# Ex - 14.4

**Q1.** The following distribution gives the daily income of 50 workers of a factory.

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

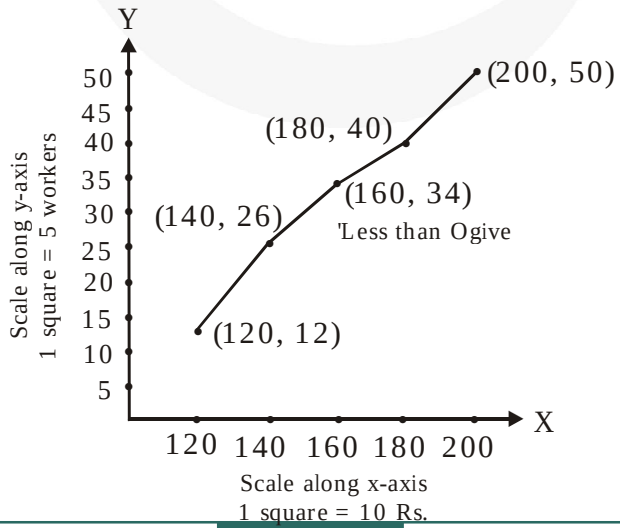
Convert the distribution above to a less than type cumulative frequency distribution and draw its ogive.

**Sol.**

| Daily income (in Rs.) | Number of workers (Frequency) $f_i$ | Cumulative frequency less than type | |
|---|---|---|---|
| 100-120 | 12 | Less than 120 | 12=12 |
| 120-140 | 14 | Less than 140 | (12+14)=26 |
| 140-160 | 8 | Less than 160 | (26+8)=34 |
| 160-180 | 6 | Less than 180 | (34+6)=40 |
| 180-200 | 10 | Less than 200 | (40+10)=50 |
| Total | n = 50 | | |

n = 50 gives n/2 = 25

On the graph, we will plot the points (120, 12), (140, 26), (160, 34), (180, 40), (200, 50).



**Q2.** During the medial check up of 35 students of a class, their weights were recorded as follows

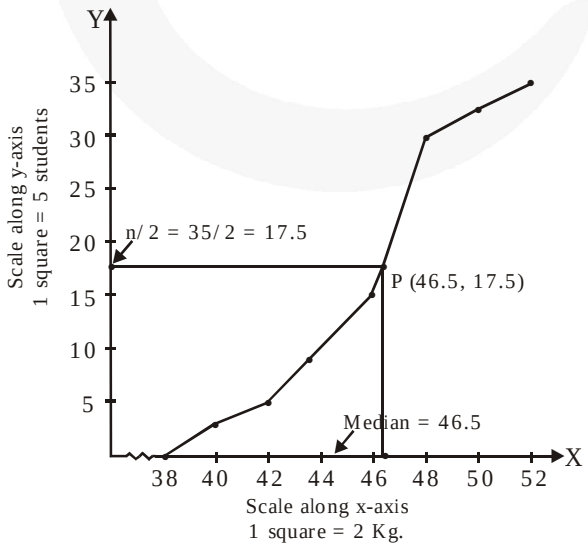
| Weight (in kg) | No. of students |
|---|---|
| Less than 38 | 0 |
| Less than 40 | 3 |
| Less than 42 | 5 |
| Less than 44 | 9 |
| Less than 46 | 14 |
| Less than 48 | 28 |
| Less than 50 | 32 |
| Less than 52 | 35 |

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.

**Sol.**

| | Weight in kg | Number of students (Frequency) $f_i$ | Cumulative frequency less than type | | |
|---|---|---|---|---|---|
| | 36-38 | 0=0 | Less than 38 | 0 | |
| | 38-40 | (3–0)=3 | Less than 40 | 3 | |
| | 40-42 | (5–3)=2 | Less than 42 | 5 | |
| | 42-44 | (9–5)=4 | Less than 44 | 9 | |
| | 44-46 | (14–9)=5 | Less than 46 | 14 | |
| median class | 46-48 | (25–14)=14 | Less than 48 | 28 | $\frac{35}{2}=\frac{n}{2}$ |
| | 48-50 | (32–28)=4 | Less than 50 | 32 | |
| | 50-52 | (35–32)=3 | Less than 52 | 35 | |
| | Total | n = 35 | | | |

To draw the 'less than' type ogive, we plot the points (38, 0), (40, 3), (42, 5), (44, 9), (46, 14), (48, 28), (50, 32) and (52, 35) on the graph.



Median from the graph = 46.5 kg.

median class is (46-48). (See in the table)

We have $\ell = 46$, f = 14, cf = 14, n = 35 and h = 2.

$$\text{Median} = \ell + \left\{\frac{\frac{n}{2} - cf}{f}\right\} \times h$$

$$= 46 + \left\{\frac{\frac{35}{2} - 14}{14}\right\} \times 2 = 46 + \frac{1}{2} = 46.5 \text{ kg}$$

Hence, the median is same as we have noticed from the graph

**Q3.** The following table gives production yield per hectare of wheat of 100 farms of a village.

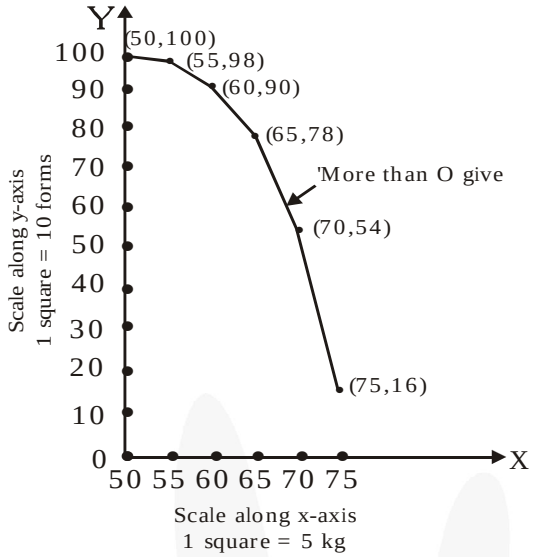
| Production yield (in kg/ ha) | 50-55 | 55-60 | 60-65 | 65-70 | 70-75 | 75-80 |
|---|---|---|---|---|---|---|
| No. of farms | 2 | 8 | 12 | 24 | 38 | 16 |

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

**Sol.**

| Production yield (in kg/ ha) | Number of farms (Frequency) $f_i$ | Cumulative frequency less than type | |
|---|---|---|---|
| 50-55 | 2 | 50 or more than 50 | 100=100 |
| 55-60 | 8 | 55 or more than 55 | (100–2)=98 |
| 60-65 | 12 | 60 or more than 60 | (98–8)=90 |
| 65-70 | 24 | 65 or more than 65 | (90–12)=78 |
| 70-75 | 38 | 70 or more than 70 | (78–24)=54 |
| 75-80 | 16 | 75 or more than 75 | (54–38)=16 |
| | n = 100 | | |

Now, we will draw the ogive by plotting the points (50,100), (55,98), (60,90), (65,78), (70,54) and (75,16). Join these points by a freehand to get an ogive of 'more than' type.


Y
(50,100)
(55,98)
(60,90)
(65,78)
'More than O give
(70,54)
(75,16)
100
90
80
70
60
50
40
30
20
10
0
X
50 55 60 65 70 75
Scale along y-axis
1 square = 10 forms
Scale along x-axis
1 square = 5 kg