Chapter 23. Graphical Representations

Ex 23.1

Answer 1.

(i)

Class Interval	0-10	10-20	20-30	30-40	40-50	50-60
Frequency	8	20	34	22	10	6

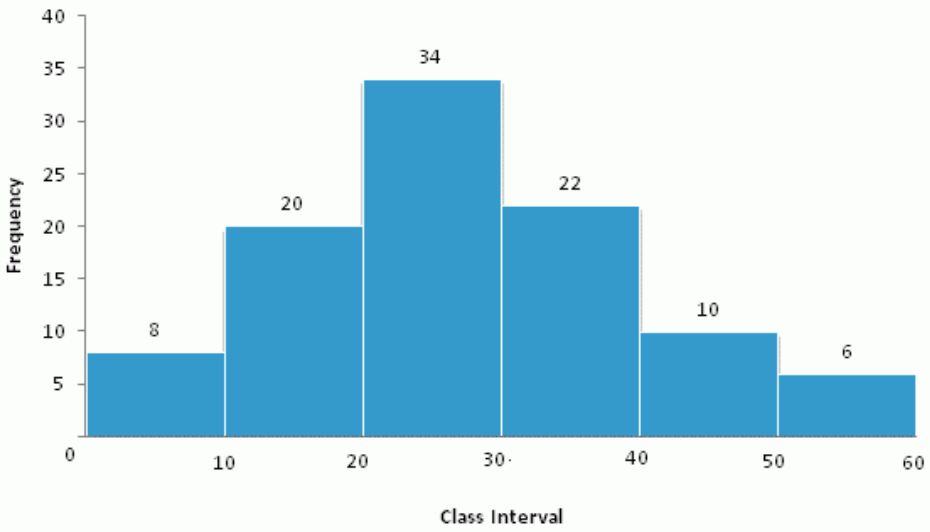
Steps:

a. On the x-axis, take 1 cm as 5 units and plot class interval.

b. On the y-axis, take 1 cm as 5 units and plot frequency.

c. Draw rectangles of histogram as per given data.

Class Interval	Frequency
0-10	8
10-20	20
20-30	34
30-40	22
40-50	10
50-60	6



(ii)

Class Interval	130-140	140-150	150-160	160-170	170-180
Frequency	24	16	29	20	11

Steps:

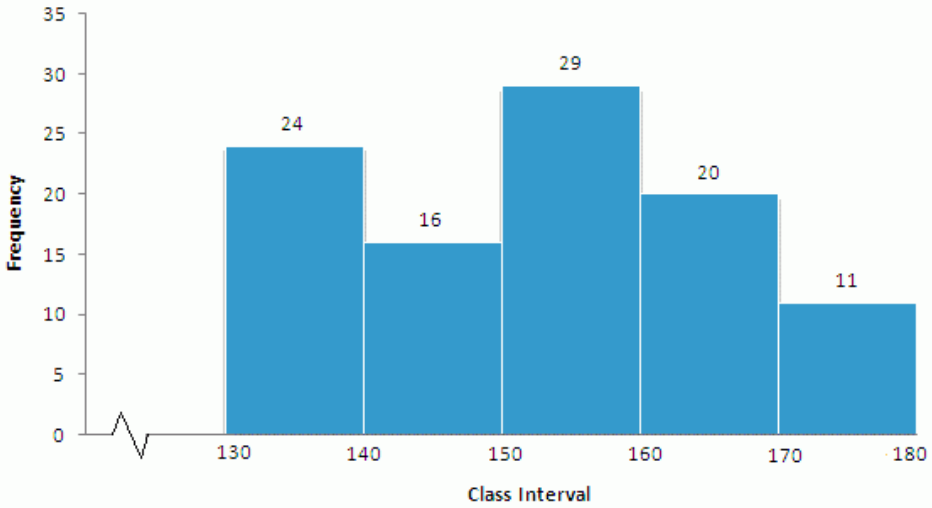
a. On the x-axis, take 1 cm as 5 units and plot class interval.

b. On the y-axis, take 1 cm as 5 units and plot frequency.

c. Draw rectangles of histogram as per given data.

c. Draw rectangles of histogram as per given data.

Class Interval	Frequency
130-140	24
140-150	16
150-160	29
160-170	20
170-180	11



(iii)

Class Interval	1-10	11-20	21-30	31-40	41-50
Frequency	11	23	30	20	16

Steps:

a. Make the class intervals continuous by subtracting 0.5 from the lower limit of each class and add 0.5 to the upper limit of each class.

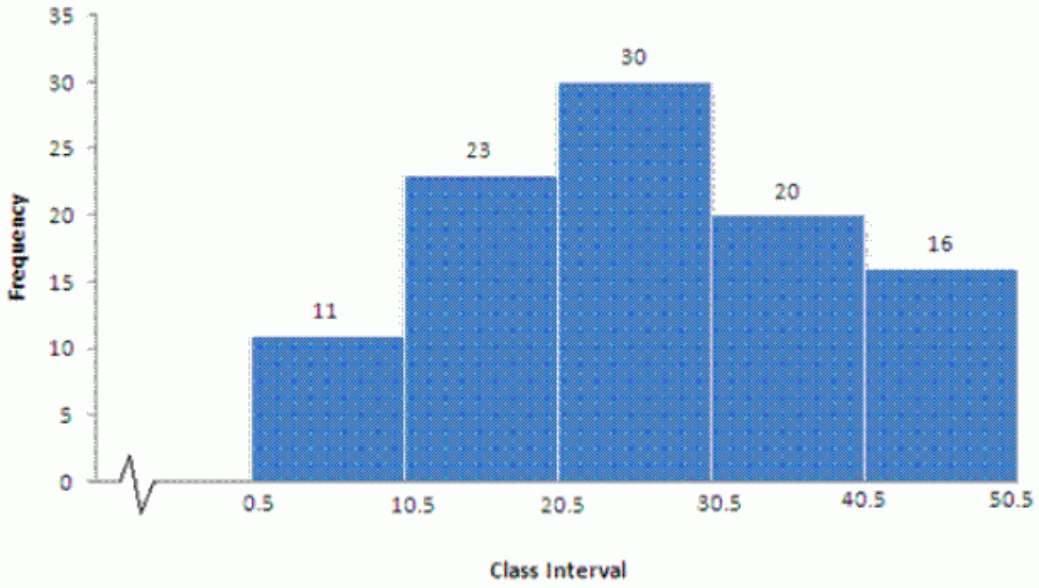
b. On the x-axis, take 1 cm as 5 units and plot class interval.

c. On the y-axis, take 1 cm as 5 units and plot frequency.

d. Draw rectangles of histogram as per given data.

