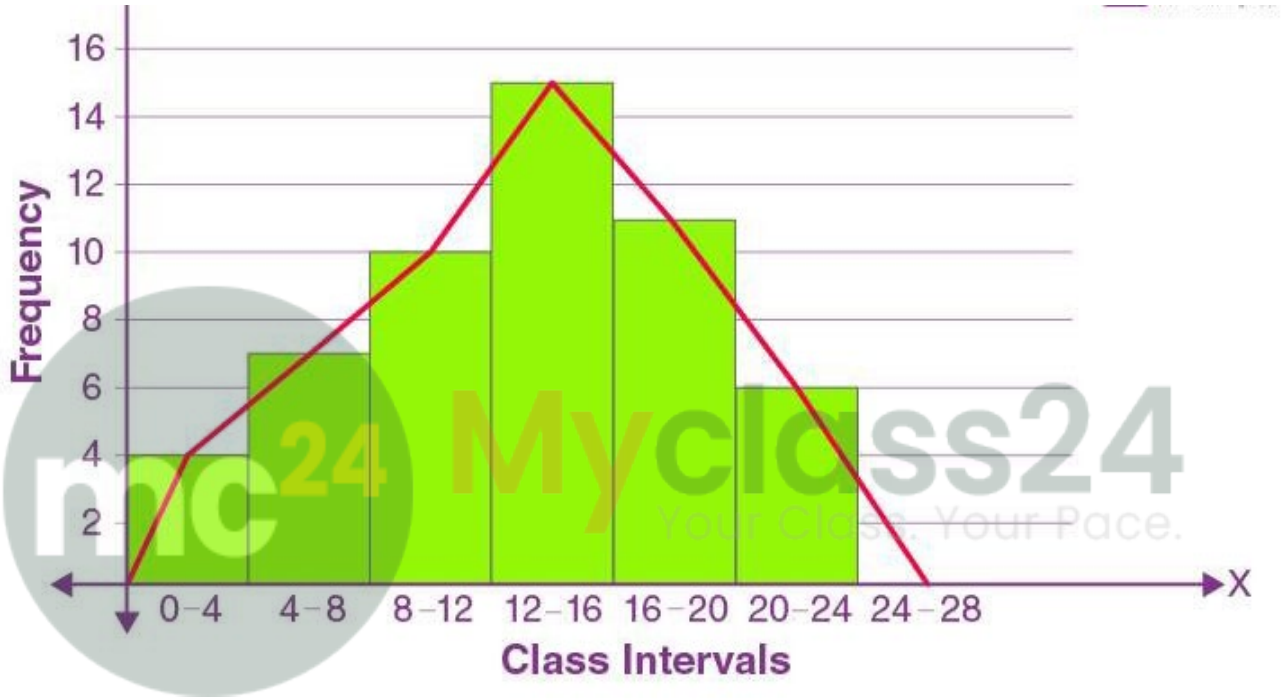
Exercise 18(B)

1. Construct a frequency polygon for the following distribution:

Class intervals	0 - 4	4 - 8	8 - 12	12 - 16	16 - 20	20 - 24
Frequency	4	7	10	15	11	6

Solution:

The frequency polygon for the given data is shown below:



