RD SHARMA

Solutions

Class 10 Maths

Chapter 7

Ex 7.6

Q.1 Draw an ogive by less than the method for the following data:

No. of rooms	No. of houses
1	4
2	9
3	22
4	28
5	24
6	12
7	8
8	6
9	5
10	2

Soln:

No. of rooms	No. of houses	Cumulative Frequency
Less than or equal to 1	4	4
Less than or equal to 2	9	13
Less than or equal to 3	22	35
Less than or equal to 4	28	63
Less than or equal to 5	24	87
Less than or equal to 6	12	97
Less than or equal to 7	8	107
Less than or equal to 8	6	113
Less than or equal to 9	5	118
Less than or equal to 10	2	120

We need to plot the points (1,4) , (2,3) , (3,35) , (4,63) , (5,87) , (6,99) , (7,107) , (8,113) , (9,118) , (10,120), by taking upper class limit over the x-axis and cumulative frequency over the y-axis.
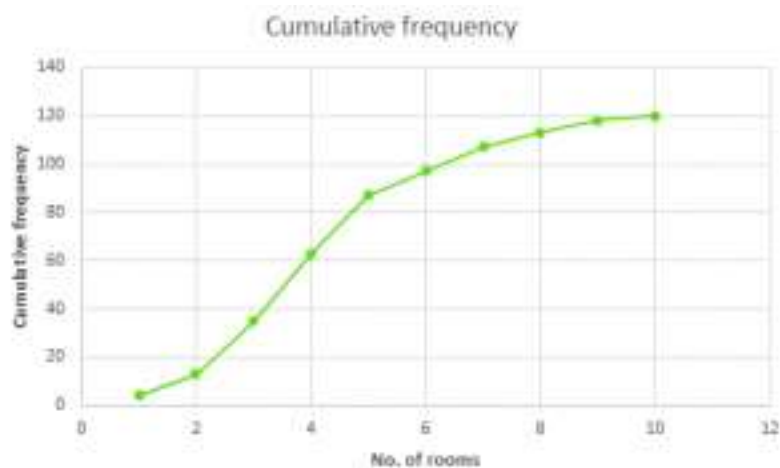
Q.2): The marks scored by 750 students in an examination are given in the form of a frequency distribution table:
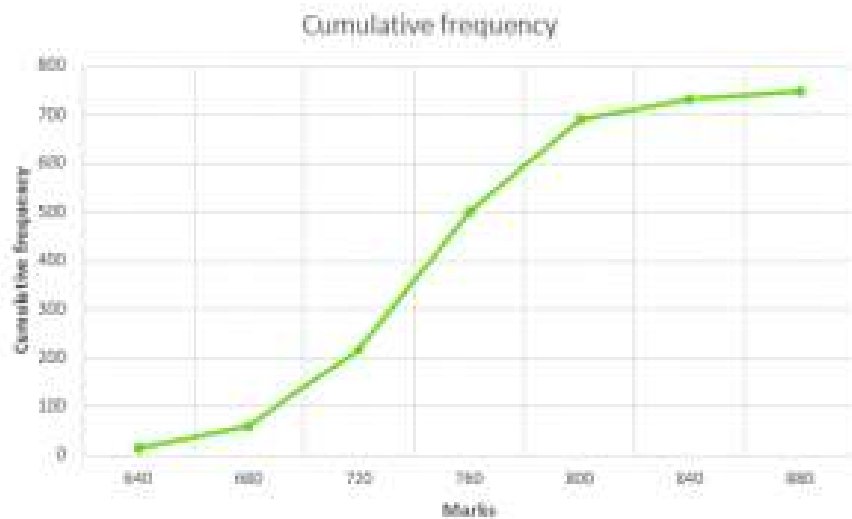
Marks	No. of Students
600-640	16
640-680	45
680-720	156
720-760	284
760-800	172
800-840	59
840-880	18

Soln:

Marks	No. of Students	Marks less than	Cumulative Frequency
600-640	16	640	16
640-680	45	680	61

680-720	156	720	217
720-760	284	760	501
760-800	172	800	693
800-840	59	840	732
840-880	18	880	750

Plot the points (640-16), (680, 61), (720,217), (760,501), (800,673), (840,732), (880,750) by taking upper class limit over the x-axis and cumulative frequency over the y-axis.

Cumulative frequency

Q.3) Draw an ogive to represent the following frequency distribution:

| Class-interval	0-4	5-9	10-14	15-19	20-24
No. of students	2	6	10	5	3

Soln:

The given frequency distribution is not continuous, so we will first make it continuous and then prepare the cumulative frequency:

Class-interval	No. of Students	Less than	Cumulative frequency
0.5-4.5	2	4.5	2
4.5-9.5	6	9.5	8

9.5-14.5	10	14.5	18
14.5-19.5	5	19.5	23
19.5-24.5	3	24.5	26

Plot the points (4.5, 2), (9.5, 8), (14.5, 18), (19.5, 23), (24.5,26) by taking the upper class limit over the x-axis and cumulative frequency over the y-axis.

Cumulative frequency
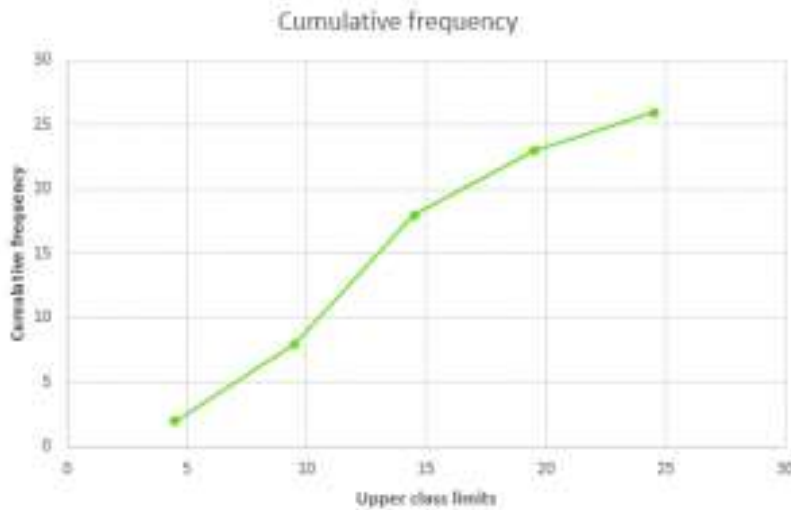
Q.4) The monthly profits (in Rs) of 100 shops are distributed as follows:

Profits per shop:	0-50	50-100	100-150	150-200	200-250	250-300
No of shops:	12	18	27	20	17	6

Draw the frequency polygon for it

Soln:

We have

Profit per shop	Mid-value	No. of shops

Less than 0	0	0
0-60	25	12
60-120	75	18
120-180	125	27
180-240	175	20
240-300	225	17
300-360	275	6
Above 300	300	0
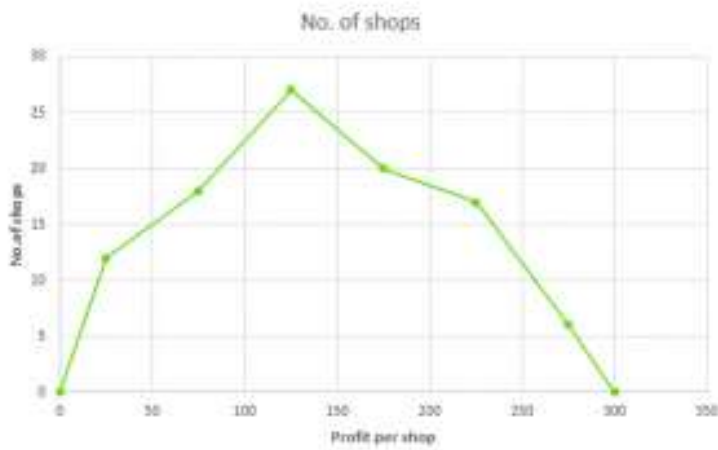
Q.5) The following distribution gives the daily income of 50 workers of a factory:

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

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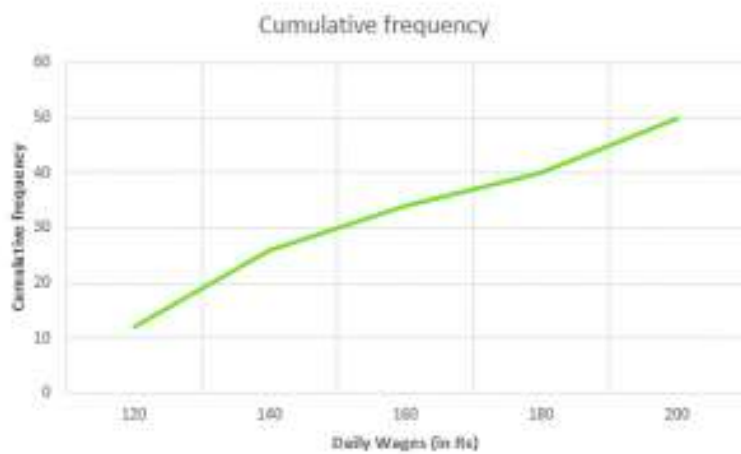
Soln:

We first prepare the cumulative frequency table by less than method as given below

Daily income	Cumulative frequency

<120	12
<140	26
<160	34
<180	40
<200	50

Now we mark on x-axis upper class limit, y-axis cumulative frequencies.