Class Interval	Frequency
0.5-10.5	11
10.5-20.5	23
20.5-30.5	30

30.5-40.5	20
40.5-50.5	16



(iv)

Class Interval	110-119	120-129	130-139	140-149	150-159
Frequency	15	23	30	20	16

Steps:

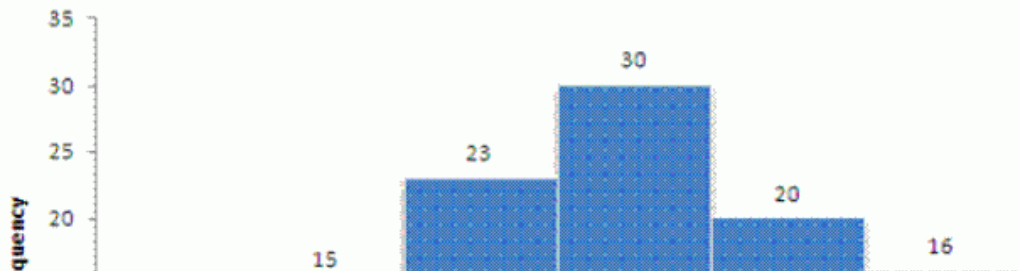
a. Make the class intervals continuous by subtracting 0.5 from the lower limit of each class and add 0.5 to the upper limit of each class.

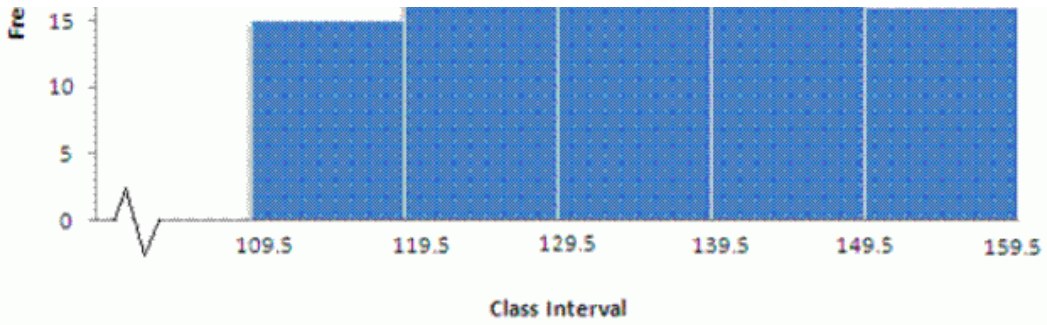
b. On the x-axis, take 1 cm as 5 units and plot class interval.

c. On the y-axis, take 1 cm as 5 units and plot frequency.

d. Draw rectangles of histogram as per given data.

Class Interval	Frequency
109.5-119.5	15
119.5-129.5	23
129.5-139.5	30
139.5-149.5	20
149.5-159.5	16





(v)

Class Mark	15	25	35	45	50	55	60
Frequency	6	12	15	18	25	14	10

Steps:

a. Make the class intervals continuous by taking class mark as midpoints.

b. On the x-axis, take 1 cm as 5 units and plot class interval.

c. On the y-axis, take 1 cm as 5 units and plot frequency.

d. Draw rectangles of histogram as per given data.

Class Interval	Frequency
0-9.5	-
9.5-19.5	6
19.5-29.5	12
29.5-39.5	15
39.5-47.5	18
47.5-52.5	25
52.5-57.5	14
57.5-62.5	10

(vi)

Class Mark	6	12	18	24	30	36
Frequency	8	12	15	18	25	7

Steps:

a. Make the class intervals continuous by taking class mark as midpoints.

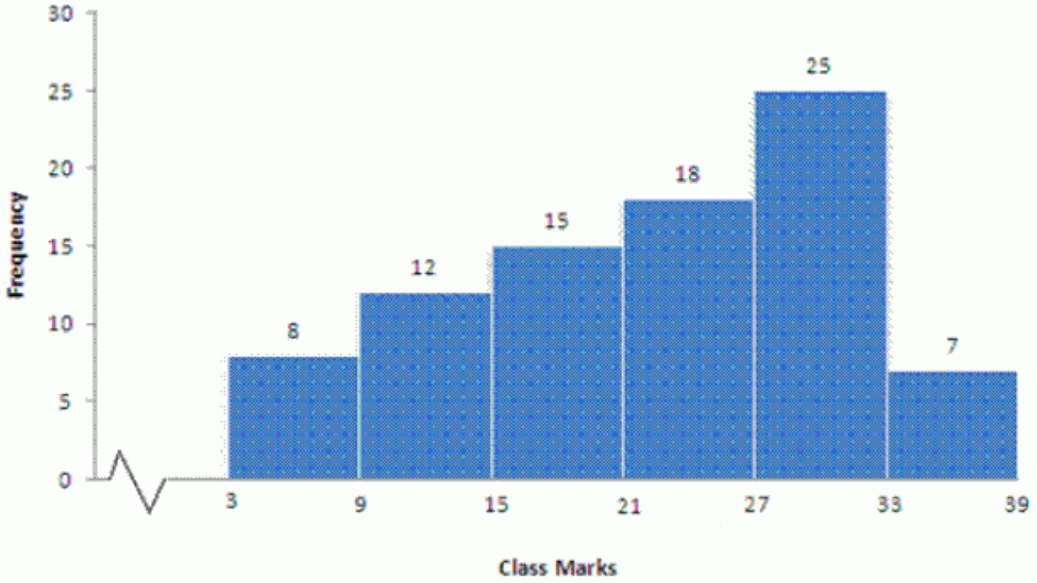
b. On the x-axis, take 1 cm as 5 units and plot class interval.

c. On the y-axis, take 1 cm as 5 units and plot frequency.

d. Draw rectangles of histogram as per given data.

Class Interval	Frequency
3 - 9	8
9 - 15	12

15 - 21	15
21 - 27	18
27 – 33	25
33 - 39	7



Answer 2.