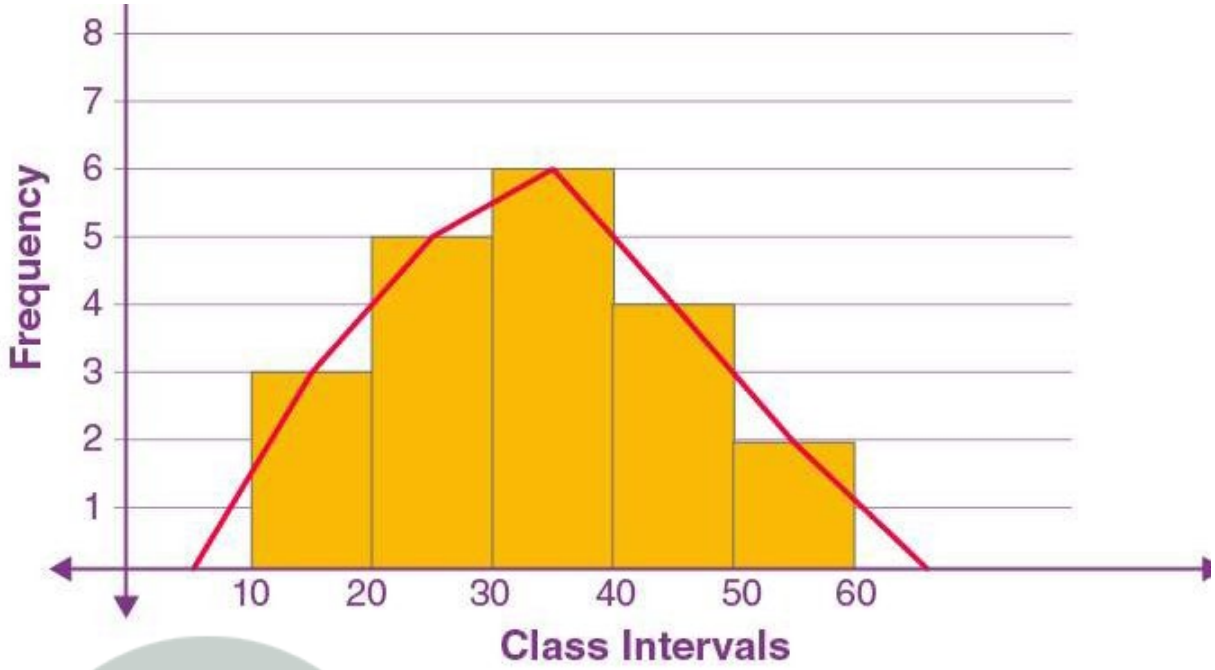
Steps for construction:
(i) Draw a histogram for the given data.
(ii) Mark the mid-point at the top of each rectangle of the histogram drawn.
(iii) Also, mark the mid-point of the immediately lower class-interval and mid-point of the immediately higher class-interval.
(iv) Lastly, join the consecutive mid-points marked by straight lines to obtain the required frequency polygon.

2. Construct a combined histogram and frequency polygon for the following frequency distribution:

Class Intervals	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60
Frequency	3	5	6	4	2

Solution:

The combined histogram and frequency polygon for the given data is shown below:



Steps for construction:
(i) Draw a histogram for the given data.
(ii) Mark the mid-point at the top of each rectangle of the histogram drawn.
(iii) Also, mark the mid-point of the immediately lower class-interval and mid-point of the immediately higher class-interval.
(iv) Lastly, join the consecutive mid-points marked by straight lines to obtain the required frequency polygon.

3. Construct a frequency polygon for the following data:

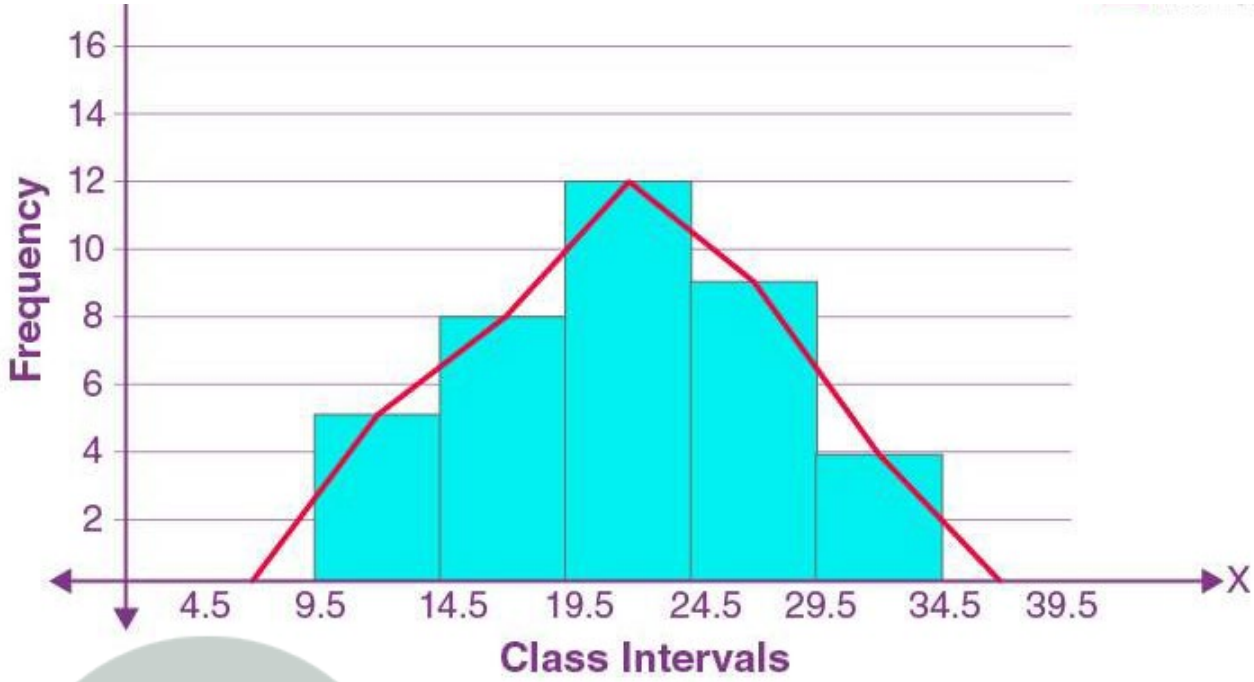
Class-Intervals	**10 - 14**	**15 - 19**	**20 - 24**	**25 - 29**	**30 - 34**
Frequency	**5**	**8**	**12**	**9**	**4**