Thus we plot the point (120,12)(140,26)(160,34)(180,40)(200,50).

Cumulative frequency

Q.6) The following table gives production yield per hectare of wheat of 100 farms of a village:

Production yield:	50-55	55-60	60-65	65-70	70-75	75-80
			in kg per hectare			
No of farms:	2	8	12	24	38	16

**Draw 'less than' ogive and 'more than' ogive**

Soln:

Less than method:

Cumulative frequency table by less than method

Production yield	Number of farms	Production yield more than	Cumulative frequency
50-55	2	55	2
55-60	8	60	10
60-65	12	65	22
65-70	24	70	46
70-80	38	75	84
75-80	16	80	100

Now we mark on x-axis upper class limit, y-axis cumulative frequencies.

We plot the point (50,100) (55, 98) (60, 90) (65, 78) (70, 54) (75, 16)

Cumulative frequency curves
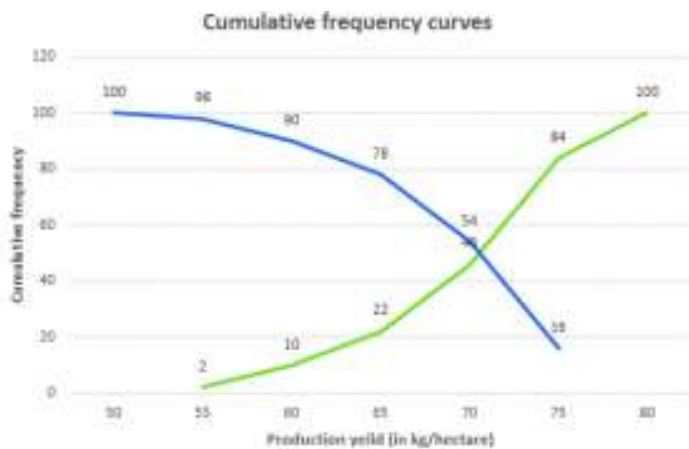
Q.7)During the medical check-up of 35 students of a class, their weight recorded as follows:

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 verify the result my **using the formula.**

Soln: Less than method

It is given that

On x-axis upper class limits. Y-axis cumulative frequency

We plot the points (38,0) (40,3)(42,5)(44,9)(46,4)(48,28)(50,32)(52,35)

More than method: cumulative frequency

Weight	No. of students	Weight more than	Cumulative frequency
38-40	3	38	34
40-42	2	40	32
42-44	4	42	30
44-46	5	44	26
46-48	14	46	21
48-50	4	48	7
50-52	3	50	3

X-axis lower class limits on y-axis cf

We plot the points (38,35)(40,32)(42,30)(44,26)(46,26)(48,7)(50,3)

CUMULATIVE FREQUENCY CURVE
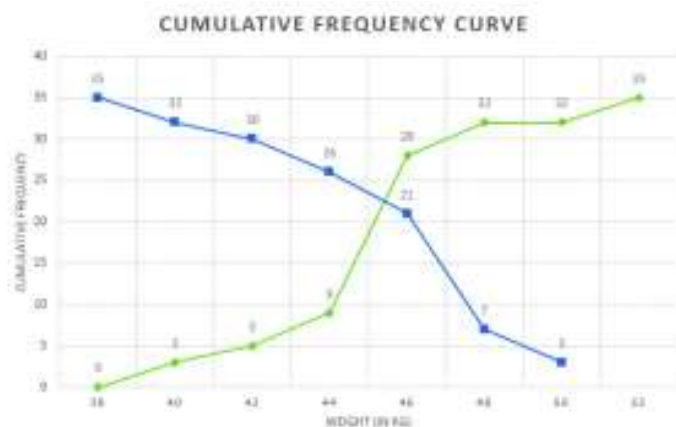
We find the two types of curves intersect at a point P. From point P perpendicular PM is draw on x-axis