(i)

Class Interval	0-10	10-20	20-30	30-40	40-50	50-60
Frequency	8	13	27	35	14	3

Steps:

1. On the x-axis, take 1 cm as 5 units and plot class interval.

2. On the y-axis, take 1 cm as 5 units and plot frequency.

3. Draw rectangles of histogram as per given data.

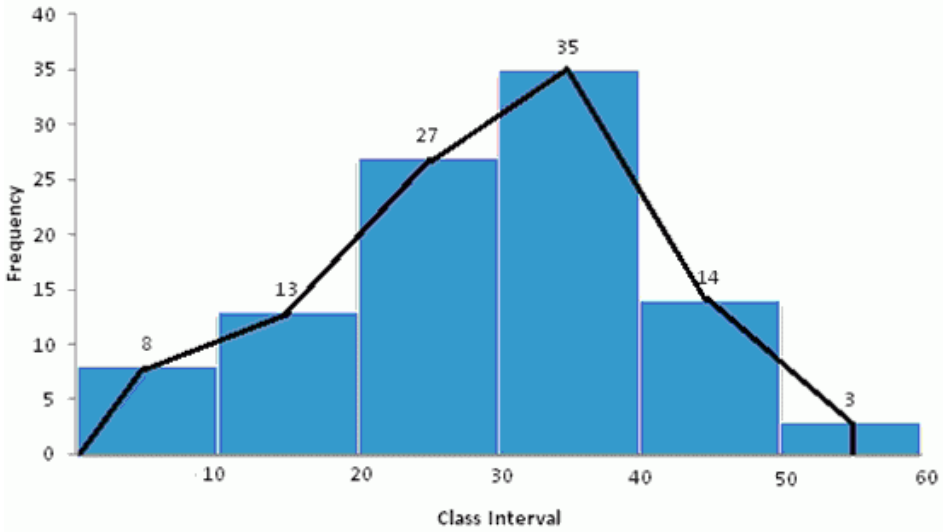
4. For each rectangle, mark the midpoint of its length at the top part. In this case, points are (5,8),(15,13),(25,27),(35,35),(45,14),(55,3).

5. Mark two more midpoints of zero frequency on x-axis at the start and at the end.

6. Now connect the points using straight lines.

Class Interval	Frequency
0-10	8
10-20	13

20-30	27
30-40	35
40-50	14
50-60	3



(ii)

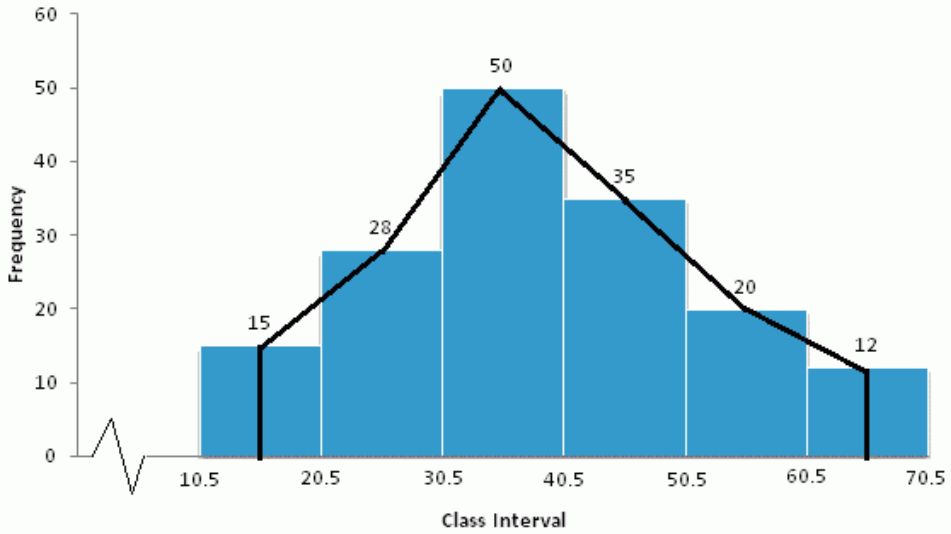
Class Interval	11-20	21-30	31-40	41-50	51-60	61-70
Frequency	15	28	50	35	20	12

Steps:

1. Organize the data into equal intervals by subtracting 0.5 from the lower limit of each class and add 0.5 to the upper limit of each class.
2. On the x-axis, take 1 cm as 5 units and plot class interval.
3. On the y-axis, take 1 cm as 5 units and plot frequency.
4. Draw rectangles of histogram as per given data.
5. For each rectangle, mark the midpoint of its length at the top part. In this case, points are (15.5,15),(25.5,28),(35.5,50),(45.5,35),(55.5,20),(65.5,12).
6. Mark two more midpoints of zero frequency on x-axis at the start and at the end.
7. Now connect the points using straight lines.

Class Interval	Frequency
10.5-20.5	15
20.5-30.5	28

30.5-40.5	50
40.5-50.5	35
50.5-60.5	20
60.5-70.5	12



(iii)

Class Interval	100-150	150-200	200-250	250-300	300-350
Frequency	10	15	17	12	10

Steps:

1. On the x-axis, take 1 cm as 5 units and plot class interval.

2. On the y-axis, take 1 cm as 5 units and plot frequency.

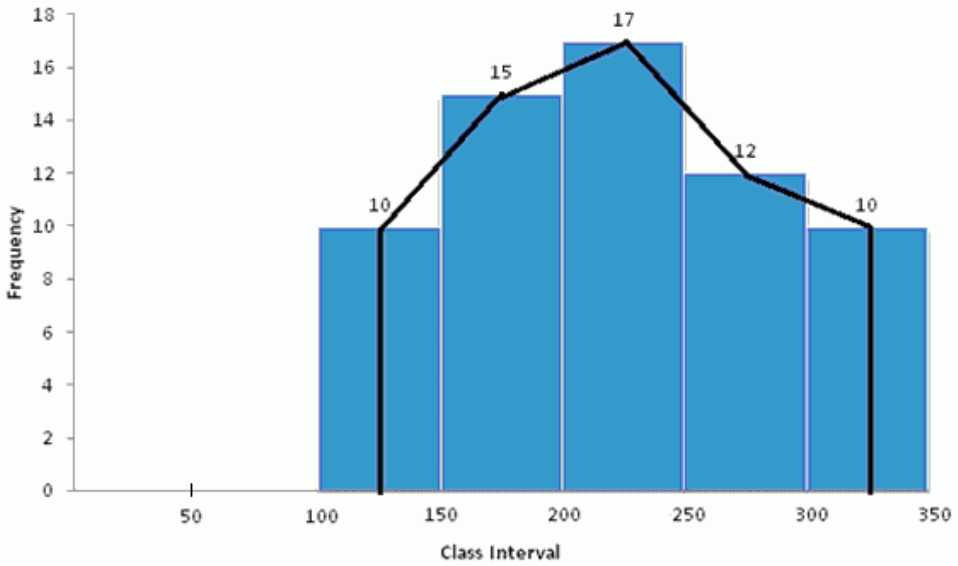
3. Draw rectangles of histogram as per given data.

