

**Q1. Define cumulative frequency distribution.**

**Solution 1: Cumulative frequency distribution:**

A table which displays the manner in which cumulative frequencies are distributed over various classes is called a cumulative frequency distribution or cumulative frequency distribution table.

**Q2. Explain the difference between a frequency distribution and a cumulative frequency distribution.**

**Solution 2:**

Frequency table or frequency distribution is a method to represent raw data in the form from which one can easily understand the information contained in a raw data, where as a table which plays the manner in which cumulative frequencies are distributed over various classes is called a cumulative frequency distribution.

**Q3. The marks scored by 55 students in a test are given below:**

| Marks           | 0-5 | 5-10 | 10-15 | 15-20 | 20-25 | 25-30 | 30-35 |
|-----------------|-----|------|-------|-------|-------|-------|-------|
| No. of students | 2   | 6    | 13    | 17    | 11    | 4     | 2     |

**Prepare a cumulative frequency table**

**Solution 3:**

| Marks | No. of students | Marks        | Cumulative Frequency |
|-------|-----------------|--------------|----------------------|
| 0-5   | 2               | Less than 5  | 2                    |
| 5-10  | 6               | Less than 10 | 8                    |
| 10-15 | 13              | Less than 15 | 21                   |
| 15-20 | 17              | Less than 20 | 38                   |
| 20-25 | 11              | Less than 25 | 49                   |
| 25-30 | 4               | Less than 30 | 53                   |
| 30-35 | 2               | Less than 35 | 55                   |
|       | N=55            |              |                      |

**Q4. Following are the ages of 360 patients getting medical treatment in a hospital on a day.**

| Age(in years)  | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 | 60-70 |
|----------------|-------|-------|-------|-------|-------|-------|
| No of patients | 90    | 50    | 60    | 80    | 50    | 30    |

**Construct a cumulative frequency table.**

**Solution 4:**

| Age (in years) | No. of students | Marks | Cumulative Frequency |
|----------------|-----------------|-------|----------------------|
|----------------|-----------------|-------|----------------------|

|       |       |              |     |
|-------|-------|--------------|-----|
| 10-20 | 90    | Less than 20 | 90  |
| 20-30 | 50    | Less than 30 | 140 |
| 30-40 | 60    | Less than 40 | 200 |
| 40-50 | 80    | Less than 50 | 280 |
| 50-60 | 50    | Less than 60 | 330 |
| 60-70 | 30    | Less than 70 | 360 |
|       | N=360 |              |     |

**Q5. The water bills (in rupees) of 32 houses in a certain street for the period 1.198 to 31.398 are given below:**

**56,43,32,38,56,24,68,85,52,47,35,58,63,74,27,84,69,35,44,75,55,30,54,65,45,67,95,72,43,65,35,69.**

**Tabulate the data and present the data as a cumulative frequency table using 70-79 as one of the class intervals.**

**Solution 5:**

The minimum bill is Rs 24

The maximum bill is Rs 95

Range=Maximum bill-Minimum bill=95-24=71

Given class interval is 70-79. So, class size=79-70=9

Therefore number of classes=  $\frac{\text{Range}}{\text{classsize}} = \frac{71}{9} = 7.80$

Number of classes=8

The cumulative frequency distribution is as follows:

| Bills | No. of houses(frequency) | Cumulative frequency |
|-------|--------------------------|----------------------|
| 16-25 | 1                        | 1                    |
| 25-34 | 3                        | 4                    |
| 34-43 | 5                        | 9                    |
| 43-52 | 4                        | 13                   |
| 52-61 | 7                        | 20                   |
| 61-70 | 6                        | 26                   |
| 70-79 | 3                        | 29                   |
| 79-88 | 2                        | 31                   |
| 88-97 | 1                        | 32                   |

**Q6. The number of books in different shelves of a library is as follows:**

**30, 32, 28, 24, 20, 25, 38, 37, 40, 45, 16, 20**

**19, 24, 27, 30, 32, 34, 35, 42, 27, 28, 19, 34**

**38, 39, 42, 29, 24, 27, 22, 29, 31, 19, 27, 25**

**28, 23, 24, 32, 34, 18, 27, 25, 37, 31, 24, 23**

**43, 32, 28, 31, 24, 23, 26, 36, 32, 29, 28, 21.**

**Prepare a cumulative frequency distribution table using 45-49 as the last class-interval.**

**Solution 6:**

The minimum number of bookshelves is 16

and maximum number of bookshelves is 45

Range=Maximum book shelves-Minimum book shelves=45-16=29

Given class interval is 45-49. So, class size=49-45=4

Therefore number of classes=  $\frac{\text{Range}}{\text{classsize}} = \frac{29}{4} = 7.25$

Number of classes=8

The cumulative frequency distribution is as follows:

| No of books | No. of shelves(frequency) | Cumulative frequency |
|-------------|---------------------------|----------------------|
| 13-17       | 1                         | 1                    |
| 17-21       | 6                         | 7                    |
| 21-25       | 11                        | 18                   |
| 25-29       | 15                        | 33                   |
| 29-33       | 12                        | 45                   |
| 33-37       | 5                         | 50                   |
| 37-41       | 6                         | 56                   |
| 41-45       | 3                         | 59                   |
| 45-49       | 1                         | 60                   |

**Q7. Given below are the cumulative frequencies showing the weights of 685 students of a school. Prepare a frequency distribution table.**

| Weight(in kg) | No. of students |
|---------------|-----------------|
| Below 30      | 0               |
| Below 30      | 24              |

|                 |            |
|-----------------|------------|
| <b>Below 35</b> | <b>78</b>  |
| <b>Below 40</b> | <b>183</b> |
| <b>Below 45</b> | <b>294</b> |
| <b>Below 50</b> | <b>408</b> |
| <b>Below 55</b> | <b>543</b> |
| <b>Below 60</b> | <b>621</b> |
| <b>Below 65</b> | <b>674</b> |
| <b>Below 70</b> | <b>685</b> |

**Solution 7:**

| <b>Weight(in kg)</b> | <b>No. of students</b> | <b>Class interval</b> | <b>frequency</b>   |
|----------------------|------------------------|-----------------------|--------------------|
| <b>Below 30</b>      | <b>24</b>              | <b>25-30</b>          | <b>24-0=24</b>     |
| <b>Below 35</b>      | <b>78</b>              | <b>30-35</b>          | <b>78-24=54</b>    |
| <b>Below 40</b>      | <b>183</b>             | <b>35-40</b>          | <b>183-78=105</b>  |
| <b>Below 45</b>      | <b>294</b>             | <b>40-45</b>          | <b>294-183=111</b> |
| <b>Below 50</b>      | <b>408</b>             | <b>45-50</b>          | <b>408-294=114</b> |
| <b>Below 55</b>      | <b>543</b>             | <b>50-55</b>          | <b>543-408=135</b> |
| <b>Below 60</b>      | <b>621</b>             | <b>55-60</b>          | <b>621-543=78</b>  |
| <b>Below 65</b>      | <b>674</b>             | <b>60-65</b>          | <b>671-621=53</b>  |
| <b>Below 70</b>      | <b>685</b>             | <b>65-70</b>          | <b>685-671=11</b>  |

**Q8. The following cumulative frequency distribution table shows the daily electricity consumption (in KW) of 40 factories in an industrial state.**

| <b>Consumption(in KW)</b> | <b>No. of factories</b> |
|---------------------------|-------------------------|
| <b>Below 240</b>          | <b>1</b>                |
| <b>Below 270</b>          | <b>4</b>                |
| <b>Below 300</b>          | <b>8</b>                |
| <b>Below 330</b>          | <b>24</b>               |
| <b>Below 360</b>          | <b>33</b>               |

|                  |           |
|------------------|-----------|
| <b>Below 390</b> | <b>38</b> |
| <b>Below 420</b> | <b>40</b> |

(1) Represent this as a frequency distribution table.

(2) Prepare a cumulative frequency table.

**Solution 8:**

(1)

| <b>Consumption(in KW)</b> | <b>No. of factories</b> | <b>Class interval</b> | <b>Frequency</b> |
|---------------------------|-------------------------|-----------------------|------------------|
| <b>Below 240</b>          | <b>1</b>                | <b>0-240</b>          | <b>1</b>         |
| <b>Below 270</b>          | <b>4</b>                | <b>240-270</b>        | <b>4-1=3</b>     |
| <b>Below 300</b>          | <b>8</b>                | <b>270-300</b>        | <b>8-4=4</b>     |
| <b>Below 330</b>          | <b>24</b>               | <b>300-330</b>        | <b>24-8=16</b>   |
| <b>Below 360</b>          | <b>33</b>               | <b>330-360</b>        | <b>33-24=9</b>   |
| <b>Below 390</b>          | <b>38</b>               | <b>360-390</b>        | <b>38-33=5</b>   |
| <b>Below 420</b>          | <b>40</b>               | <b>390-420</b>        | <b>40-38=2</b>   |

(2)

| <b>Class interval</b> | <b>Frequency</b> | <b>Consumption(in KW)</b> | <b>No. of factories</b> |
|-----------------------|------------------|---------------------------|-------------------------|
| <b>0-240</b>          | <b>1</b>         | <b>More than 0</b>        | <b>40</b>               |
| <b>240-270</b>        | <b>3</b>         | <b>More than 240</b>      | <b>40-1=39</b>          |
| <b>270-300</b>        | <b>4</b>         | <b>More than 270</b>      | <b>39-3=36</b>          |
| <b>300-330</b>        | <b>16</b>        | <b>More than 300</b>      | <b>36-4=32</b>          |
| <b>330-360</b>        | <b>9</b>         | <b>More than 330</b>      | <b>32-16=16</b>         |
| <b>360-390</b>        | <b>5</b>         | <b>More than 360</b>      | <b>16-9=7</b>           |
| <b>390-420</b>        | <b>2</b>         | <b>More than 390</b>      | <b>7-5=2</b>            |
|                       |                  | <b>More than 420</b>      | <b>2-2=0</b>            |
|                       | <b>N=40</b>      |                           |                         |

**Q9. Given below is a cumulative frequency distribution table showing ages of the people living in a locality:**

|  |  |
|--|--|
|  |  |
|--|--|

| Age in years | No. of years |
|--------------|--------------|
| Above 108    | 0            |
| Above 96     | 1            |
| Above 84     | 3            |
| Above 72     | 5            |
| Above 60     | 20           |
| Above 48     | 158          |
| Above 36     | 427          |
| Above 24     | 809          |
| Above 12     | 1026         |
| Above 0      | 1124         |

**Prepare a frequency distribution table.**

**Solution 9:**

| Age (in years) | No. of persons | Class interval | Frequency      |
|----------------|----------------|----------------|----------------|
| Above 0        | 1124           | 0-12           | $1124-1026=98$ |
| Above 12       | 1026           | 12-24          | 217            |
| Above 24       | 809            | 24-36          | 382            |
| Above 36       | 427            | 36-48          | 269            |
| Above 48       | 158            | 48-60          | 138            |
| Above 60       | 20             | 60-72          | 15             |
| Above 72       | 5              | 72-84          | $5-3=2$        |
| Above 84       | 3              | 84-96          | $3-1=2$        |
| Above 96       | 3              | 96-108         | $1-0=1$        |