

Expected Topics:

- Presentation of Data
- Ways to Represent Data
 - Textual
 - Tabular
 - Graphical
- Frequency Distribution
- Cumulative Frequency Distribution

Chapter 3

Presentation of Data and Frequency Distribution

Presentation of Data

It is an organization of data into tables, graphs or charts, so that logical and statistical conclusions can be derived from the collected measurements.

Parts of a Statistical Table

- **Table Heading** – shows the table number and the title.
- **Table number** - serves to give the table an identity.
- **Table title** – briefly explains what are being presented.
- **Body** – it is the main part of the table which contains the quantitative information.
- **Stub** – classification or categories found at the left side of the body of the table.
- **Box Head** – the captions that appear above the column. It identifies what are contained in the column.
- **Footnotes**
- **Source of Data**

Example of Tabular Method

Table 1
Enrolment Profile
College of Accountancy
Mary the Queen College Pampanga
A.Y. 2011 – 2012
(First Semester)

| Subjects | Number of Students | Percentage (%) |
|----------------------|---------------------------|-----------------------|
| Accounting 3 | 121 | 10.77 |
| Finance 1 | 136 | 12.11 |
| English 3 | 99 | 8.82 |
| Math 3 | 130 | 11.58 |
| Computer 3 | 143 | 12.73 |
| Management 1 | 126 | 11.22 |
| Economics 1 | 122 | 10.86 |
| Theology 3 | 123 | 10.95 |
| Physical Education 3 | 123 | 10.95 |
| Total (N) | 1,123 | 100% |

$$\text{Percentage} = (\text{Number of Students} / N) \times 100$$

1. Bar Graphs

Vertical Bar Graph

Horizontal Bar Graph

2. Line Graph

3. Pie Chart

4. Pictograph

Vertical Bar Graph

| Year | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---------------------|------|------|------|------|------|------|------|------|------|
| Number of Enrollees | 70 | 80 | 50 | 300 | 600 | 800 | 1000 | 1200 | 1800 |

