Chapter – 14
Statistics

Exercise 14.4

Q.1 The following distribution gives the daily income of 50 workers of a factory

Daily income (in Rs)	100-120	120-140	140-160	160-180	180-200
Number of workers	12	14	8	6	10

Convert the distribution above to a less than type cumulative frequency distribution, and draw its ogive

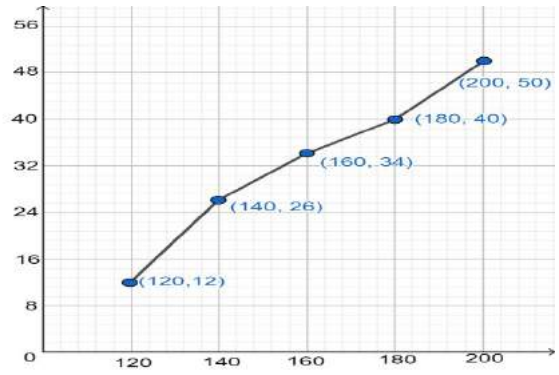
Answer:

The less than type cumulative frequency distribution of given data can be found as follows, Here previous cumulative frequencies are added to current frequency to find the cumulative frequency of any class.

Daily income (in Rs.) Upper class limits	Cumulative frequency
Less than 120	12
Less than 140	26
Less than 160	34
Less than 180	40
Less than 200	**50**

Now,

Taking upper class interval on x-axis and their respective frequencies on y-axis, ogive will be:



Q.2 During the medical check-up of 35 students of a class, their weights were recorded as follows:

Weight (in kg)	Number of students
Less than 38	0
Less than 40	3
Less than 42	5
Less than 44	9
Less than 46	14
Less than 48	28
Less than 50	32
Less than 52	35

Draw a less than type ogive for the given data. Hence obtain the median weight from the graph and verify the result by using the formula.

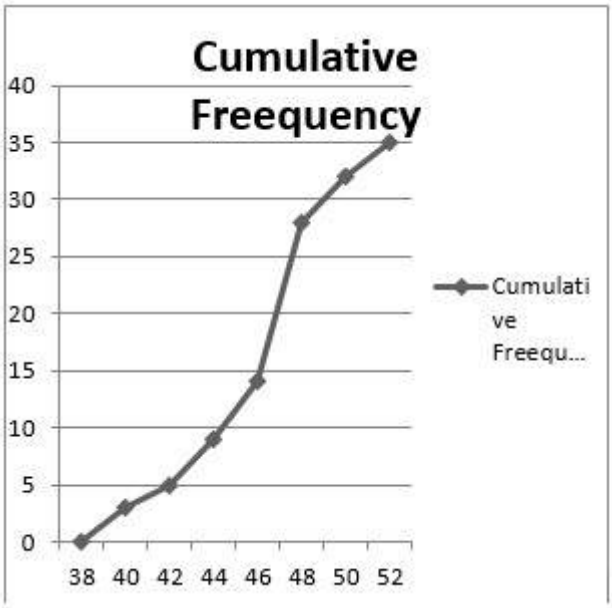
Answer:

The frequency distribution table of less than type graph is as follows:

Weight (in kg) Upper class limits	Number of students (Cumulative Frequency)
Less than 38	0
Less than 40	3
Less than 42	5
Less than 44	9
Less than 46	14
Less than 48	28
Less than 50	32
Less than 52	35

Now,

Taking upper class interval on x-axis and their respective frequencies on y-axis, ogive will be:



Here, N = 35

$\frac{N}{2}$ =17.5

Mark the point A whose ordinate is 17.5 and is x-ordinate is 46.5.

Hence,

Median of the data is 46.5

Now,

It can be observed that the difference between two consecutive upper class limits is 2

The class marks with respective frequencies are obtained below:

Weight (in kg)	Frequency	(Cumulative Frequency)
Less than 38	0	0
38-40	3	3
40-42	2	5
42-44	4	9
44-46	5	14
46-48	14	28
48-50	4	32
50-52	3	35
N	35	

We can see that the cumulative frequency is greater than n/2 and is 28 which belongs to the interval 46-48

Hence,

Median class = 46-48

Lower limit, l = 46

cf = 14

f = 14

h = 2

Now,

Median can be calculated as:

$$\text{Median} = l + \left(\frac{\frac{n}{2} - cf}{f}\right) \times 2$$

$$= 46 + \left(\frac{17.5 - 14}{14}\right) \times 2$$

$$= 46 + \frac{.3.5}{7}$$

$$= 46.5$$

Q.3 The following table gives production yield per hectare of wheat of 100 farms of a village

Production yield (in kh/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

Answer:

The frequency distribution table of more than type graph is as follows:

Production yield (lower class limits)	**Cumulative frequency**
More than or equal to 50	100
More than or equal to 55	98
More than or equal to 60	90
More than or equal to 65	78

More than or equal to 70	54
More than or equal to 75	16

Now,

Taking lower limit on x-axis,

Cumulative Frequencies on y- axis,

Its ogive can be drawn as: