



## MATHS

### BOOKS - NAGEEN PRAKASHAN ENGLISH

## STATISTICS

#### Solved Examples

1. Find the mean of the following frequency distribution by direct method.

Class interval	0-10	10-20	20-30	30-40	40-50	50-60
Frequency	10	12	17	15	11	9

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2. Find the mean of the following table by direct method:

Class interval	0-10	10-20	20-30	30-40	40-50
Frequency	4	13	18	9	6

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3. Find the mean from the following table by direct method :

Class interval	0-10	10-20	20-30	30-40	40-50	50-60
Frequency	7	14	28	26	16	9

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4. If the mean of the following data is 26, then find the value of p:

Class interval	0-10	10-20	20-30	30-40	40-50
Frequency	6	$p$	9	4	11

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5. Find the value of  $p$ , if the mean of the following distribution is

18 :

$x_i$	13	15	17	19	$20 + p$	23
$f_i$	8	2	3	4	$5p$	6

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6. Find the mean from the following data :

Marks	5	10	15	20	25	30	35	40
No. of students	3	10	25	49	65	73	78	80

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7. Find the mean for the following distribution table by short cut

method:

Class interval	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	4	4	7	10	12	8	5

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8. Find the mean from the following distribution table using short cut method :

Class interval	0-6	6-12	12-18	18-24	24-30
Frequency	6	8	10	9	7

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9. The height of 84 trees is given in the following table. Find the their arithmetic mean by short cut method :

Height (in cm)	25	35	45	55	65	75	85	95
No. of trees	2	4	5	20	46	4	2	1

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10. The age of 40 students of a class is given in the following table. Find their mean short cut method:



Age (in years)	11	12	13	14	15	16	17
No. of students	2	4	6	9	8	7	4

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11. Find the mean of the following table by step deviation method :

$x_i$	4	7	10	13	16	19
$f_i$	20	25	27	30	27	25

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12. Find the mean of the following table by step deviation method

:

Marks	5	15	25	35	45
No. of students	2	12	10	8	4

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13. The marks obtained by 30 students are given in the following table. Find their mean by step deviation method :

Class Interval (Marks obtained)	0-10	10-20	20-30	30-40	40-50
No. of students	2	10	8	4	4

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14. Find the mean from the following table using step deviation method :

Class interval	0-10	10-20	20-30	30-40	40-50
Frequency	3	7	22	10	8

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15. Find the mean for the following data by step-deviation method :

Marks obtained	Less than 10	Less than 20	Less than 30	Less than 40	Less than 50	Less than 60
No. of students	14	22	37	58	67	75

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16. Find the mean for the following frequency distribution :

Class	25-29	30-34	35-39	40-44	45-49
Frequency	14	22	16	6	5

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17. Find the class limits corresponding to each frequency if the mean of the following distribution is 33 and assumed mean 35 :

Step deviations	-3	-2	-1	0	1	2
Frequency	5	10	25	30	20	10

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18. Find the median from the following table :

Class interval	0-10	10-20	20-30	30-40	40-50	50-60
Frequency	7	12	18	15	10	3

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19. Find the median from the following table :

Class interval	10-25	25-40	40-55	55-70	70-85	85-100
Frequency	6	20	44	26	3	1

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20. Find the median from the following table :

Class interval	20-30	30-40	40-50	50-60	60-70	70-80
Frequency	3	6	16	19	9	3

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21. Find the median from the following data :

Daily income (below)(in ₹)	30	40	50	60	70	80	90
No. of persons	69	236	436	508	566	593	600

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22. Marks of 40 student in a test out of maximum 50 marks are as follow :

Marks	30	50	45	15	40	20	35	25
No. of students	1	2	3	3	6	8	8	9

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23. Find the median of the following frequency distribution :

Weekly wages (in ₹)	60-68	70-78	80-88	90-98	100-108	110-118
Number of days	5	15	20	30	20	8

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24. Find the median for the following frequency distribution:

Class	160-162	163-165	166-168	169-171	172-174
Frequency	15	117	136	118	14

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25. Find the median for the following data :

Marks obtained	below 10	below 20	below 30	below 40	below 50	below 60
Number of students	5	14	22	35	46	50

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26. Find the missing frequency if the median for the given distribution is 24:

Class	0-10	10-20	20-30	30-40	40-50
Frequency	5	25	25	$p$	7

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27. If the median of the distribution given below is 28.5 , find the values of  $x$  and  $y$ .

