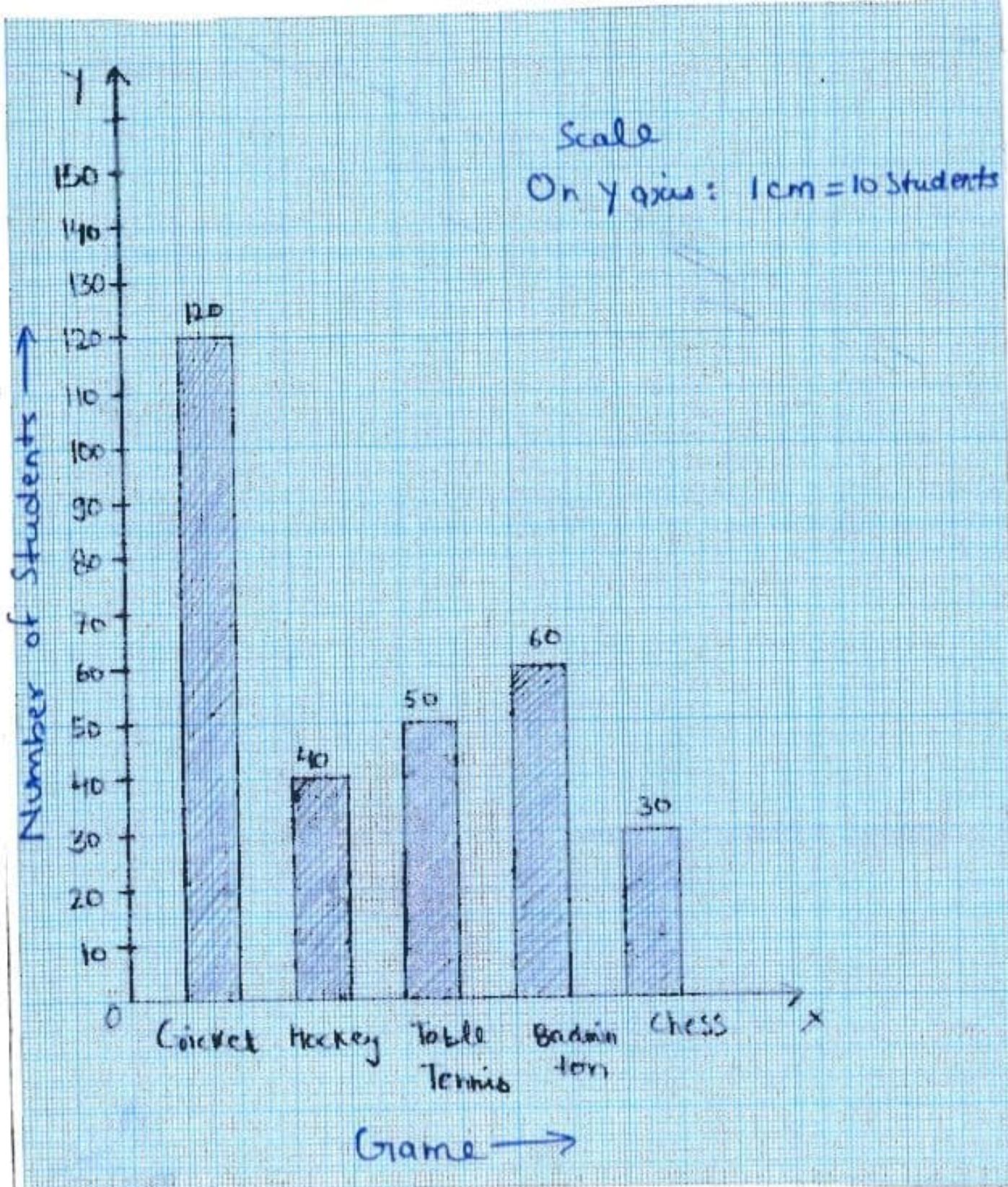
2. Games played by 300 students in a school are recorded as :

Game	Cricket	Hockey	Table Tennis	Badminton	Chess
No. of students	120	40	50	60	30

Draw a bar graph for the above data.

Solution: The bar graph is shown below:

Scale
On y axis : 1 cm = 10 Students

3. Three dice were thrown, the outcomes noted and added (The results can be 3, 4, 5, 6........18). Four players played the game 10 times each. Their scores were
5, 7, 9, 8, 6, 4, 6, 12, 15, 18, 17, 12, 10, 3, 13, 7, 11, 17, 10, 5,
4, 6, 8, 16, 18, 14, 6, 18, 9, 10, 15, 14, 3, 7, 9, 17, 11, 4, 12, 16.
Divide this data into class intervals of size 3 and draw a histogram.

Solution: The frequency distribution table for the above data is given below:

Class Interval	Tally Marks	Frequency
0-3	O	0
3-6	ЖНГ II	7
6-9	ЖНГ III	8
9-12	ЖНГ IIII	9
12-15	ЖНГ II	7
15-18	ЖНГ IIII	9