The verification,

We have

Weight (in kg)	No. of students	Cumulative frequency
36-38	0	0
38-40	3	3
40-42	2	5
42-44	4	9
44-46	5	28
46-48	14	32
48-50	4	32
50-0	3	35

Now, N = 35

$N2 = 17.5 \frac{N}{2} = 17.5$

The cumulative frequency just greater than $N2 \frac{N}{2}$ is 28 and the corresponding class is $46 - 48$

Thus $46 - 48$ is the median class such that

$L = 46$, $f = 14$, $C_1 C_1 = 14$ $h = 2$

Median = $L + N2 - c_1 f \times hL + \frac{\frac{N}{2} - c_1}{f} \times h$

= $46 + 17.5 - 1414 \times 246 + \frac{17.5 - 14}{14} \times 2$

= 46 + 7/14

46.5

Median = 46.5 kg

Hence verified

Q.9) The following table shows the height of trees:

Height	No. of trees
Less than 7	26
Less than 14	57
Less than 21	92
Less than 28	134
Less than 35	216
Less than 42	287
Less than 49	341
Less than 56	360

Draw 'less than 'ogive and 'more than 'ogive

Soln:

By less than method

| Height	No. of trees
Less than 7	26
Less than 14	57
Less than 21	92
Less than 28	134
Less than 35	216
Less than 42	287
Less than 49	341
Less than 56	360

Plot the points (7,26) , (14,57) , (21,92) , (28,134) , (35,216) , (42,287) , (49,341) , (56,360) by taking upper class limit over the x-axis and cumulative frequency over the y-axis.

By more than method:

Height	Frequency	Height more than	C.F.

0-7	26	0	360
7-14	31	5	334
14-21	35	10	303
21-28	42	15	268
28-35	82	20	226
35-42	71	25	144
24-49	54	30	73
49-56	19	35	19

Take lower class limit over the x-axis and CF over the y-axis and plot (0,360) , (7,334) , (14,303) , (21,268) (28,226) , (35,144) , (42,73) , (49,19).

Cumulative frequency curves

Height of the trees
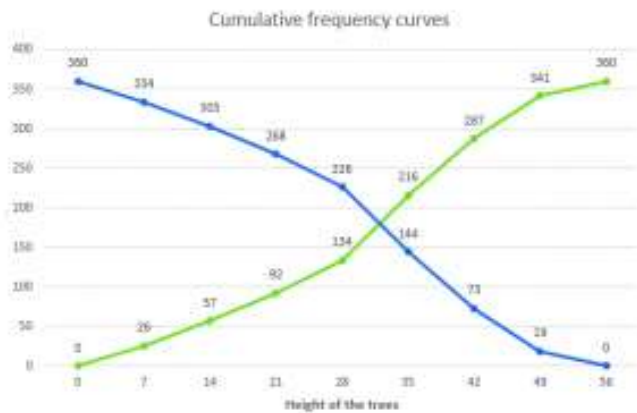
Q.10) The annual profits earned by 30 shops of a shopping complex in a locality give rise to the following distribution:

Profit (In lakhs In Rs)	Number of shops (frequency)
More than or equal to 5	30
More than or equal to 10	28
More than or equal to 15	16
More than or equal to 20	14
More than or equal to 25	10
More than or equal to 30	7

More than or equal to 35	3

Draw both ogive for the above data and hence obtain the median.

Soln:

More than method

Profit (In lakhs in Rs)	Number of shops (frequency)
More than or equal to 5	30
More than or equal to 10	28
More than or equal to 15	16
More than or equal to 20	14
More than or equal to 25	10
More than or equal to 30	7
More than or equal to 35	3

Now, we mark on x-axis lower class limits, y-axis cumulative frequency

Thus, we plot the points (5,30)(10,28)(15,16)(20,14)(25,10)(30,7) and (35,3)

Less than method

Profit in lakhs	No of shops	Profits less than	C.F
0-10	2	10	2
10-15	12	15	14
15-20	2	20	16
20-25	4	25	20
25-30	3	30	23
30-35	4	35	27
35-40	3	40	30

Now we mark the upper class limits along x-axis and cumulative frequency along y-axis.

Thus we plot the points (10,2)(15,14)(20,16)(25,20)(30,23)(35,27)(40,30)

We find that the two types of curves intersect of P from point L it is drawn on x-axis

The value of a profit corresponding to M is 17.5. Hence median is 17.5 lakh

Chart Title

Profit (in Lakhs Rs)