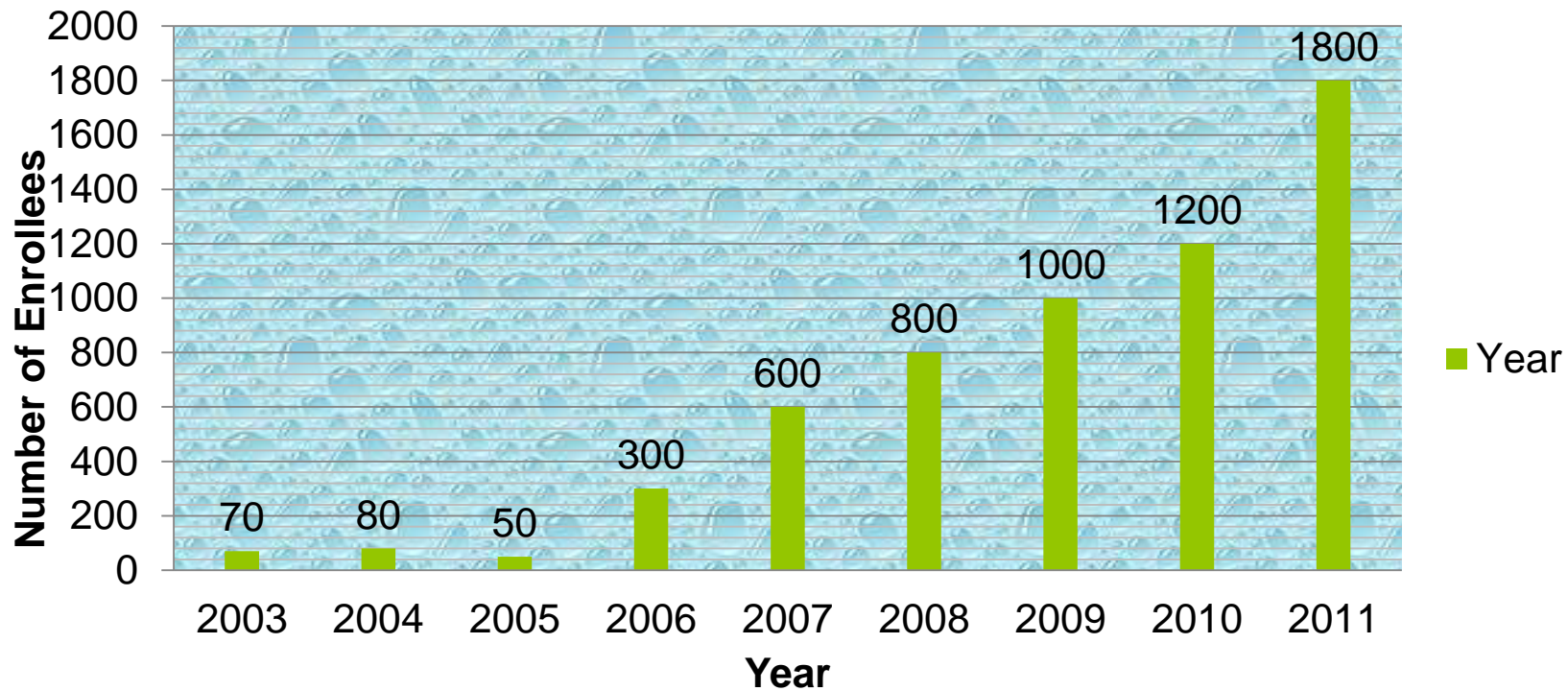


Figure 1 Number of Enrollees of Mary the Queen College Pampanga

Horizontal Bar Graph

| Year | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
|---------------------|------|------|------|------|------|------|------|------|------|
| Number of Enrollees | 70 | 80 | 50 | 300 | 600 | 800 | 1000 | 1200 | 1800 |