Class interval	0-10	10-20	20-30	30-40	40-50	50-60	Total
Frequency	5	$x$	20	15	$y$	5	60



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28. Compute the mode for the following frequency distribution :

Class	0-10	10-20	20-30	30-40	40-50
Frequency	25	16	28	20	5



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29. Calculate the value of mode for the following frequency distribution :

Class	1-4	5-8	9-12	13-16	17-20	21-24
Frequency	5	8	12	15	14	7



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30. The mode of the following series is 17.3 . Find the missing frequency :

Age (in years)	0-5	5-10	10-15	15-20	20-25	25-30	30-35
No. of patients	6	11	...	24	17	13	5



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31. A survey regarding the heights ( in cm) of 50 girls of class X of a school was conducted and the following data was obtained. Find the mean

Heights (in cm)	120-130	130-140	140-150	150-160	160-170	Total
No. of girls	2	8	12	20	8	50



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**32.** find the mode of the following data. :

Class interval	20-30	30-40	40-50	50-60	60-70	70-80
Frequency	10	6	8	12	5	9

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**33.** Draw a less than cumulative frequency curve (ogive) for the following distribution :

Marks	5-10	10-15	15-20	20-25	25-30
No. of students	7	9	12	8	6

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**34.** In a study of the cases of diabetes the following data was obtained.

Age in years	10-20	21-30	31-40	41-50	51-60	61-70
No. of cases	0	2	9	14	12	0

Draw a less than ogive for above data .

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35. Construct a less than ogive and a more than ogive from the following data :

Age in years	0-10	10-20	20-30	30-40	40-50	50-60
No. of persons	3	16	30	35	13	2

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36. During the medical checkup of 35 students of a class their weight were recorded as follows :

Weight (in kg.)	No. of Students
38–40	3
40–42	2
42–44	4
44–46	5
46–48	14
48–50	4
50–52	3

Draw a less than type a more than type ogive from the given data.

Hence obtain the median weight from the graph.



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**37.** Find the median for the following distribution :

C.I.	0-10	10-20	20-30	30-40	40-50
Frequency	5	7	10	8	5



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Problems From Ncert Exemplar

1. To find out the concentration of  $SO_2$  in the air (in parts per million, i.e., ppm), the data was collected for 30 localities in a certain city Find the mean concentration of  $SO_2$  in the air.

Concentration of $SO_2$ (in ppm)	Frequency ( $f$ )
0.00 – 0.04	4
0.04 – 0.08	9
0.08 – 0.12	9
0.12 – 0.16	2
0.16 – 0.20	4
0.20 – 0.24	2

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2. In a retail market, fruit vendors were selling mangoes kept in packing boxes. These boxes contained varying number of mangoes. The following was the distribution of mangoes according to the number of boxes. No. of mangoes: 50-52 53-55 56-58 59-61 62-64 No. of boxes: 15 110 135 115 25 Find the mean

number of mangoes kept in a packing box. Which method of finding the mean did you choose?

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3. The given distribution shows the number of runs scored by some top batsmen of the world in one-day international cricket matches.

Runs scored	3000-4000	4000-5000	5000-6000	6000-7000	7000-8000	8000-9000	9000-10000	10000-11000
Number of batsmen	4	18	9	7	6	3	1	1

Find the mode of the data.

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4. The following table gives production yield per hectare of wheat of 100 farms of a village.