Solution:

As the class intervals are inclusive, let's first convert them into the exclusive form.

Class-Interval	Frequency
9.5 - 14.5	5
14.5 - 19.5	8
19.5 - 24.5	12
24.5 - 29.5	9
29.5 - 34.5	4

The frequency polygon for the given data is shown as below:



Steps for construction:
(i) Draw a histogram for the given data.
(ii) Mark the mid-point at the top of each rectangle of the histogram drawn.
(iii) Also, mark the mid-point of the immediately lower class-interval and mid-point of the immediately higher class-interval.
(iv) Lastly, join the consecutive mid-points marked by straight lines to obtain the required frequency polygon.

4. The daily wages in a factory are distributed as follows:

Daily wages (in Rs.)	**125 - 175**	**175 - 225**	**225 - 275**	**275 - 325**	**325 - 375**
Number of workers	**4**	**20**	**22**	**10**	**6**

Draw a frequency polygon for this distribution.
Solution:

The frequency polygon for the given data is shown as below:

Steps for construction:
(i) Draw a histogram for the given data.
(ii) Mark the mid-point at the top of each rectangle of the histogram drawn.
(iii) Also, mark the mid-point of the immediately lower class-interval and mid-point of the immediately higher class-interval.
(iv) Lastly, join the consecutive mid-points marked by straight lines to obtain the required frequency polygon.

5. (i) Draw frequency polygons for each of the following frequency distribution:
(a) using histogram
(b) without using histogram

C.I	**10 - 30**	**30 - 50**	**50 - 70**	**70 - 90**	**90 - 110**	**110 - 130**	**130 - 150**
f	**4**	**7**	**5**	**9**	**5**	**6**	**4**

