MATHS

BOOKS - NAGEEN PRAKASHAN ENGLISH

STATISTICS

Solved Examples

1. The number of children in the families of a village are listed below :

1 2 1 1 2 2 2 3 2 2 2 4 1 2 3 2 2 1 1 0 0 1 2 0 1 2 0 1 2 2 2 2 1 2 3 3 4 2 1 2

Prepare a frequency distribution table.

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2. Given below are the marks obtained by 30 students of a class, Using the class intervals of equal class size in which one class interval is 30-40

(excluding 40), construct a frequency table.

42	74	39	48	42	80	35	38	52	81
31	72	65	58	77	82	79	65	47	30
64	56	39	48	60	63	72	50	46	35

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3. The marks of 20 students out of 25 are given below

12	17	22	7	11	19	24	18	4	8
23	2	5	15	21	16	11	9	12	17

Prepare a frequency table for the given data.

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4. The table given below shows a frequency distribution table, find

(a) Upper limit of third class (b) Lower limit of fifth class

(c) Class size (d) Class mark of third class

Class interval	Frequency
0-10	7
10-20	12
20-30	18
30-40	22
40-50	16
50-60	5

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5. The class marks of a distribution are 61,66,71,76,81,86,91,96,101,106. Determine the class size, class limits and true class limits.

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6. The following data gives the weights of 30 persons (in kg)

70.0,69.4,49.4,64.5,59.4,72.4,47.5,48.8,62.3,64.2,66.8,70.3,71.3,56.3,52.7,66.6,59.9,64

(i) Construct a frequency distribution such that the last class is 72-76.

(ii) State the upper class limits of last three class intervals.

(iii) State the maximum weight that can be included in the fourth class interval.

(iv) State the class mark of each of the classes.

(v) Find the range of the given weights.

(vi) If 60kg is the weight of a person then in which class interval, it will be taken.

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7. The approximate speeds of some objects are given below. Draw a bar graph to represent them:

Name of objects	Bicycle	Scooter	Car	Bus	Train
Speed (in km/hr)	10	40	60	50	80

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8. Given below is the data of school going students (boys and girls):

Mode of transport	School bus	Walking	Bicycle	Other vehicles
Number of boys	75	120	240	150
Number of girls	135	60	180	90

Draw the bar graph to represent the above data.

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9. In a class of 40 students, the marks obtained (out of 50) are as given below:

Marks	0-10	10-20	20-30	30-40	40-50
No. of students (Frequency)	5	10	12	8	5

Draw a histogram to represent the given data.

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10. Draw a histogram to represent the following:

Class interval	30-36	36-42	42-48	48-54	54-60	60-66
Frequency	10	15	25	30	20	5

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11. Draw a histogram from the following data:

Class intervals	11-20	21-30	31-40	41-50	51-60	61-70
Frequency	9	15	25	38	16	6

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12. Draw a frequency polygon from the following data, giving the age of doctors working in C.G.H.S. in a city.

Age (in years)	25-30	30-35	35-40	40-45	45-50
No. of doctors	40	60	50	35	20

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13. The daily pocket expenses of 206 students in a school are given below.

Pocket expenses (in rupees)	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40
Number of students (Frequency)	10	16	30	42	50	30	16	12

Construct a frequency polygon representing the above data.

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14. Draw a histogram for the marks of students given below:

Marks	0-10	10-30	30-45	45-50	50-60
No. of students	8	32	18	10	6

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15. Find the mean of 32, 35, 36, 31 and 41.

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16. Find the mean of all prime numbers between 20 and 50.

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17. The mean of 10 observations is 12. If mean of first 6 observations is 13.

Find the mean of remaining 4 observations.

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18. Find the arithmetic mean of:

x_i	10	15	20	25	30
f_i	3	4	2	5	6

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19. The table shows the marks obtained by 25 students in a class test. Find the mean of the marks obtained

Marks obtained	0	4	7	9	10
No. of students	1	3	7	8	6

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20. Find the median of 7,6,5,3,9,4,3.