Production yield (in kg/ha)	50-55	55-60	60-65	65-70	70-75	75-80
Number of farms	2	8	12	24	38	16

Change the distribution to a more than type distribution, and draw its ogive

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## Exercise 14 A

1. Find the mean by direct method :

Class	0-10	10-20	20-30	30-40	40-50
Frequency	12	16	6	7	9

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2. Find the mean using direct method :

Class	0-100	100-200	200-300	300-400	400-500
Frequency	6	9	15	12	8



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3. Find the mean using direct method. :

Class	0-10	10-20	20-30	30-40	40-50
Frequency	3	5	9	5	3



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4. Find the mean using direct method :

Marks	0-40	40-80	80-120	120-160	160-200
No. of students	12	20	35	30	23



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5. The mean of the following distribution is 25 . Find the value of  $p$  using direct method :

Class	0-10	10-20	20-30	30-40	40-50
Frequency	5	$p$	15	16	6



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6. The mean of the following distribution is 54. Find the value of  $p$  using direct method :

Class	0-20	20-40	40-60	60-80	80-100
Frequency	7	11	10	$p$	13



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7. The mean of the following distribution is 62.8 and the sum of all the frequencies is 50. Find the missing frequencies  $f_1$  and  $f_2$



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8. Find the mean from the following table using short cut method.

:

Class interval	5-10	10-15	15-20	20-25	25-30	30-35	35-40
Frequency	5	8	12	17	12	8	5

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9. Find the mean from the following table using short cut method

:

Class interval	0-10	10-20	20-30	30-40	40-50	50-60
Frequency	10	13	17	15	11	9

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10. Find the mean from the following table using short cut method :

Class interval	100-200	200-300	300-400	400-500	500-600	600-700
Frequency	17	20	30	18	8	7



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11. Find the mean from the following table using step deviation method :

Class interval	20-25	25-30	30-35	35-40	40-45
Frequency	11	8	6	10	5



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12. Find the mean from the following table using step deviation method :

Class interval	20-25	25-30	30-35	35-40	40-45	45-50	50-55
Frequency	12	10	8	9	6	3	2



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13. Find the mean from the following table using step deviation

Class interval	10-15	15-20	20-25	25-30	30-35	35-40
Frequency	3	7	9	12	6	3

method :

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14. Find the mean from the following table using step deviation

method :

Class interval	60-79	80-99	100-119	120-139	140-159	160-179	180-199
Frequency	18	24	26	32	25	19	16

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15. In the following table, the total expenditure of the labourers of a city is given Find the average expenditure by deviation method.

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16. The mean of the following frequency distribution is 57.6 and the sum of the observations is 50. Find the missing frequencies  $f_1$  and  $f_2$  :

Class	0-20	20-40	40-60	60-80	80-100	100-120
Frequency	7	$f_1$	12	$f_2$	8	5

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17. The mean of the following frequency distribution is 50 Find  $f_1$   $f_2$   $f_3$  if  $f_2 : f_3 = 4 : 3$ :

Classes	0-20	20-40	40-60	60-80	80-100	Total
Frequency	17	$f_1$	$f_2$	$f_3$	19	120

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## Exercise 14 B

1. Find the median from the following data :

Class Interval	0-10	10-20	20-30	30-40	40-50
Frequency	8	30	40	12	10

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2. Find the median from the following data :

Daily income (below)(in ₹)	30	40	50	60	70	80	90
No. of persons	69	236	436	508	566	593	600

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3. Find the median of the following frequency table :

Class Interval	0-10	10-20	20-30	30-40	40-50
Frequency	4	13	10	9	6

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4. If the median of the following frequency distribution is 32.5 .