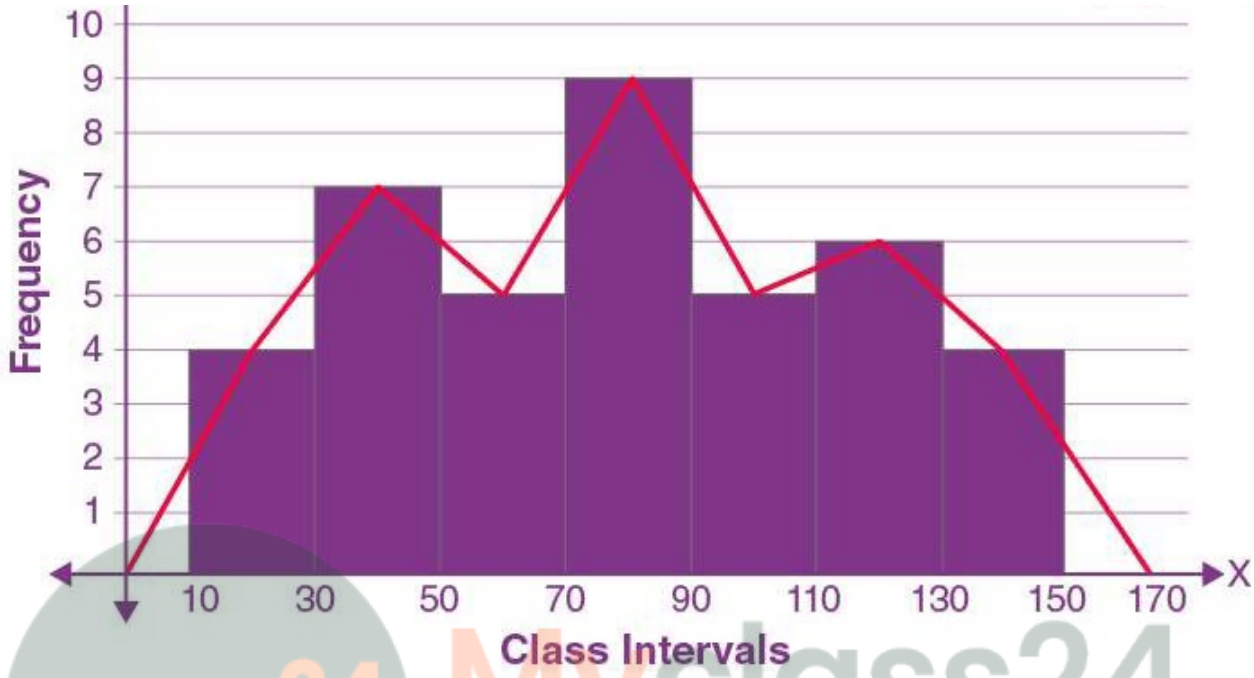
Solution:

(a) Using Histogram:

Class Interval	Frequency
10 - 30	4
30 - 50	7
50 - 70	5
70 - 90	9
90 - 110	5
110 - 130	6

130 - 150	4

The frequency polygon for the given data is shown as below:



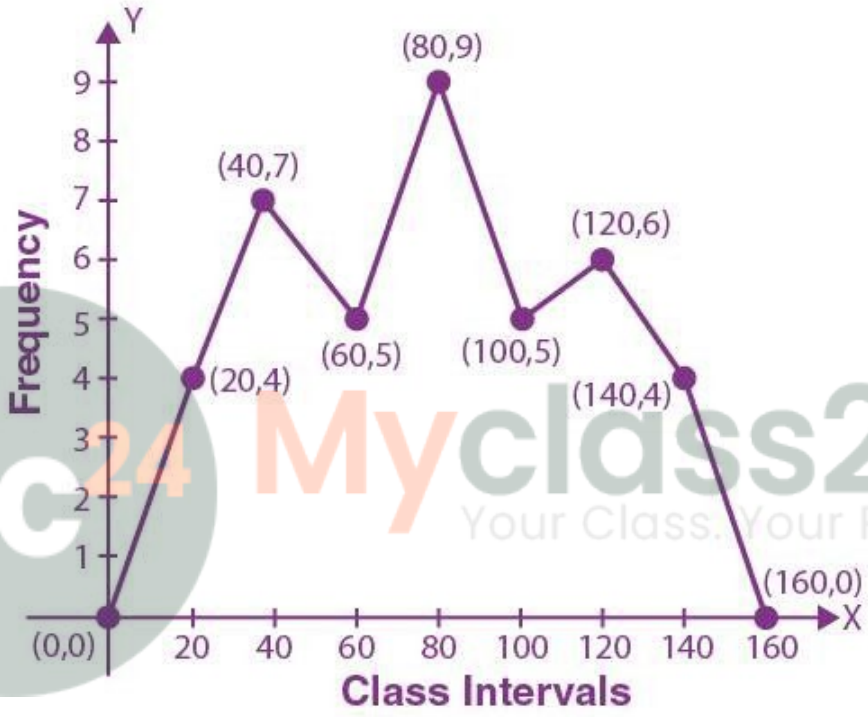
Steps for construction:
(i) Draw a histogram for the given data.
(ii) Mark the mid-point at the top of each rectangle of the histogram drawn.
(iii) Also, mark the mid-point of the immediately lower class-interval and mid-point of the immediately higher class-interval.
(iv) Lastly, join the consecutive mid-points marked by straight lines to obtain the required frequency polygon.