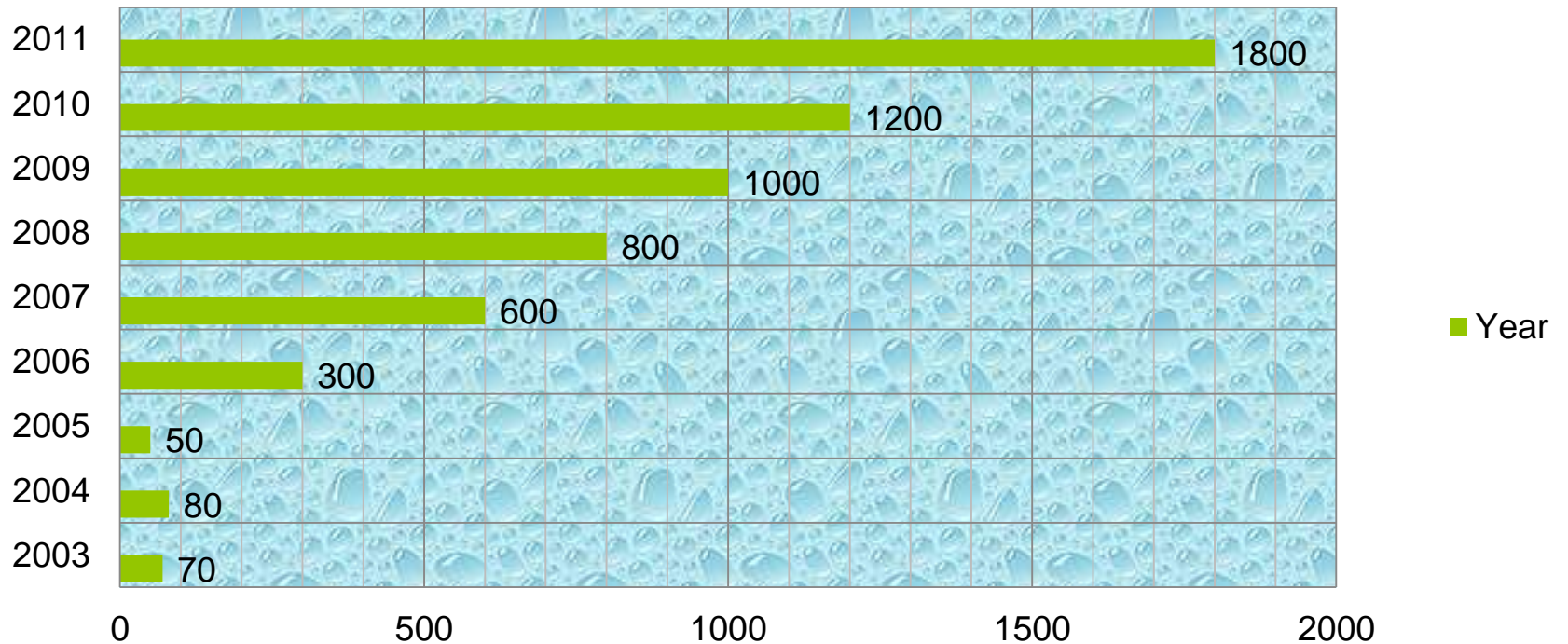
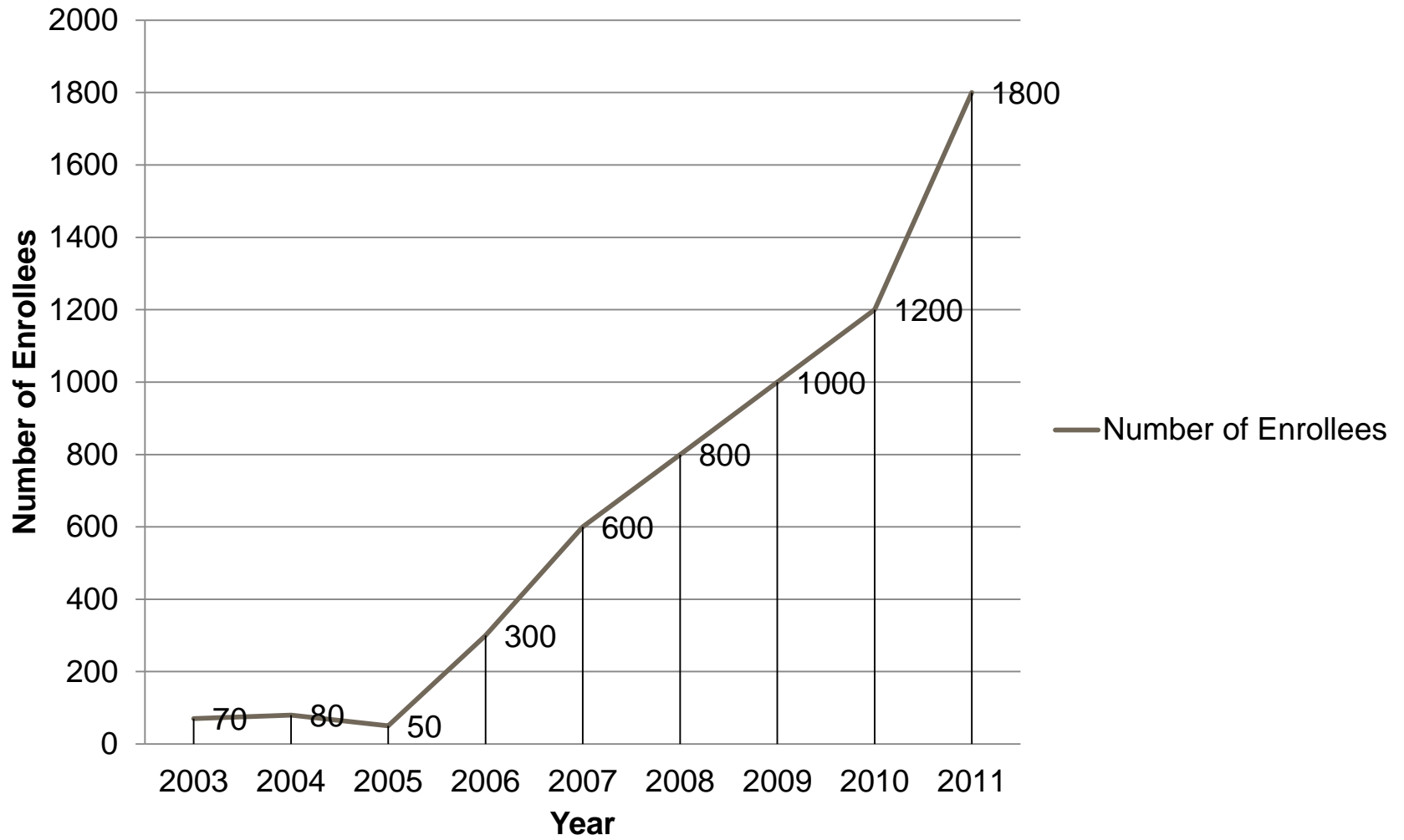