Find the value of  $p$  :

Class Interval	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	3	5	9	12	$p$	3	2

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5. If the median of the following frequency distribution is 32  $N = 100$ ,

then find the values of  $p$  and  $q$

Class interval	0-10	10-20	20-30	30-40	40-50	50-60
Frequency	10	$p$	25	$q$	16	10

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6. Find the median from the following data :

Marks (below)	10	20	30	40	50	60	70	80
No. of students	12	32	57	80	92	116	164	200

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7. Determine the median for the following income distribution :

Income groups	below 100	100-200	200-300	300-400	400-500	above 500
No. of persons	5	10	18	30	20	17

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## Exercise 14 C

1. Find the mode of the following frequency distribution :

Class	0-20	20-40	40-60	60-80	80-100	100-120	120-140
Frequency	6	8	10	12	6	5	3

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2. Computer the mode for the following

Size of items	0-4	4-8	8-12	12-16	16-20	20-24	24-28	28-32	32-36
Frequency	5	7	9	17	12	10	6	3	1



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3. Given below is the frequency distribution of the heights of playces in a school :

Height (in cm)	160-162	163-165	166-168	169-171	172-174
No. of students	15	118	142	127	18

Find the modal height



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4. Find the mode of the following frequency distribution

Class	20-30	30-40	40-50	50-60	60-70	70-80
Frequency	4	7	9	11	6	2



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5. The following distributions represent the height of 160 students of a class :

Height (in cm)	140-145	145-150	150-155	155-160	160-165	165-170	170-175	175-180
No. of students	12	20	30	38	24	16	12	8

Find the modal height

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6. The following table gives the weekly wage of workers in a factory:

Weekly wage (in ₹)	50-55	55-60	60-65	65-70	70-75	75-80	80-85	85-90
No. of workers	5	20	10	10	9	6	12	8

Find the mean

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7. The following data gives the distribution of total household expenditure ( in *Rs.* ) of workers in a city :

Expenditure (in Rs)	1000 – 1500	1500 – 2000	2000 – 2500	2500 – 3000	3000 – 3500	3500 – 4000	4000 – 4500	4500 – 5000
Number of manual workers	24	40	31	28	32	23	17	5

Find the average expenditure which is being done by maximum number of manual workers.

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8. The mode of the following series is 36. Find the missing frequency in it :

Class interval	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	8	10	...	16	12	6	7

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9. Compute the mode of the following data :

Class interval	10-19	20-29	30-39	40-49	50-59
Frequency	16	23	15	20	12

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### Exercise 14 D

1. Find the mean of the following data :

Class	0-20	20-40	40-60	60-80	80-100	100-120	120-140
Frequency	6	8	10	12	6	5	3

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2. 100 surnames were randomly picked up from a local telephone directly and the frequency distribution of the number of letters in the English alphabets in the surnames was obtained as follows:

Number of letters: 1-4 4-7 7-10 10-13 13-16 16-19 Number surnames 6  
30 40 16 4 4 Determine the median number of letters in the surnames. Find the mean number of letters in the surnames. Also, find the modal size of the surnames.

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3. The following table given the daily income of 50 workers of a factory :

Daily income (in ₹)	100-120	120-140	140-160	160-180	180-200
No. of surnames	12	14	8	6	10

Find the mean of above data.

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4. A survey regarding the heights (in cm ) of 50 girls of a class conducted and the following data was obtained.

Height in cm	120-130	130-140	140-150	150-160	160-170
No. of girls	2	8	12	20	8

Find the mean of above data.

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5. The table below shows the daily expenditure on food of 30 households in a locality:

Daily expenditure (in ₹)	100-150	150-200	200-250	250-300	300-350
No. of households	6	7	12	3	2

Find the mean daily expenditure on food.

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**Exercise 14 E**

1. The frequency distribution of scores obtained by 230 candidates in a medical entrance test is as follows :

Scores	400-450	450-500	500-550	550-600	600-650	650-700	700-750	750-800
No. of candidates	20	35	40	32	24	27	18	34

Draw a less than cumulative curve (ogive) to represent the data.

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2. Draw a less than cumulative curve (ogive) to represent the data.

Class	25-49	50-74	75-99	100-124	125-149
Frequency	15	25	30	20	10

Also, find the median with the help of less than ogive.

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3. The following table shows the distribution of heights of a group of factory workers.

Height in cm	150-155	155-160	160-165	165-170	170-175	175-180	180-185
No. of workers	6	12	18	20	13	8	6

Determine the cumulative frequencies.

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4. Draw a more than ogive from the given data and estimate median with the help of ogive. :

Marks	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99
No. of students	5	9	16	22	26	18	11	6	4	3

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5. Draw less than and more than ogive on the same graph and estimate median :

Age in years	15-19	20-24	25-29	30-34	35-39	40-44	45-49
No. of men (in thousands)	221	350	131	93	240	329	130

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## Revision Exercise Very Short Answer Questions

1. A data has 19 observation arranged in ascending order. Which observation represent the median.

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2. Write the median class of the following distribution:

<b>Class</b>	0-10	10-20	20-30	30-40	40-50	50-60
<b>Frequency</b>	7	6	8	10	12	5

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3. Write the modal class of the following distribution :

<b>Class</b>	0-10	10-20	20-30	30-40	40-50	50-60
<b>Frequency</b>	3	5	12	7	6	8





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4. Write the cumulative frequency of class interval 30-40

Class	0-10	10-20	20-30	30-40	40-50
Frequency	3	7	6	8	5

A. 21

B. 24

C. 28

D. 8

Answer: B



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5. In the following data, find the values of a and b . Find the median class modal class :

Class	0-50	50-100	100-150	150-200	200-250	250-300	300-350	350-400
Frequency	5	9	8	11	10	6	8	3
Cumulative frequency	5	$a$	22	33	$b$	49	57	60



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6. For a certain distribution, mode and median were found to be 1000 and 1250 respectively. Find mean for this distribution using an empirical relation



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7. While calculating mean the following entries were found

$$\sum fx = 600. \sum f = 50. \text{ Find the mean.}$$

A. 12

B. 60

C. 50

D. 15

**Answer: A**

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8. While calculating mode the following observation are found. Lower limit of modal class =40, frequency of modal class =20, frequency of previous class =12 , frequency of preceding class =11 and width of the class =10, find mode .

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9. If mode and mean of data are found 28 and 24 respectively, find median using empirical formula.

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## Revision Exercise Short Answer Questions

1. Find the mean of following data :

Marks	0-5	5-10	10-15	15-20	20-25	25-30	30-35
No. of students	5	8	19	25	27	20	10



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2. Find the mean of the following distribution :

Class	24-49	50-74	75-99	100-124	125-149
Frequency	15	25	30	20	10



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3. If the mean of the following data is 5.6, find  $p$  :

$x$	2	4	6	8	10
$f$	7	4	$p$	5	4

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4. Find the median for the following data :

Marks	Below 10	Below 20	Below 30	Below 40	Below 50	Below 60
No. of students	6	15	29	41	60	70

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5. Find the mode of the following distribution :

Marks :	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60
Number of Students :	4	6	7	12	5	6

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Revision Exercise Long Answer Questions

1. Find the mean percentage of the work completed for a presect in a country from the following frequency distribution by step deviation method. :

Percentage of work completed	under 20	under 40	under 60	under 80	under 100
No. of districts	15	60	75	92	100



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2. The total number of observations in the following distribution table is 120 and their mean is 50. Find the value of missing frequencies  $f_1$  and  $f_2$  :

Class	0-20	20-40	40-60	60-80	80-100
Frequency	17	$f_1$	32	$f_2$	19

A.  $f_1 = 22$  and  $f_2 = 24$

B.  $f_1 = 28$  and  $f_2 = 24$

C.  $f_1 = 28$  and  $f_2 = 25$

D. None

**Answer: B**

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

Class	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70
Frequency	6	8	10	15	5	4	2

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**4. Find the mode of the following series:**

Size	45-55	55-65	65-75	75-85	85-95	95-105	105-115
Frequency	7	12	17	30	32	6	10



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