(b) Without using Histogram:

Steps for construction:
(i) Find the class mark (mid-value) of each given class-interval.
Using, Class mark = mid-value = (Upper limit + Lower limit)/2
(ii) On a graph paper, mark class marks along X-axis and frequencies along Y-axis.
(iii) On this graph paper, mark points taking values of class-marks along X-axis and the values of their corresponding frequencies along Y-axis.
(iv) Draw line segments joining the consecutive points marked in step (3) above.

C.I.	Class mark	Frequency
0 - 10	0	0
10 - 30	20	4

30 - 50	40	7
50 - 70	60	5
70 - 90	80	9
90 - 110	100	5
110 - 130	120	6
130 - 150	140	4
150 - 170	160	0



5. (ii) Draw frequency polygons for each of the following frequency distribution:
(a) using histogram
(b) without using histogram

C.I	**5 - 15**	**15 - 25**	**25 - 35**	**35 - 45**	**45 - 55**	**55 - 65**
f	**8**	**16**	**18**	**14**	**8**	**2**

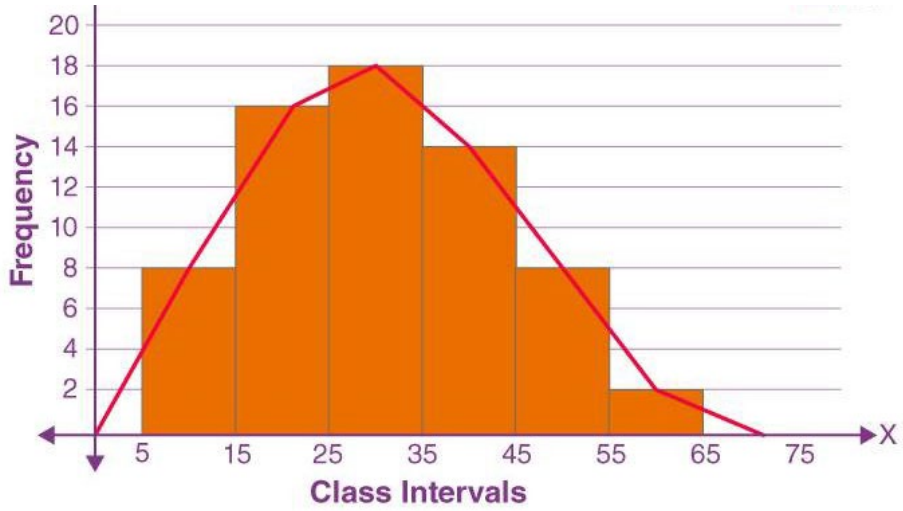
Solution:

(a) Using Histogram:

C.I.	Frequency
5 - 15	8
15 - 25	16
25 - 35	18
35 - 45	14
45 - 55	8

55 - 65	2

The frequency polygon for the given data is shown as below:



Steps for construction:
(i) Draw a histogram for the given data.
(ii) Mark the mid-point at the top of each rectangle of the histogram drawn.
(iii) Also, mark the mid-point of the immediately lower class-interval and mid-point of the immediately higher class-interval.
(iv) Lastly, join the consecutive mid-points marked by straight lines to obtain the required frequency polygon.

(b) Without using Histogram:

Steps for construction:
(i) Find the class mark (mid-value) of each given class-interval.
Using, Class mark = mid-value = (Upper limit + Lower limit)/2
(ii) On a graph paper, mark class marks along X-axis and frequencies along Y-axis.
(iii) On this graph paper, mark points taking values of class-marks along X-axis and the values of their corresponding frequencies along Y-axis.
(iv) Draw line segments joining the consecutive points marked in step (3) above.

C.I.	Class mark	Frequency
5 - 15	0	0
5 - 15	10	8
15 - 25	20	16
25 - 35	30	18
35 - 45	40	14
45 - 55	50	8
55 - 65	60	2
65 - 75	70	0