Figure 2 Number of Enrollees of Mary the Queen College Pampanga

Line Graph



Pie Chart

Table 3 Monthly Expenses of a Filipino Family with Four Children

| | Amount | Percentage (%) | Degrees (⁰) |
|----------------|--------|----------------|--------------------------|
| Food | 9,000 | 64.3 | 231.5 |
| Transportation | 2,000 | 14.3 | 51.5 |
| Miscellaneous | 3,000 | 21.4 | 77 |
| Total | 14,000 | 100 | 360 |

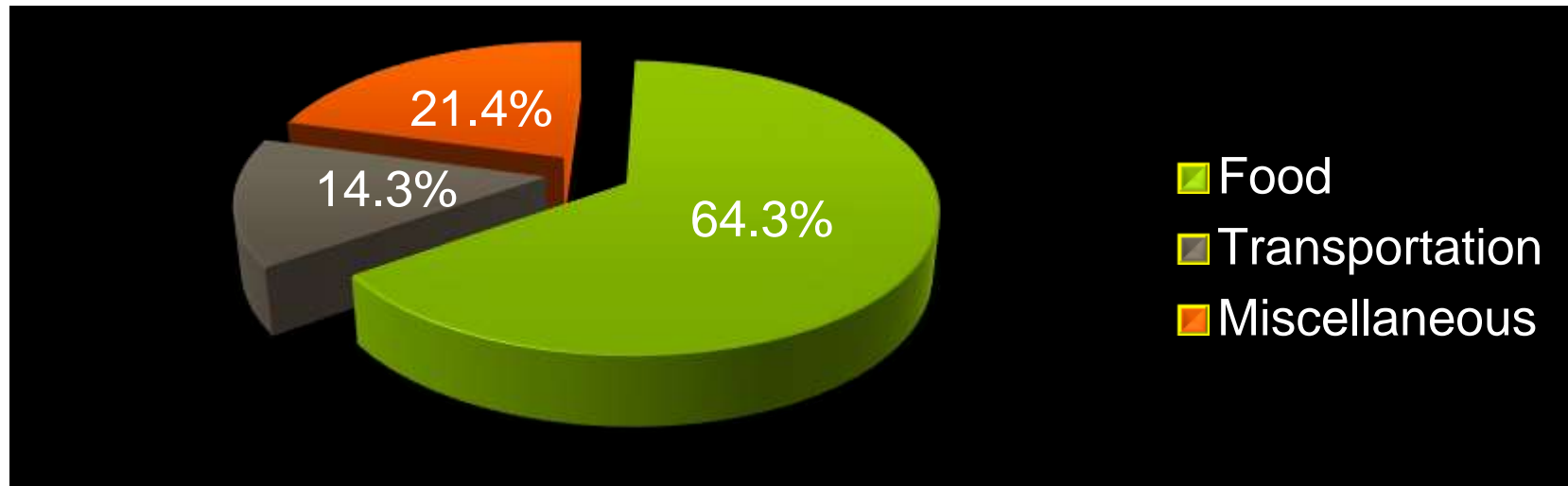


Figure 3 Pie Chart showing the monthly expenses of a family with four children

Frequency Distribution

It is the tabular arrangement of the gathered data by categories plus their corresponding frequencies and class marks or midpoints.

