EXERCISE 14.4 PAGE: 293

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

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

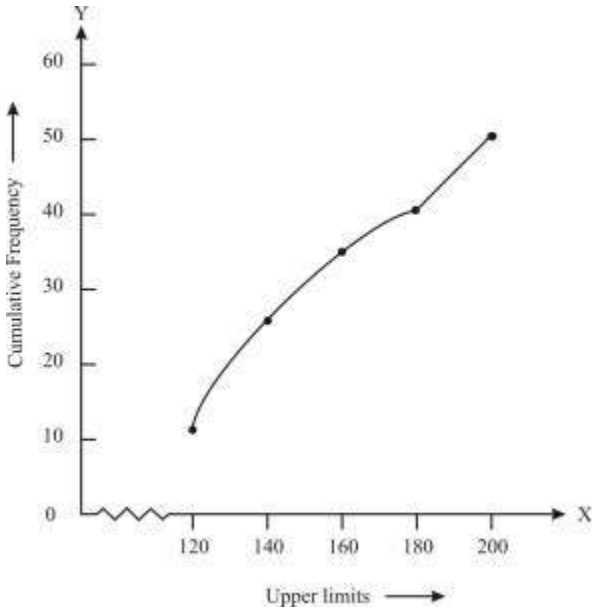
Convert the distribution above to a less than type cumulative frequency distribution and draw its ogive.

Solution

Convert the given distribution table to a less than type cumulative frequency distribution, and we get

Daily Income	Cumulative Frequency (or) Number of workers
Less than 120	12
Less than 140	26
Less than 160	34
Less than 180	40
Less than 200	50

From the table plot the points corresponding to the ordered pairs such as (120, 12), (140, 26), (160, 34), (180, 40) and (200, 50) on graph paper and the plotted points are joined to get a smooth curve and the obtained curve is known as less than type ogive curve



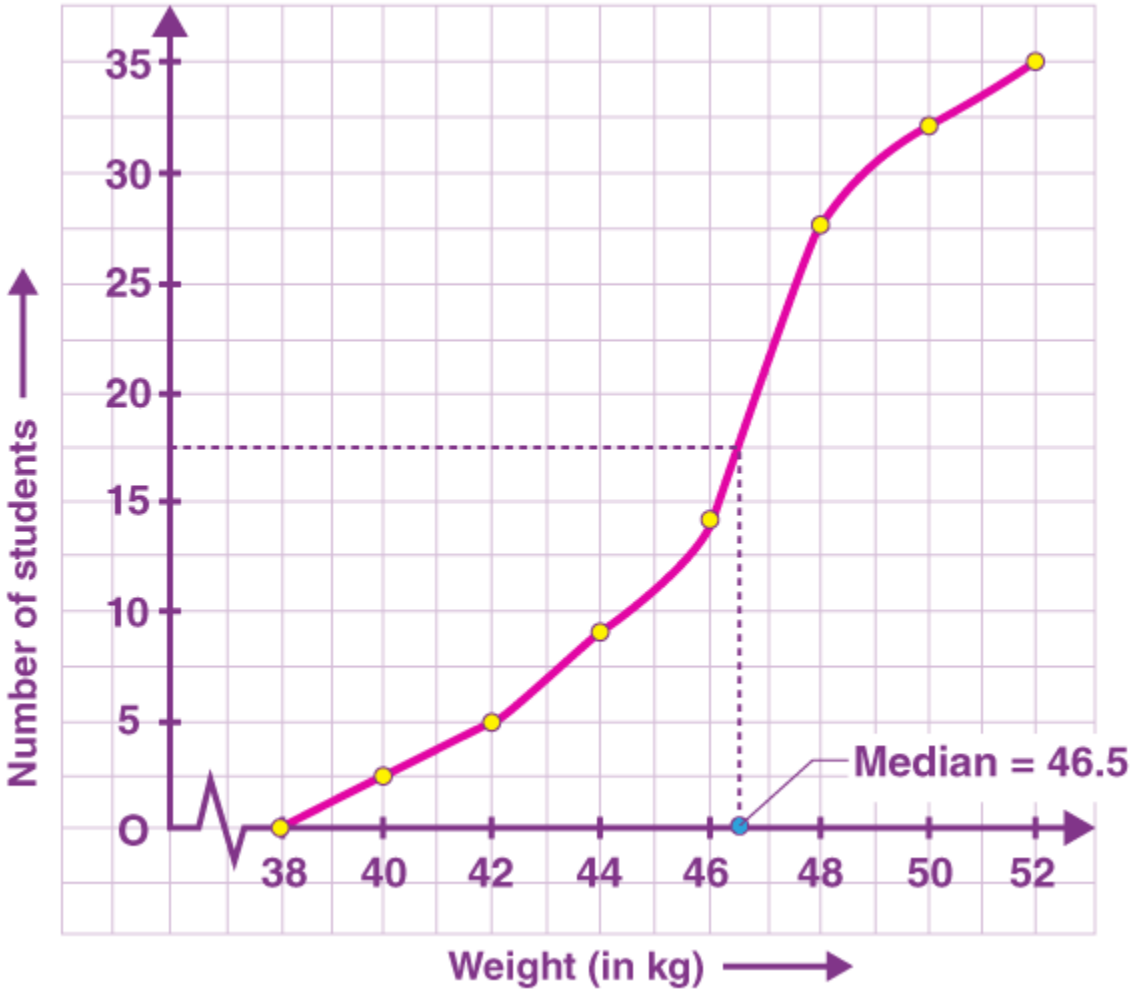
2. During the medical check-up of 35 students of a class, their weights were recorded as follows:

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.

Solution:

From the given data, to represent the table in the form of graph, choose the upper limits of the class intervals are in x-axis and frequencies on y-axis by choosing the convenient scale. Now plot the points corresponding to the ordered pairs given by (38, 0), (40, 3), (42, 5), (44, 9),(46, 14), (48, 28), (50, 32) and (52, 35) on a graph paper and join them to get a smooth curve. The curve obtained is known as less than type ogive.



Locate the point 17.5 on the y-axis and draw a line parallel to the x-axis cutting the curve at a point. From the point, draw a perpendicular line to the x-axis. The intersection point perpendicular to x-axis is the median of the given data. Now, to find the median by making a table.

	Class interval	Number of students(Frequency)	Cumulative Frequency
Less than 38	0 – 38	0	0
Less than 40	38 – 40	3 – 0 = 3	3
Less than 42	40 – 42	5 – 3 = 2	5

Less than 44	42 – 44	9 – 5 = 4	9
Less than 46	44 – 46	14 – 9 = 5	14
Less than 48	46 – 48	28 – 14 = 14	28
Less than 50	48 – 50	32 – 28 = 4	32
Less than 52	50 – 52	35 – 22 = 3	35

Here, N = 35 and N/2 = 35/2 = 17.5

Median class = 46 – 48

Here, l = 46, h = 2, cf= 14, f = 14

The mode formula is given as:

Median=$\text{l}+\frac{\text{n}}{2}-\text{cf}}{\text{f}}\times h$
= 46 + [(17.5 – 14)/ 14] × 2

= 46 + 0.5

= 46 + 0.5 = 46.5

Thus, median is verified.

3. 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.

Solution:

Converting the given distribution to a more than type distribution, we get

Production Yield (kg/ha)	Number of farms
More than or equal to 50	100

More than or equal to 55	100 – 2 = 98
More than or equal to 60	98 – 8 = 90
More than or equal to 65	90 – 12 = 78
More than or equal to 70	78 – 24 = 54
More than or equal to 75	54 – 38 = 16

From the table obtained draw the ogive by plotting the corresponding points where the upper limits in x-axis and the frequencies obtained in the y-axis are (50, 100), (55, 98), (60, 90), (65, 78), (70, 54) and (75, 16) on the graph paper. The graph obtained is known as more than type ogive curve.