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21. Find the median of the following data 3,5,9,10,11,4,5,8,12,15

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22. Find the mode of 4,6,2,2,1,3,7,9,2,3,2.

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23. Find the mode of the following frequency table, which gives the marks scored by 40 students in a test:

Marks obtained	0	1	2	3	4	5	6
No. of students	1	0	2	3	3	6	5

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24. In an examination, the mean of marks scored by a class of 30 students was calculated as 58.5 Later on, it was detected that the marks of one student was wrongly copied as 57 instead of 75. Find the correct mean.

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25. From a set of $n(n > 1)$ numbers, all except one, which is $n - \frac{1}{n}$ are $n's$. Find the mean of all the n numbers.

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26. The average scored by the students of a class in English is 64. The average of marks scored by boys and the girls are respectively 68 and 58. Then find the ratio of the number of boys to the number of girls.

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27. Calculate the mean of the following distribution:

Class interval	0-10	10-20	20-30	30-40	40-50	50-60
Frequency	8	5	12	35	24	16

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28. Find the value of p, if mean of the following distribution is 7.5.

x	3	5	7	9	11	13
f	6	8	15	p	8	4

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29. The mean of 1,7,5,3,4 and 4 is m. The numbers 3,2,4,2,3,3 and p have mean m-1. Find m and p.

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30. The sum of deviations of a set of values $x_1, x_2, x_3, \ldots\ldots x_n$ measured from 50 is -10 and the sum of deviations of the values from 46 is 70. Find the value of n and the mean.

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31. The following observations have been arranged in ascending order. If the median of the data is 63, find the valueof x.

29,32,48,50,x,x+2,72,78,84,95

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32. If $x_1, x_2, \ldots\ldots\ldots, x_n$ are n values of a variable x such that $\sum(x_i - 3) = 170$ and $\sum(x_i - 6) = 50$.

Find the value of n and the mean of n values.

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Problems From Ncert Exemplar

1. The distance (in km) of 40 engineers from their residence to their place of work were found as follows.

5	3	10	20	25	11	13	7	12	31
19	10	12	17	18	11	32	17	16	2
7	9	7	8	3	5	12	15	18	3
12	14	2	9	6	15	15	7	6	12

Construct a grouped frequency distribution table with calss- size 5 for the data given above taking the first interval as 0-5 (5 not included).

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2. The heights of 50 students, measured to the nearest centimetres have been found to be as follows:

161	150	154	165	168	161	154	162	150	151
162	164	171	165	158	154	156	172	160	170
153	159	161	170	162	165	166	168	165	164
154	152	153	156	158	162	160	161	173	166
161	159	162	167	168	159	158	153	154	159

(i) Represent the data given above by a grouped frequency distribution table, taking class intervals as 160-165, 165-170 etc.

(ii) What can you conclude about their heights from the table ?

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3. A study was conducted to find out the concentration of sulphur dioxide in the air in parts per million (ppm) of a certain city. The data obtained for 30 days is a follows :

0.03	0.08	0.08	0.09	0.04	0.17	0.16	0.05	0.02	0.06
0.18	0.20	0.11	0.08	0.12	0.13	0.22	0.07	0.08	0.01
0.10	0.06	0.09	0.18	0.11	0.07	0.05	0.07	0.01	0.04

(i) Make a grouped frequency distribution table for this data with class-intervals as $0.00 - 0.04, 0.04 - 0.08$ and so on.

(ii) For how many day's was the concentration of sulphar dioxide more than 0.11 parts per million (ppm)?

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4. The value of π upto 50 decimal places is given below

3.14159265358979323846264338327950288419716939937510

(i) Make a frequency distribution of the digits from 0 to 9 after the decimal point.

(ii) What are the most and the least frequently occuring digits?

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5. The truth table given below represents

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6. The length of 40 leaves of a plant measured correct to one millimetre and the obtained data is represented in the following table:

Length (in mm)	Number of leaves
118-126	3
127-135	5
136-144	9
145-153	12
154-162	5
163-171	4
172-180	2

(i) Draw a histogram to represent the given data.

(ii) Is there any other suitable graphical representation for the same data?

(iii) Is it correct to conclude that the maximum number of leaves 153 mm long and why?

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7. The following table gives the life times of 400 neon lamps:

(i) Represent the given information with the help of histogram.

(ii) How many lamps have a life time of more than 700 hours?

Life time (in hours)	Number of lamps
300 - 400	14
400 - 500	56
500 - 600	60
600 - 700	86
700 - 800	74
800 - 900	62
900 -1000	48

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8. The following table gives the distribution of students of two sections according to the marks obtained by them

Section *A*		Section *B*	
Marks	Frequency	Marks	Frequency
0-10	3	0-10	5
10-20	9	10-20	19
20-30	17	20-30	15
30-40	12	30-40	10
40-50	9	40-50	1

Represent the marks of the students of both the sections on the same graph by two frquency polygons. From the two polygons compare the performance of the two sections.

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9. The runs scored by two teams A and B on the first 60 balls in a cricket match are given below:

Number of balls	Team *A*	Team *B*
1-6	2	5
7-12	1	6
13-18	8	2
19-24	9	10
25-30	4	5
31-36	5	6
37-42	6	3
43-48	10	4
49-54	6	8
55-60	2	10

Represent the data of both the teams on the same graph by frequency polygons.

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10. A random survey of the number of children of various are groups playing in park was found as follows :

Age (in years)	Number of children
1-2	5
2-3	3
3-5	6
5-7	12
7-10	9
10-15	10
15-17	4

Draw a histogram to represent the data above.

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11. 100 surnames were randomly picked up from a local telephone directory and a frequency distribution of the number of letter in English alphabet in the surnames was found as follows:

Number of letters	Number of surnames
1-4	6
4-6	30
6-8	44
8-12	16
12-20	4

(i) Draw a histogram to depict the given information.

(ii) Write the class interval in which the maximum number of surnames lie.

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12. The mean of five numbers is 30. If one number is excluded, their mean becomes 28. The excluded number is

A. 28

B. 30

C. 35

D. 38

Answer:

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13. If the mean of the observation $x,\ x+3,\ x+5,\ x+7$ and $x+10$ is $9,$ then mean of the last three observations is

A. $10\frac{1}{3}$

B. $10\frac{2}{3}$

C. $11\frac{1}{3}$

D. $11\frac{2}{3}$

Answer:

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14. The mean deviation for n observations $x_1, x_2, , x_n$ from their mean X is given by $\sum_{i=1}^{n}(x_i - X)$ (b) $\frac{1}{n}\sum_{i=1}^{n}(x_i - X)$ (c) $\sum_{i=1}^{n}(x_i - X)^2$ (c) $\frac{1}{n}\sum_{i=1}^{n}(x_i - X)^2$

A. -1

B. 0

C. 1

D. n-1

Answer:

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15. If each observation of the data is increased by 5, then their mean

A. remains the same

B. becomes 5 times the original mean

C. is decreased by 5

D. is increased by 5

Answer:

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16. Let $\bar{x}$ be the mean of $x_1, x_2, \ldots\ldots\ldots, x_n$ and $\bar{y}$ be the mean of $y_1, y_2, \ldots\ldots\ldots\ldots, y_n$.

