

Exercise 12.1

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Q.1 The following distribution represent the achieved by a group of chemistry students in the chemistry laboratory.

Scores	24 – 28	29 – 33	34 – 38	39 – 43	44 – 48	49 – 53	Total
No. of students	3	6	12	23	15	6	65

(i) What is the upper limit of the last class?

Solution:

The upper limit of the last group is 53.

(ii) What is the lower limit of the class 39-43?

Solution:

The lower limit of the class (39-43) is 39.

(iii) What is the midpoint of the class (34 – 38) ?

Solution:

The midpoint of the class (34 – 38) 36. i.e.

$$\text{Midpoint (x)} = \frac{34 + 38}{2} = \frac{72}{2} = 36$$

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(iv) What are the class frequencies of the classes 29-33 and 44-48?

Solution

The class frequencies of the classes (29 – 33) and (44 – 48) are 6 and 15 respectively.

(v) What is the size of the class limits in the above frequency distribution?

Solution

The size of class intervals of the given frequency distribution is 5.

(vi) In which class or groups does minimum number of students fall?

Solutions

The group (24-28) contains minimum number of students.

(vii) What is the lower limit of the class having 15 as its class frequency?

Solution

The lower limit of the class having 15 as its class frequency is 44.

(viii) What is the number of students having scores between 24 and 43?

The number of students having scores between 24 and 43 is 44.

Q. 2 For school staff, the following expenditures (rupees in hundred) are required for the repair of chairs.

145,152,153,156,158,160,146,152,155
 159,161,163,165,147,148,151,154,156
 158,160,144,167,151,150,152,149,145
 153,152,155

Prepare a frequency distribution by tally bar method using 3 as the size of class limits and also write down what are the frequencies of the last three classes?

Solution:

No. of observations: $n = 30$

Smallest value = 144

Largest value = 167

Size of class intervals = 3

Class Limits	Tally marks	(f)
144 – 146	IIII	4
147 – 149	III	3
150 – 152	IIII II	7
153 – 155	IIII	5
156 – 158	IIII	4
159 – 161	IIII	4
162 – 164	I	1
165 – 167	II	2
Total		$\Sigma f = 30$

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The frequencies of last three classes are 4, 1 and 2 respectively.

Q. 3 Given below are the weights in kg of 30 students of a high school.

30,33,24,21,15,39,37,44,42,33

33,28,29,32,31,28,26,32,34,35

38,36,41,30,35,41,23,26,18,34

Taking 5 as the size of the class limit, prepare a frequency table and construct a frequency polygon.

Solution:

No. of observation = $n = 30$

Smallest value = 15

Largest value = 44

Size of class limits = 5

Class limits	Tally marks	(f)
15 – 19	II	2
20 – 24	IIII	3
25 – 29	IIII	5
30 – 34	IIII IIII	10
35 – 39	IIII I	6
40 – 44	IIII	4
Total		Σf = 30

Frequency Polygon

Solution:

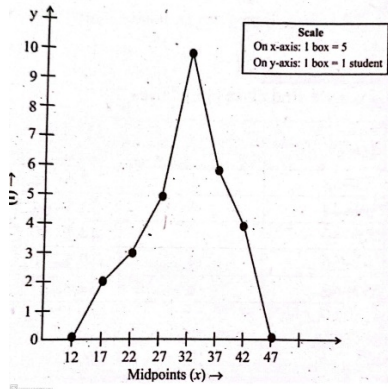
Take two additional groups with zero frequency one before the very first group and second after the very last group.

Also find the midpoints of all the groups.

Class limits	(f)	Midpoints
10 – 14	0	12
15 – 19	2	17
20 – 24	3	22
25 – 29	5	27
30 – 34	10	32
35 – 39	6	37
40 – 44	4	42
45 – 49	0	47

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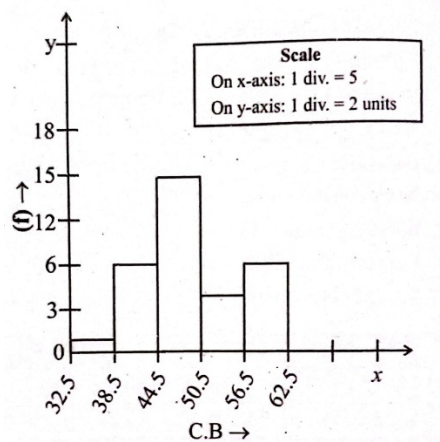


The class limits with least frequency is (33-38).

Histogram

First we find class boundaries

Class limits	f	Class boundaries
33 – 38	1	32.5 – 38.5
39 – 44	6	38.5 – 44.5
45 – 50	5	44.5 – 50.5
51 – 56	4	50.5 – 56.5
57 – 62	6	56.5 – 62.5

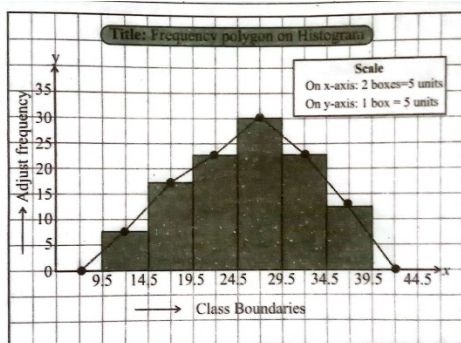


Q. 5 From the table given below. Draw a frequency polygon on histogram for the given frequency distribution.

Weight (kg)	10 – 14	15 – 19	20 – 24	25 – 29	30 – 34	35 – 39
Frequency (f)	06	17	23	30	22	13

Solution:

Weight	(f)	Midpoint (x)	Class Boundaries
10-14	6	12	9.5-14.5
15-19	17	17	14.5-19.5
20-24	23	22	19.5-24.5
25-29	30	27	24.5-29.5
30-34	22	32	29.5-34.5
35-39	13	37	34.5-39.5



Q.6 The following data shows the number of heads in an experiment of 50 sets of tossing a coin 5 times. Make a discrete frequency distribution from the information.

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

4,3,2,5,3,2,1,3,5,4,3,2,1,3,2,1,3,1,3,1,4,3,2,2,4

Solution:

No of observations = $n = 50$

Smallest value = 0

Largest value = 5

No. of Heads	Tally Marks	(f)
0		5
1		7
2		9
3		14
4		9
5		6
		$\Sigma f = 50$

Q. 7 The marks obtained by the students of Grade-10 in mathematics test were Grouped into the following frequency distribution,

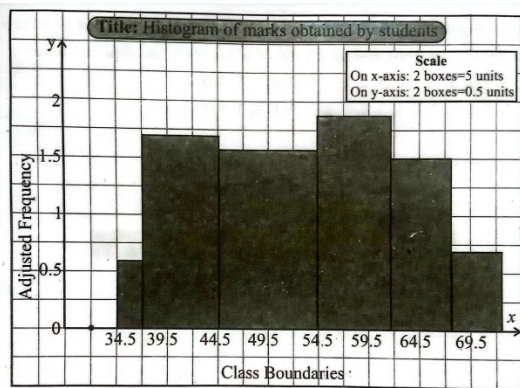
Marks	35 – 37	38 – 44	45 – 54	55 – 61	62 – 67	68 – 72
Frequency	2	12	16	13	9	3

Draw a histogram for the above distribution.

Solution:

Mark s	(f)	Class boundaries	h	f/h
35-37	2	34.5-37.5	3	0.67
38-44	12	37.5-44.5	7	1.7

	2			
45-54	$\frac{1}{6}$	44.5-54.5	$\frac{1}{0}$	1.6
55-61	$\frac{1}{3}$	54.5-61.5	7	$\frac{1.8}{6}$
62-67	9	61.5-67.5	6	1.5
68-72	3	67.5-72.5	5	0.6



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Q. 8 Make a frequency polygon on histogram for the following grouped data:

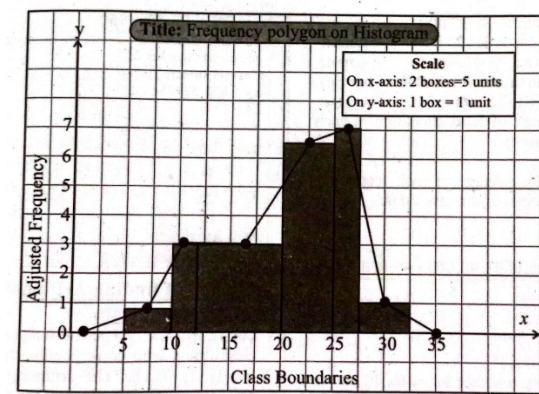
Marks	5 – 8	8 – 12	12 – 20	20 – 25	25 – 27	27 – 32
Frequency	2	12	25	32	14	5

Solution:

Class limits	(f)	Midpoints (x)	Width of class (h)	Height of rectangle f/h
5-8	2	6.5	$8 - 5 = 3$	$\frac{2}{3} = 0.67$
8-12	$\frac{1}{2}$	10	$12 - 8 = 4$	$\frac{12}{4} = 3$

12-20	$\frac{2}{5}$	16	$20 - 12 = 8$	$\frac{25}{8} = 3.1$
20-25	$\frac{3}{2}$	22.5	$25 - 20 = 5$	$\frac{32}{5} = 6.4$
25-27	$\frac{1}{4}$	26	$27 - 25 = 2$	$\frac{14}{2} = 7$
27-32	5	28.5	$32 - 27 = 5$	$\frac{5}{5} = 1$

Frequency on Histogram.



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