4. For each rectangle, mark the midpoint of its length at the top part. In this case, points are (125.10),(175,15),(225,17),(275,12),(325,10).

5. Mark two more midpoints of zero frequency on x-axis at the start and at the end.

6. Now connect the points using straight lines.

Class Interval	Frequency
100-150	10
150-200	15
200-250	17
250-300	12
300-350	10



Answer 3.

(i)

Class Mark	10	15	20	25	30	35	40
Frequency	4	20	40	45	30	25	5

Steps:

1. On the x-axis, take 1 cm as 5 units and plot class interval.

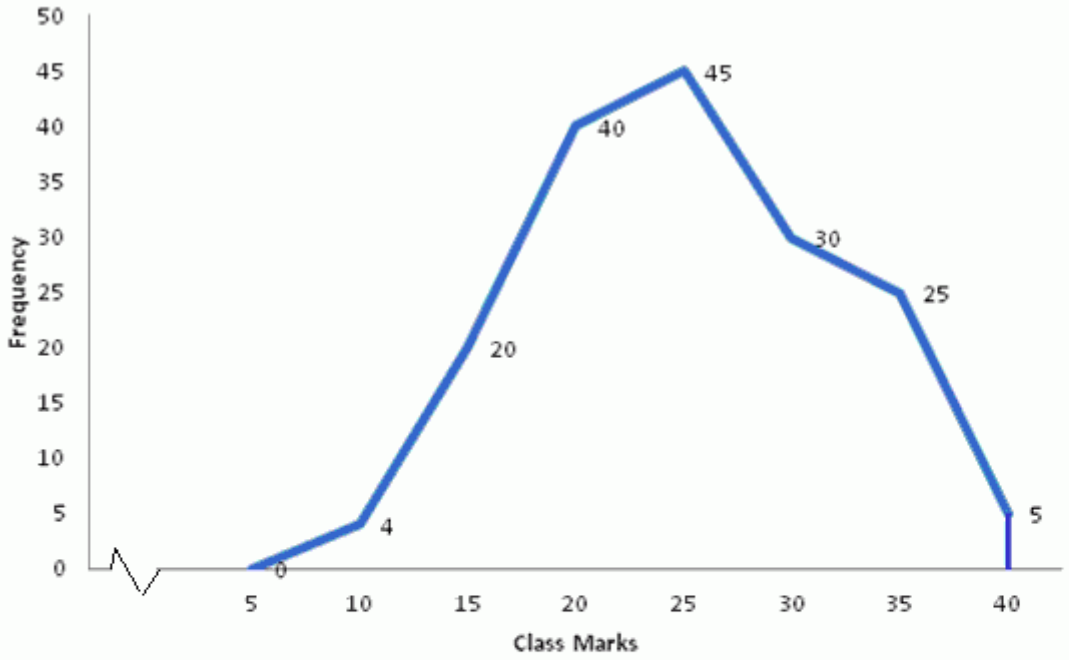
2. On the y-axis, take 1 cm as 5 units and plot frequency.

3. Mark the given data on the graph.
(10,4),(15,20),(20,40),(25,45),(30,30),(35,25),(40,5)

5. Mark two more midpoints of zero frequency on x-axis at the start and at the end.

6. Now connect the points using straight lines.

Class Mark	Frequency
10	4
15	20
20	40
25	45
30	30
35	25
40	5



(ii)

Class Interval	10-20	20-40	40-60	60-80	80-100
Frequency	9	17	15	20	14

Steps:

1. Find class mark by calculating the average of the class interval.

2. On the x-axis, take 1 cm as 5 units and plot class interval.

3. On the y-axis, take 1 cm as 5 units and plot frequency.

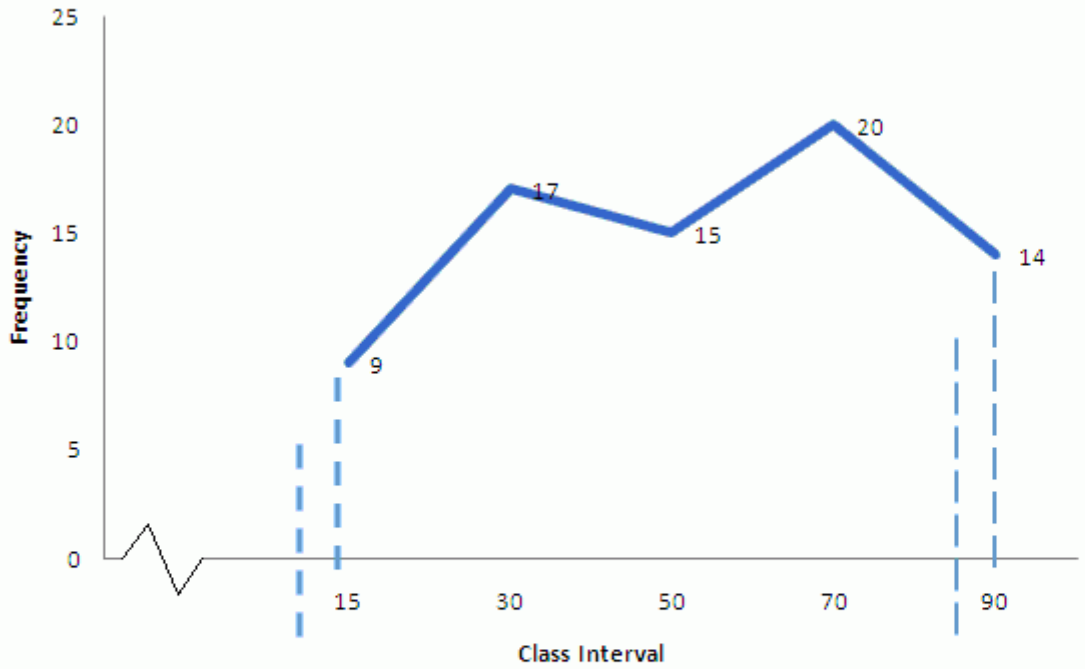
4. Plot the points on the graph. (15,9),(30,17),(50,15),(70,20),(90,14).