If $\bar{z}$ is the mean of $x_1, x_2, \ldots\ldots\ldots\ldots\ldots\ldots x_n, y_1, y_2, \ldots\ldots\ldots\ldots, y_n$, then $\bar{z}$ is equal to

A. $\bar{x} + \bar{y}$

B. $\frac{\bar{x} + \bar{y}}{2}$

C. $\frac{\bar{x} + \bar{y}}{n}$

D. $\frac{\bar{x} + \bar{y}}{2n}$

Answer:

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17. If $\bar{x}$ is the mean of $x_1, x_2, \ldots\ldots\ldots\ldots, x_n$, then for $a \neq 0$, the mean of $ax_1, ax_2, \ldots\ldots\ldots, ax_n, \frac{x_1}{a}, \frac{x_2}{a}, \ldots\ldots\ldots\ldots, \frac{x_n}{a}$ is

A. $\left(a + \frac{1}{a}\right)\bar{x}$

B. $\left(a + \frac{1}{a}\right)\frac{\bar{x}}{2}$

C. $\left(a + \frac{1}{a}\right)\frac{\bar{x}}{n}$

D. $\frac{\left(a + \frac{1}{a}\right)\bar{x}}{2n}$

Answer:

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18. If $\bar{x}_1, \bar{x}_2, \bar{x}_3, \ldots \bar{x}_n$ are the means of n groups with $n_1, n_2, n_3, \ldots. n_n$ numbers of observations respectively. Than the mean $\bar{x}$ of all group together is given by :

A. $\sum_{i=1}^{n} n_i \bar{x}_i$

B. $\frac{\sum_{i=1}^{n} n_i \bar{x}_i}{n^2}$

C. $\frac{\sum_{i=1}^{n} n_i \bar{x}_i}{\sum_{i=1}^{n} n_i}$

D. $\frac{\sum_{i=1}^{n} n_i \bar{x}_i}{2n}$

Answer:

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19. The mean of 100 observation is 50. If one of the observation which was 50 is replaced by 150, the resulting mean will be

A. 50.5

B. 51

C. 51.5

D. 52

Answer:

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20. There are 50 numbers. Each number is subtracted from 53 and the mean of the number so obtained is found to be -3.5. The mean of the given number is

A. 46.5

B. 49.5

C. 53.5

D. 56.5

Answer:

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21. The mean of 25 observation is 36. Out of these observations, if the mean of first 13 observations is 32 and that of the last 13 observations is 40, the $13th$ observation is

A. 23

B. 36

C. 38

D. 40

Answer:

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22. The marks obtained (out of 100) by a class of 80 students are given below:

Marks	Number of students
10-20	6
20-30	17
30-50	15
50-70	16
70-100	26

Construct a histogram to represent the data above

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Exercise 14 A

1. Statistical Data : Primary Data and Secondary Data.

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2. Explain the meaning of the following:

(i) Class-interval(ii) Class size (iii) Frequency (iv) Class limits (v) True class limits

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3. Arrange the following data as on array (in ascending order)

6.3, 5.9, 9.8, 12.3, 5.6,4.7.

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4. Following are the marks obtained by 30 students in a examination

15	20	8	9	10	16	17	20	24	30
44	47	38	36	40	27	25	28	30	19
7	11	21	31	41	37	47	23	20	17

Taking class intervals $0-10, 10-20, \ldots . 40-50$ construct a frequency table.

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5. The marks obtained by 32 students of a class are given below. Prepare a frequency table with class intervals $31-40, 41-50, \ldots .$ etc.

35	44	55	68	70	41	38	53	72	69	61
49	64	50	32	48	57	63	70	78	63	46
41	52	39	43	60	70	48	72	37	40	

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6. From the following frequency table.

Class interval	0-5	5-10	10-15	15-20	20-25	25-30	30-35
Frequency	6	10	18	29	35	38	40

Find : (a) The frequency of fifth class interval

(b) The upper class limit of third class interval.

(c) The lower class limit of second class interval.

(d) The class mark of sixth class interval.

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7. The class marks of a distribution are 12, 18, 24, 30. Find the class interval.

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8. Use the table given below to find : (a) The actual class limits of the fourth class. (b) The class boundaries of the sixth class. (c) The class mark of the third class. (d) The upper and lower limits of the fifth class. (e) The

size of the third class.