Definition of Terms

1. **Range (R)** – the difference between the highest score and the lowest score.
2. **Class Interval (k)** – a grouping or category defined by a lower limit and an upper limit.
3. **Class Boundaries (CB)** – these are also known as the exact limits, and can be obtained by subtracting 0.5 from the lower limit of an interval and adding 0.5 to the upper limit interval.
4. **Class Mark (x)** – is the middle value or the midpoint of a class interval. It is obtained by getting the average of the lower class limit and the upper class limit.
5. **Class Size (i)** – is the difference between the upper class boundary and the lower class boundary of a class interval
6. **Relative Frequency (RF)** – these are the percentage distribution in every class interval.
7. **Class Frequency** – it refers to the number of observations belonging to a class interval, or the number of items within a category.

Example

Statistics Test Scores of 50 students. Construct a frequency distribution

| | | | | |
|----|----|----|----|----|
| 51 | 65 | 68 | 87 | 76 |
| 56 | 69 | 75 | 89 | 80 |
| 61 | 66 | 73 | 86 | 79 |
| 70 | 71 | 54 | 87 | 78 |
| 68 | 74 | 66 | 88 | 77 |
| 67 | 73 | 64 | 90 | 77 |
| 72 | 52 | 67 | 86 | 79 |
| 74 | 59 | 70 | 89 | 85 |
| 55 | 63 | 74 | 82 | 84 |
| 57 | 68 | 72 | 81 | 83 |

1. Find the range R, using the formula:

$$R = \text{Highest Score} - \text{Lowest Score}$$

2. Compute for the number of class intervals, n, by using the formula:

$$k = 1 + 3.3 \log n$$

Note: The ideal number of class intervals should be 5 to 15. Less than 8 intervals are recommended for a data with less than 50 observations/values. For a data with 50 to 100 observations/values, the suggested number should be greater than 8. Please note also that the few number of class intervals will result to crowded data while too many number of class intervals tend to spread out the data too much.

3. Compute for the class size, I, using the formula:

$$i = R/k$$

Steps in Constructing a Frequency Distribution

4. Using the lowest score as lower limit, add $(i - 1)$ to it to obtain the higher limit of the desired class interval.
5. The lower limit of the second interval may be obtained by adding the class size to the lower limit of the first interval. Add $(i - 1)$ to the result to obtain the higher limit of the second interval.
6. Repeat step 5 to obtain the third class interval, and so on, and so forth.
7. When the n class intervals are completed, determine the frequency for each class interval by counting the elements.

Solution:

1. $R = \text{Highest Score} - \text{Lowest Score}$

$$R = 90 - 51$$

$$R = 39$$

2. $k = 8$ (desired interval)