5. Mark two more midpoints of zero frequency on x-axis at the start and at the end.

6. Now connect the points using straight lines.

Class Interval	Class mark	Frequency
10-20	$= \frac{10+20}{2} = 15$	9
20-40	$= \frac{20+40}{2} = 30$	17
40-60	$40+60$	15

	$= \frac{}{2} = 50$	
60-80	$= \frac{60+80}{2} = 70$	20
80-100	$= \frac{80+100}{2} = 90$	14



(iii)

Class Interval	1-10	11-20	21-30	31-40	41-50
Frequency	8	12	10	16	6

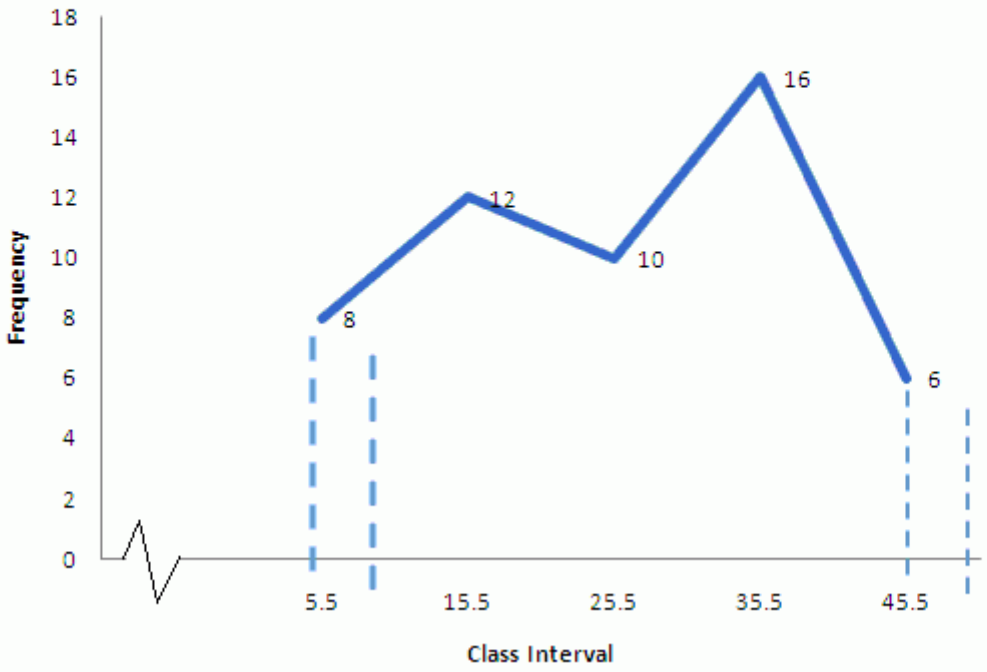
Steps:

1. Make the class intervals continuous by subtracting 0.5 from the lower limit of each class and add 0.5 to the upper limit of each class.
2. Find class mark by calculating the average of the class interval.
3. On the x-axis, take 1 cm as 5 units and plot class interval.
4. On the y-axis, take 1 cm as 5 units and plot frequency.
5. Plot the points on the graph.
   (5.5,8),(15.5,12),(25.5,10),(35.5,16),(45.5,6).
6. Mark two more midpoints of zero frequency on x-axis at the start and at

the end.

7. Now connect the points using straight lines.

Class Interval	Class Mark	Frequency
0.5-10.5	$= \frac{0.5+10.5}{2} = 5.5$	8
10.5-20.5	$= \frac{10.5+20.5}{2} = 15.5$	12
20.5-30.5	$= \frac{20.5+30.5}{2} = 25.5$	10
30.5-40.5	$= \frac{30.5+40.5}{2} = 35.5$	16
40.5-50.5	$= \frac{40.5+50.5}{2} = 45.5$	6



Answer 4.

(i)

Class Interval	0-10	10-20	20-30	30-40	40-50

(i)

Frequency	8	12	10	14	6

Steps:

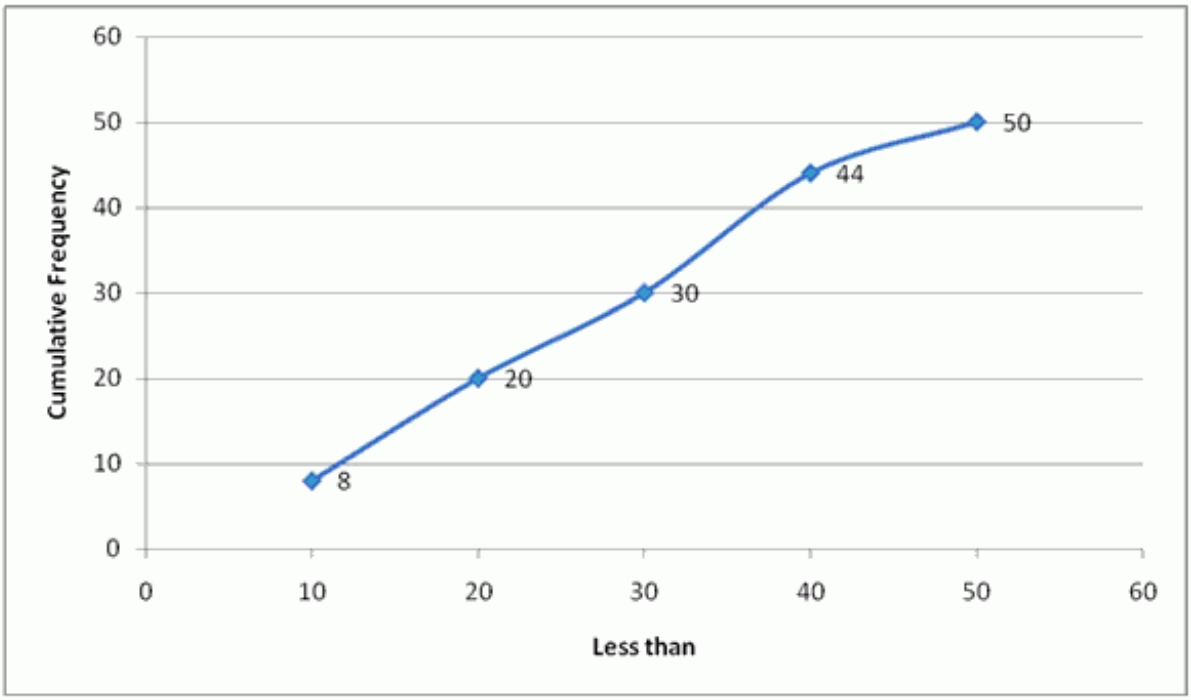
1. On the x-axis, take 1 cm as 5 units and plot class interval.