Class interval	Frequency
$30-34$	7
$35-39$	10
$40-44$	12
$45-49$	13
$50-54$	8
$55-59$	4

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9. Construct a frequency table for the following ages (in years) of 30 students using equal class intervals, one of them being 9-12, where 12 is not included.

18, 12, 7, 6, 11, 15, 21, 9, 8, 13, 15, 17, 22, 19, 14, 21, 23, 8, 12, 17, 15, 6, 18, 23, 22, 16, 9, 21, 11, 16.

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10. The following are weights (in kg) of 50 children taken at the time of birth:

2.0	2.5	2.8	2.3	3.0	3.1	2.4	2.5	4.2	3.5
3.7	2.8	2.3	2.9	3.5	3.1	4.1	2.5	3.1	3.6
2.9	2.7	3.0	3.9	2.9	3.1	3.7	3.8	3.2	3.3
4.1	4.2	3.7	4.5	4.2	3.0	2.5	3.9	2.8	3.5
3.8	3.1	4.3	2.8	4.1	3.1	2.8	4.1	2.8	4.1

Make an inclusive form grouped frequency distribution table with 0.3 kg as the width of ' each class.

Also, find the true class limits of each class.

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Exercise 14 B

1. Draw a bar graph from the following data:

Class	VI	VII	VIII	IX	X
No. of students	30	40	20	50	40

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2. Mr. Mirza's monthly income is रु 7,200 . He spends. रु 1,800 on rent रु 2,700 on food, रु 900 on education of his children रु 12,00 on other things and saves the rest. Draw a pie- chart to represent it.

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3. The following table shown the market position of different brands of tea-leaves.

Brand	A	B	C	D	Others
% Buyers	35	20	20	15	10

Draw a bar graph.

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4. Construct a histogram for the following distribution:

Class interval	0-5	5-10	10-15	15-20
Frequency	5	6	3	2

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5. Draw a histogram for the following data:

Class interval	0-10	10-20	20-30	30-40	40-50
Frequency	8	20	30	15	15

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6. Draw a histogram for the following data:

Class interval	0-8	8-16	16-24	24-32	32-40
Frequency	6	5	10	8	4

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7. Draw a histogram for the following data:

Class interval	1-10	11-20	21-30	31-40	41-50
Frequency	12	16	8	22	14

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8. Draw a histogram for the following data:

Class interval	10-14	14-20	20-32	32-52	52-80
Frequency	5	6	9	25	21

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9. Draw a frequency polygon from the following data:

Class interval	3000-4000	4000-5000	5000-6000	6000-7000	7000-8000
No. of workers	7	12	21	15	4

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10. Draw a histogram and frequency polygon from the following data:

Age in years	20-28	28-36	36-44	44-52	52-60	60-68
No. of pupils	14	18	16	24	10	20

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11. The daily wages in a factory are distributed as follows:

Daily wages (in ₹)	12.5-17.5	17.5-22.5	22.5-27.5	27.5-32.5	32.5-37.5
No. of workers	4	20	22	10	6

Draw a frequency polygon for the following distribution.

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12. Draw a histogram for the marks of students given below:

Marks	10-15	15-20	20-25	25-30	30-40	40-60
No. of students	7	9	8	5	12	8

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13. Construct a frequency polygon for the following data:

Age (in years)	0-2	2-4	4-6	6-8	8-10	10-12	12-14	14-16	16-18
Frequency	2	4	6	8	9	6	5	3	1

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Exercise 14 C

1. Find the mean of the following data.

(i) 3, 5, 3, 4, 2, 0, 7 and 10 (ii) 6.2, 5.6, 4.8, 11.2, 12.5, 7.4 and 6.3 (iii) 16, 39, 43, 120, 475, 248, 368

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2. Find the arithmetic mean of first 6 natural numbers.

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3. Find the mean of all factors of 10.

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4. Find the mean of integers from -4 to 5.

