CBSE Class–10 Mathematics

NCERT solution

Chapter - 14

Statistics - Exercise 14.4

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
No. of workers	12	14	8	6	10

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

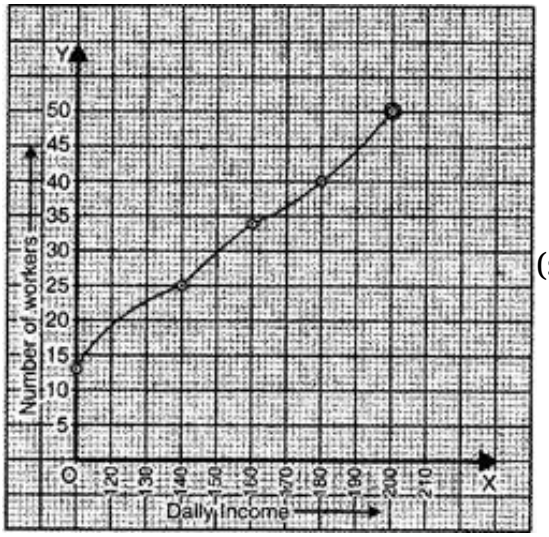
Ans.

Daily income (in Rs.)	**Number of workers** (f_i)	**Cumulative Frequency Less than type** (x_i)
100 – 120	12	12
120 – 140	14	26
140 – 160	8	34
160 – 180	6	40
180 – 200	10	50
Total	$\sum f_i = n = 50$	

Now, by drawing the points on the graph,

i.e., (120, 12); (140, 26); (160, 34); (180, 40); (200, 50)

Scale: On $x-$ axis 10 units = Rs. 10 and on $y-$ axis 10 units = 5 workers



(start the graph from 120 correspond to 12 on y axis)

2. During the medical checkup 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.

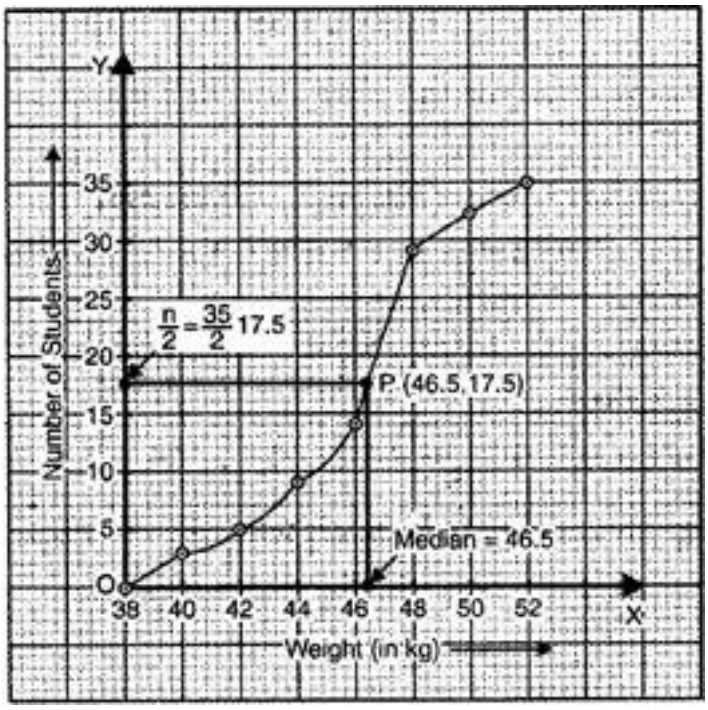
Ans.

Weight (in kg)	No. of students (f_i)	Class interval	Cumulative frequency Less than type
Less than 38	0	36 – 38	0
Less than 40	3 – 0 = 3	38 – 40	3
Less than 42	5 – 3 = 2	40 – 42	5
Less than 44	9 – 5 = 4	42 – 44	9
Less than 46	14 – 9 = 5	44 – 46	14
Less than 48	28 – 14 = 14	46 – 48	28
Less than 50	32 – 28 = 4	48 – 50	32
Less than 52	35 – 32 = 3	50 – 52	35
Total	$\sum f_i = n = 35$		

Hence, the points for graph are:

(38, 0), (40, 3), (42, 5), (44, 9), (46, 14), (48, 28), (50, 32), (52, 35)

Scale: On $x-$ axis, 10 units = 2 kg and on $y-$ axis, 10 units = 5 students



change : (in graph :38 is plotted wrongly on graph on 38 its zero and at 40 38 is there)
From the above graph, Median = 46.5 kg, which lies in class interval 46 – 48.

Here, $\sum f_i = n = 35$, then $\frac{n}{2} = \frac{35}{2} = 17.5$, which lies in interval 46 – 48.

∴ Median class = 46 – 48

So, $l = 46,\ n = 35,\ f = 14,\ cf = 14$ and $h = 2$

Now, Median = $l + \left[\frac{\frac{n}{2} - cf}{f}\right] \times h$

= $46 + \left[\frac{17.5 - 14}{14}\right] \times 2$

= $46 + \frac{7}{14}$

= 46 + 0.5

= 46.5

Hence median weight of students is 46.5 kg.

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
No. of farms	2	8	12	24	38	16

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

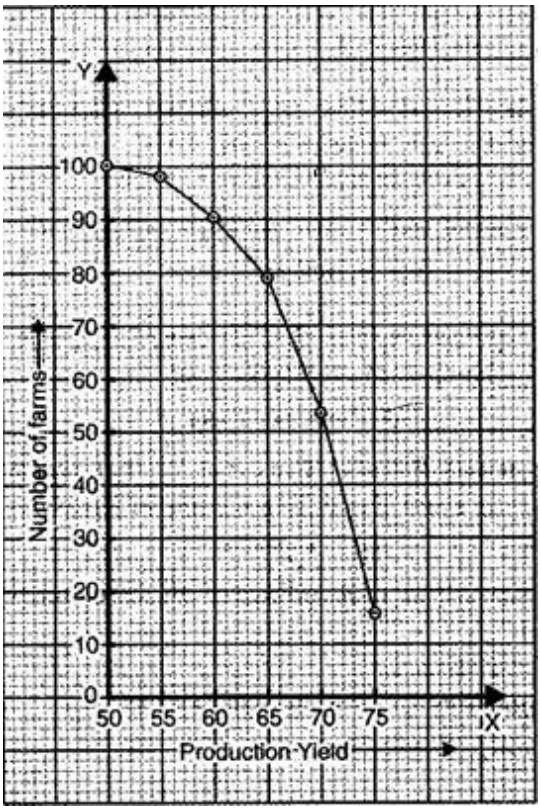
Ans.

Production yield (in kg/ha)	**Number of farms** (f_i)	**Cumulative Frequency Less than type** (x_i)
50 – 55	2	100
55 – 60	8	100 – 2 = 98
60 – 65	12	98 – 8 = 90
65 – 70	24	90 – 12 = 78
70 – 75	38	78 – 24 = 54
75 – 80	16	54 – 38 = 16
Total	$\sum f_i = n = 100$	

The points for the graph are:

(50, 100), (55, 98), (60, 90), (65, 78), (70, 54), (75, 16)

Scale: On $x-$ axis, 10 units = 5 kg/ha and on $y-$axis, 10 units = 10 forms.



(change the place of 50 in the graph it must be at 55)