2. On the y-axis, take 1 cm as 5 units and plot frequency.

3. Plot the points with coordinates having abscissae as actual limits and ordinates as the cumulative frequencies. In this case (10,8),(20,20),(30,30),(40,44),(50,50).

4. Join the points plotted by a smooth curve.

less than	Cumulative Frequency
10	8
20	20
30	30
40	44
50	50



(ii)

Class Interval	100-150	150-200	200-250	250-300	300-350	350-400
Frequency	10	13	17	12	10	8

Steps:

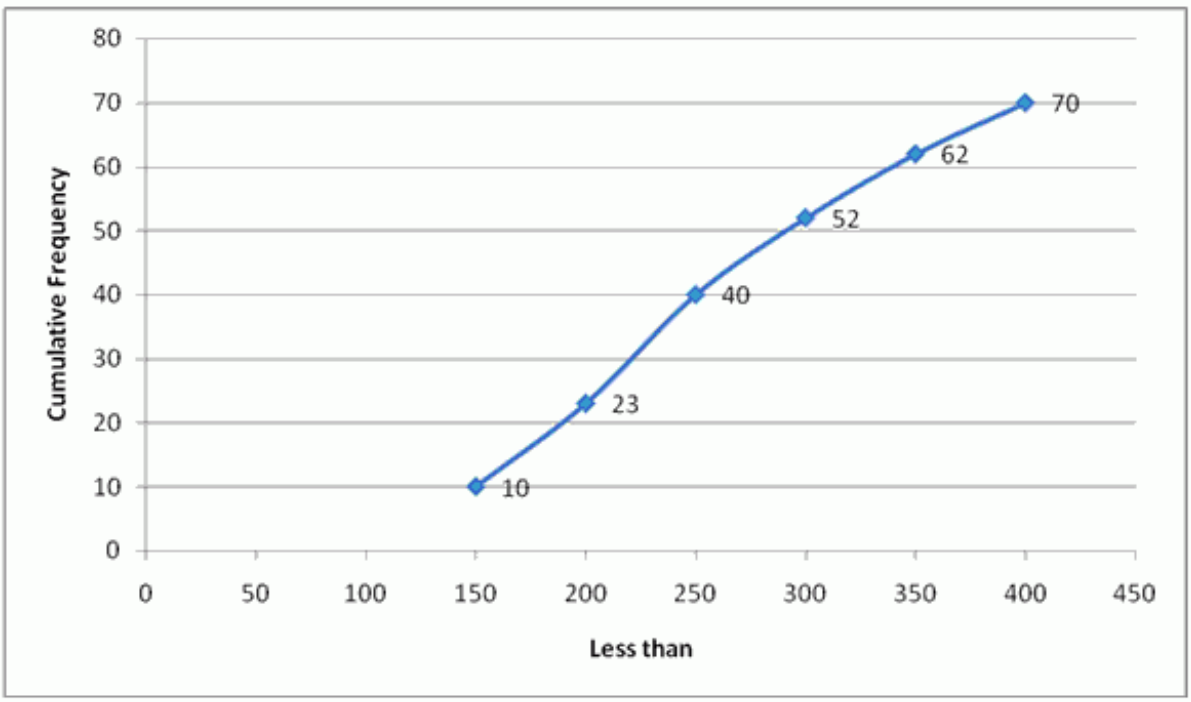
1. On the x-axis, take 1 cm as 5 units and plot class interval.

2. On the y-axis, take 1 cm as 5 units and plot frequency.

3. Plot the points with coordinates having abscissae as actual limits and ordinates as the cumulative frequencies. In this case (150,10),(200,23),(250,40),(300,52),(350,62),(400,70).

4. Join the points plotted by a smooth curve.

less than	Cumulative Frequency
150	10
200	23
250	40
300	52
350	62
400	70



(iii)

Class Interval	10-19	20-29	30-39	40-49	50-59

(iii)

Frequency	28	23	15	20	14

Steps:

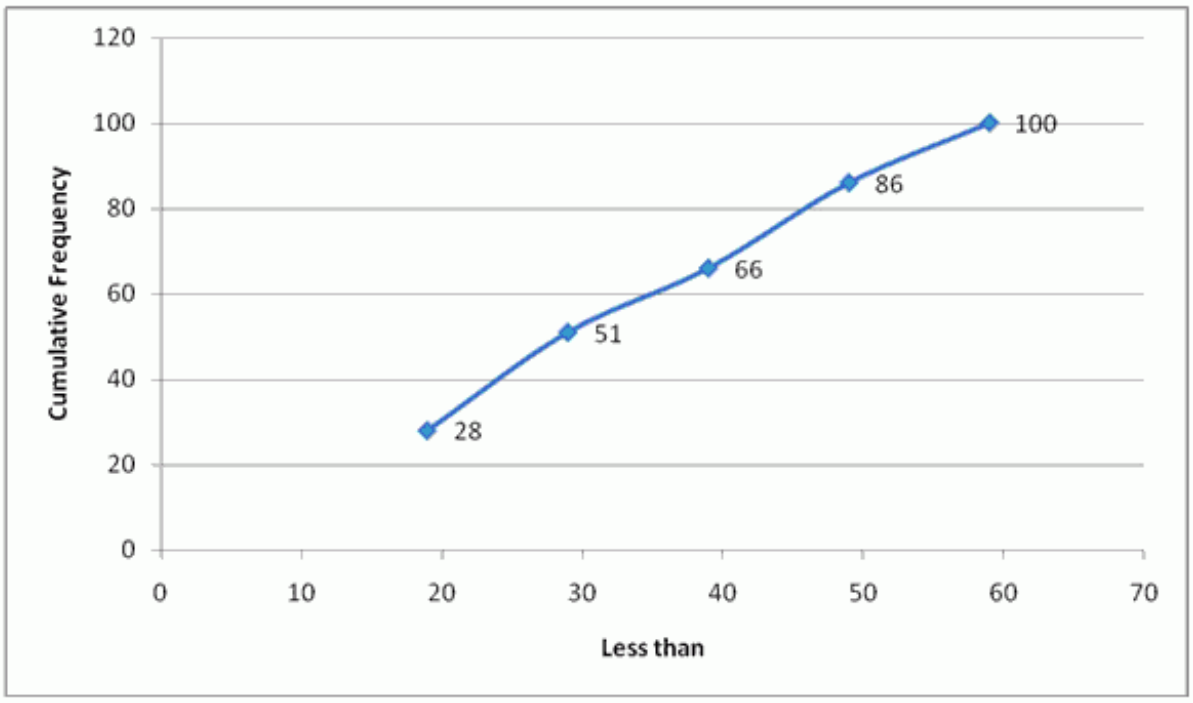
1. On the x-axis, take 1 cm as 5 units and plot class interval.