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5. The mean of 3, a+2, 8, 12, 2a-1 and 6 is 7, find the value of a.

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6. The mean of 16, 19, P, 21, 25, 28 is 22, find the value of P.

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7. The mean of 20 observations is 30. If the mean of first 15 observations is 32, find the mean of last 5 observations.

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8. The mean of 25 observations is 72. It was detected that one observation 53 was wrongly copied as 78. Find the correct mean.

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9. The mean monthly salary of 8 teachers is ₹ 32,000. When the salary of one senior teacher is included their mean becomes ₹ 33,500. Find the salary of the senior teacher.

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10. Find the mean of the frequency distribution:

(i)

Observations (x)	2	4	7	8
Frequency (f)	6	9	12	15

(ii) The weight of 40 students of class IX are given below:

Weight (kg)	38	40	41	43	45	48
No. of students	3	8	9	7	6	7

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11. Find the median of

(i) 7, 11, 25, 45, 23, 12, 11, 9, 10

(ii) 15, 14, 11, 9, 7, 12, 18, 20

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12. Find the median of first 7 prime numbers.

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13. Find the median of first 10 even natural numbers.

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14. The following data have been arranged in ascending order. If their median is 63, find the value of x.

34,37,53,55,x,x+2,77,83,89 and 100.

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15. Find the mode of

(i) 7, 7, 8, 10, 10, 11,13, 14

(ii) 4, 5, 6, 7, 8, 7, 6, 5, 3, 4, 6, 7, 6

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16. Find the mode of following data:

x	15	16	17	18	19	20	21	22	23
f	6	7	9	13	10	12	8	0	4

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17. Find the mode of following data:

x	3	5	9	11
f	16	12	24	10

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18. Find the mean, median and mode of the following data:

19, 7, 7, 25, 7

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19. Find the sum of deviations of the following data measured from their actual mean.

7,8,10,12,18

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20. The weights of 9 boxes in kgms are as follows:

27.5, 31.2, 28.0, 32.0, 29.8, 30.3, 92.0, 28.7, 31.5

Find the appropriate average weight of the boxes.

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Revision Exercise

1. If the heights of 5 persons are 140 cm, 150 cm, 152 cm, 158 cm and 161 cm respectively, find the mean height.

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2. Find the mean of $x,\ x+2,\ x+4,\ x+6,\ x+8$

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3. Find the mean of the following distribution:

x	4	6	9	10	15
f	5	10	10	7	8

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4. Find the value of P if the mean of the following distribution is 7.5

x	3	5	7	9	11	13
y	6	8	15	P	8	4

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5. The mean weight of 120 students of a school is $52 \cdot 75$ kg. If the mean weight of 50 of them is 51 kg, find the mean weight of the remaining students.

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6. The runs scored by 12 numbers of a cricket team are 14, 30, 43, 42, 12, 50, 32, 20, 0, 58, 37, 36. Find the median score.

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7. Find the median of the following distribution:

40, 49, 17, 68, 44, 62, 48, 47, 21, 55, 32, 50, 12, 27, 30, 18

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8. The median of the following observation 11, 12, 14, (x - 2), (x + 4), (x + 9), 32, 38, 47 arranged in ascending order is 24. Find the value of x and hence find the mean.

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9. Find the mode of the following distribution 7, 9, 8, 11, 8, 12, 8, 9.

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10. The marks of 19 students in a test were as follows: 5, 6, 8, 9, 10, 11, 12, 13, 13, 14, 14, 15, 15, 15, 16, 16, 18, 19, 20. Calculate the median and mode.

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11. In a school there are five sections of class IX. The number of students in each section is given below.

Construct a bar graph.

Section	A	B	C	D	E
No. of students	40	48	52	45	30

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12. Draw a histogram to represent the following:

Class interval	0-8	8-16	16-24	24-32	32-40
Frequency	6	9	12	10	5

Also draw a frequency polygon with the help of histogram

Watch Video Solution