2. On the y-axis, take 1 cm as 5 units and plot frequency.

3. Plot the points with coordinates having abscissae as actual limits and ordinates as the cumulative frequencies. In this case (19,28),(29,51),(39,66),(49,86),(59,100).

4. Join the points plotted by a smooth curve.

less than	Cumulative Frequency
19	28
29	51
39	66
49	86
59	100



(iv)

Marks obtained	Less than 10	Less than 20	Less than 30	Less than 40	Less than 50
No. of students	8	22	48	60	75

Steps:

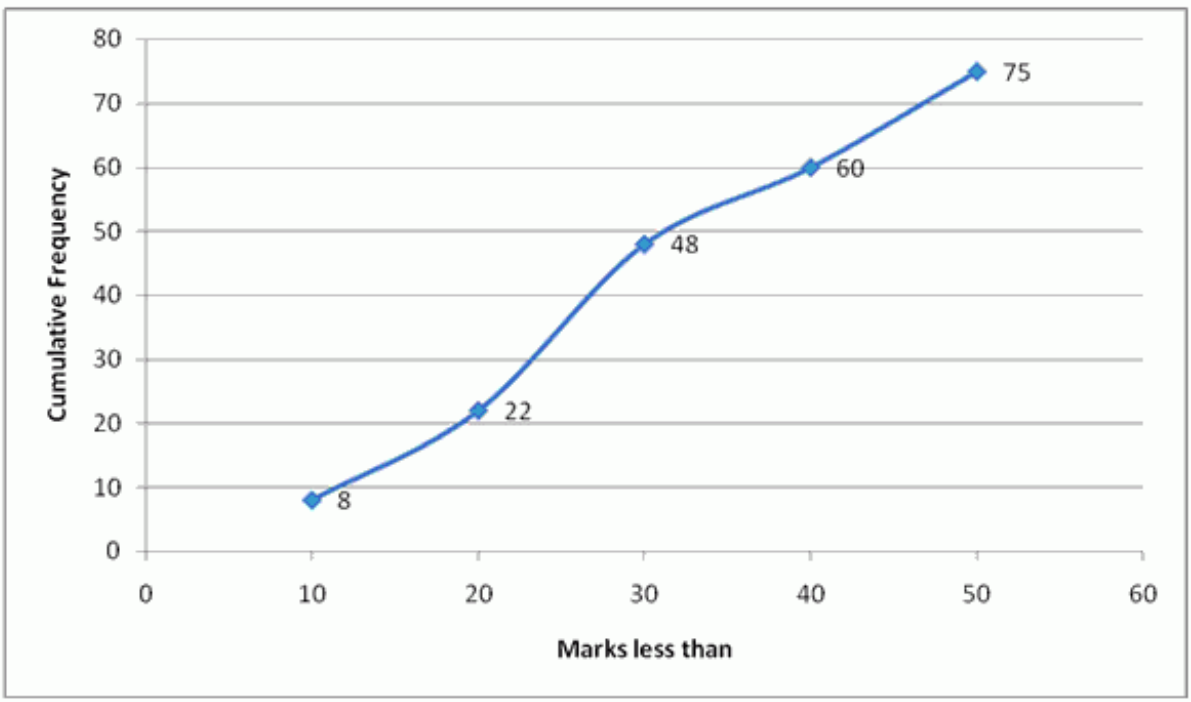
1. On the x-axis, take 1 cm as 5 units and plot marks.

2. On the y-axis, take 1 cm as 5 units and plot frequency.

3. Plot the points with coordinates having abscissae as actual limits and ordinates as the cumulative frequencies. In this case (10,8),(20,22),(30,48),(40,60),(50,75).

4. Join the points plotted by a smooth curve.

Marks less than	Cumulative Frequency
10	8
20	22
30	48
40	60
50	75



(v)

Age in years	Less than 10	Less than 20	Less than 30	Less than 40	Less than 50
No. of people	0	17	42	67	100

No. of people	0	17	42	67	100

Steps:

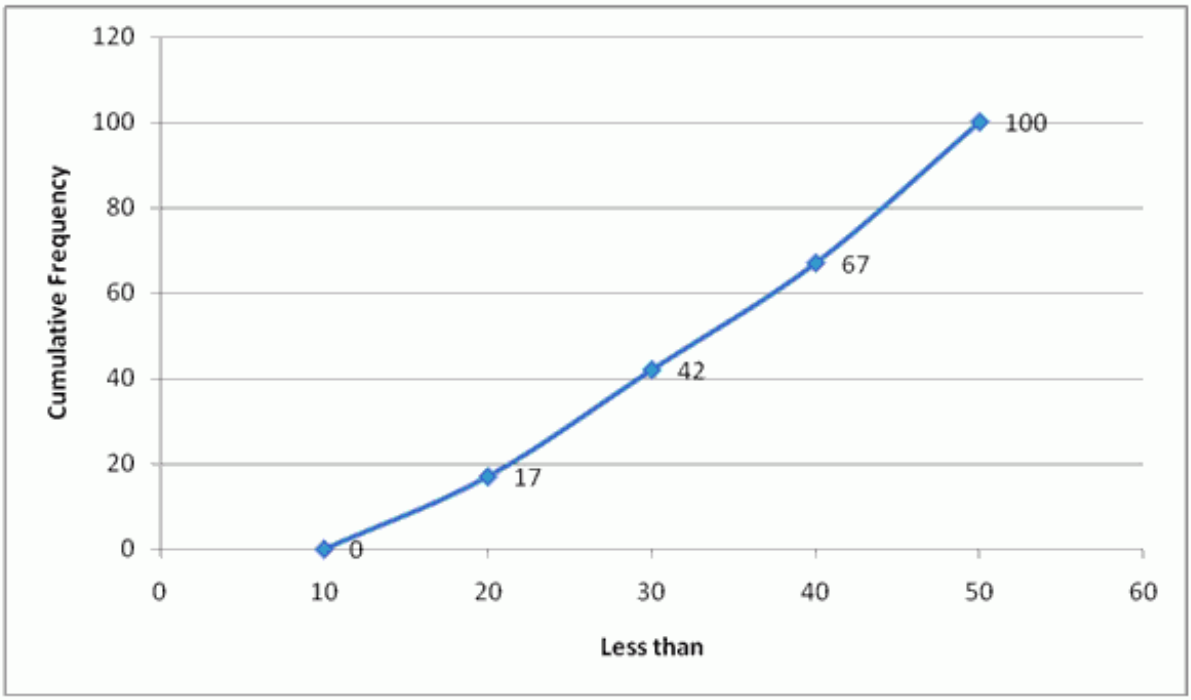
1. On the x-axis, take 1 cm as 5 units and plot age.

2. On the y-axis, take 1 cm as 5 units and plot frequency.

3. Plot the points with coordinates having abscissae as actual limits and ordinates as the cumulative frequencies. In this case (10,0),(20,17),(30,42),(40,67),(50,100).

4. Join the points plotted by a smooth curve.

Age less than	Cumulative Frequency
10	0
20	17
30	42
40	67
50	100



(vi)

Marks obtained	More than 10	More than 20	More than 30	More than 40	More than 50
No. of students	8	25	38	50	67

Steps:

1. Start with lower limits of class intervals and from cumulative frequency, subtract the frequency of each class to obtain c.f distribution.

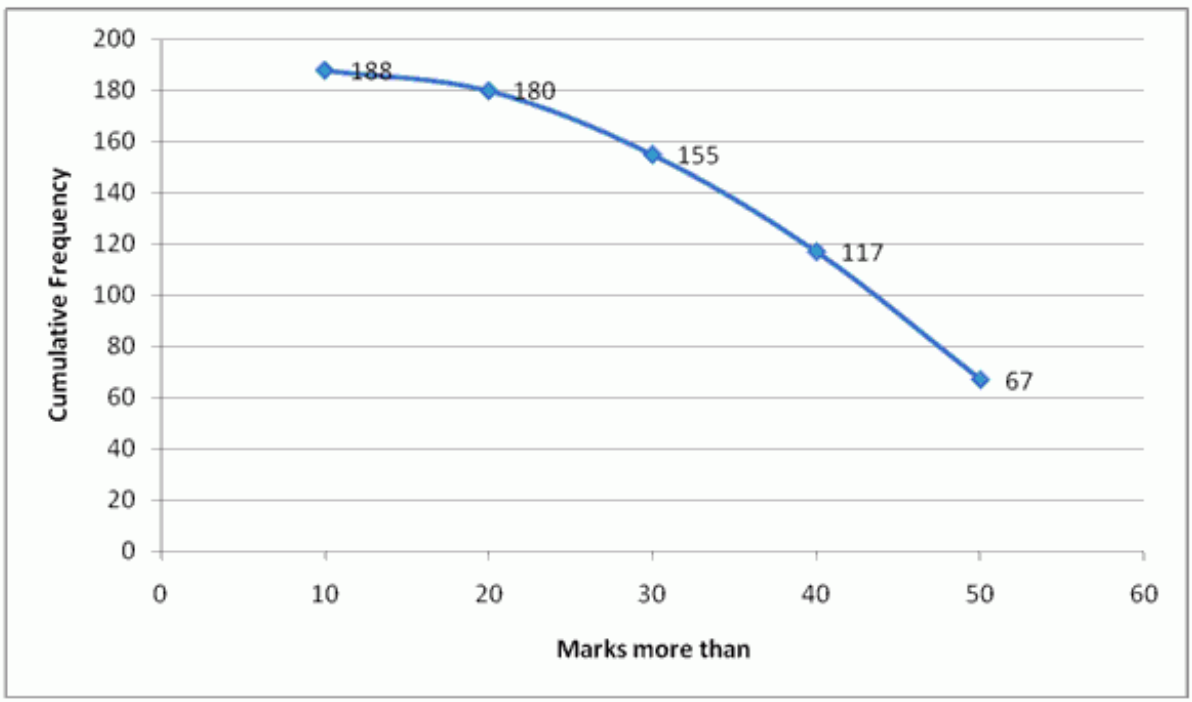
2. Mark lower class limits along X-axis. 1cm = 5 units

3. Mark cumulative frequencies along Y-axis. 1 cm = 5 units

4. Plot points (x, f) where x is the lower limit of one class and f is the corresponding c.f. (10,188),(20,180),(30,155),(40,117),(50,67)

5. Join the points to get the ogive.

Marks more than	Frequency	Cumulative Frequency
10	8	188
20	25	180
30	38	155
40	50	117
50	67	67



(vii)

Marks (more than)	0	10	20	30	40	50	60	70	80	90	100
Cumulative Frequency	100	87	65	55	42	36	31	21	18	7	0

Steps:

1. Start with lower limits of class intervals and from cumulative frequency, subtract the frequency of each class to obtain c.f distribution.

2. Mark lower class limits along X-axis. 1cm = 5 units

3. Mark cumulative frequencies along Y-axis. 1 cm = 5 units

4. Plot points (x, f) where x is the lower limit of one class and f is the corresponding c.f.
(0,100),(10,87),(20,65),(30,55),(40,42),(50,36),(60,31),(70,21),(80,18), (90,7),(100,0).

5. Join the points to get the ogive.

Marks more than	Cumulative Frequency
0	100
10	87
20	65
30	55
40	42
50	36
60	31
70	21
80	18

90	7
100	0