3. $i = R/k$

$$i = 39/8$$

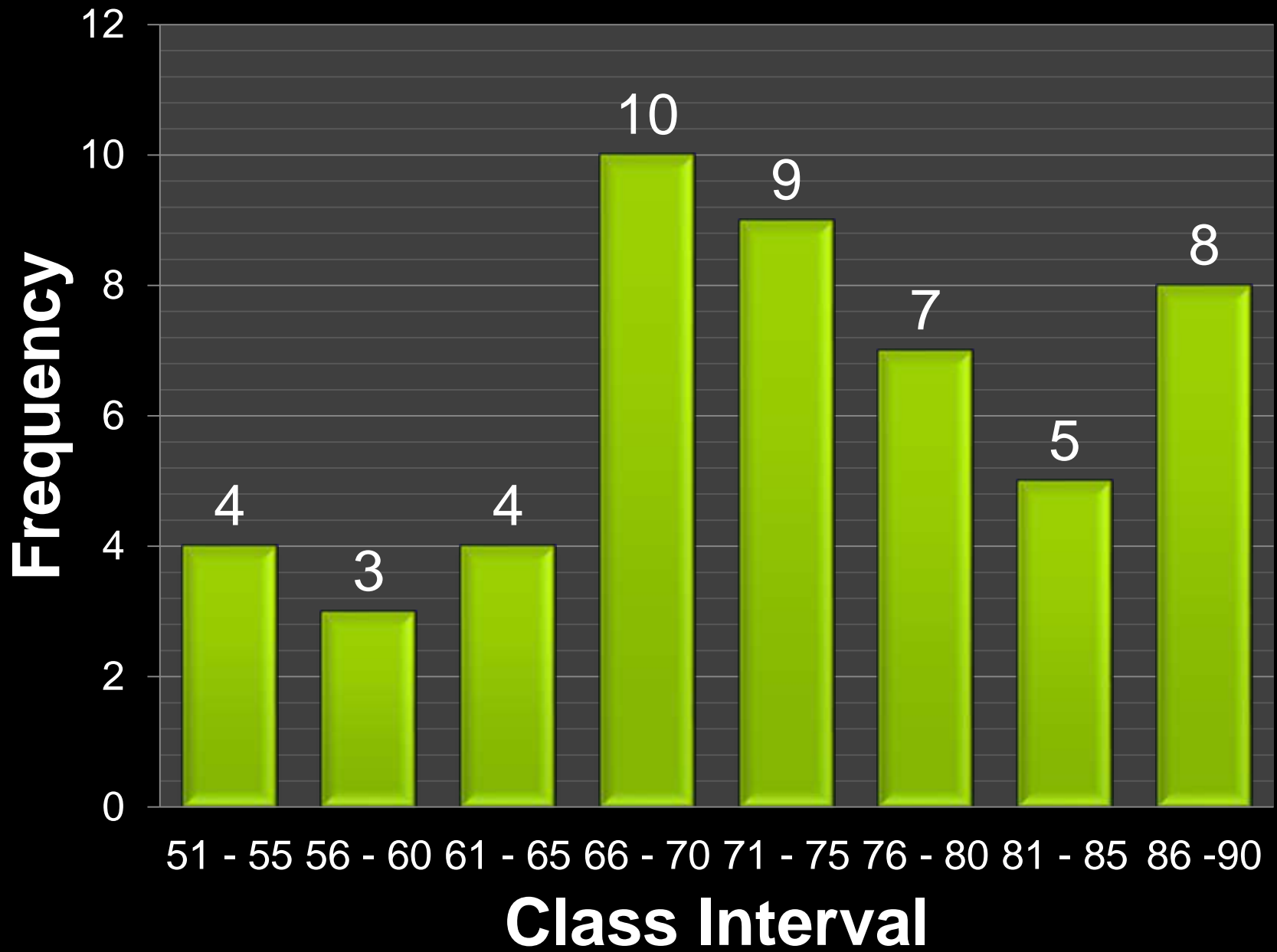
$$i = 4.875$$

$$i = 5$$

Solution:

The Frequency Distribution of the Statistics Score of 50 Students

| Class Interval | f | x | Class Boundary | |
|----------------|-----------|----|----------------|-------|
| | | | Lower | Upper |
| LL - UL | | | | |
| 51 - 55 | 4 | 53 | 50.5 | 55.5 |
| 56 - 60 | 3 | 58 | 55.5 | 60.5 |
| 61 - 65 | 4 | 63 | 60.5 | 65.5 |
| 66 - 70 | 10 | 68 | 65.5 | 70.5 |
| 71 - 75 | 9 | 73 | 70.5 | 75.5 |
| 76 - 80 | 7 | 78 | 75.5 | 80.5 |
| 81 - 85 | 5 | 83 | 80.5 | 85.5 |
| 86 - 90 | 8 | 88 | 85.5 | 90.5 |
| | 50 | | | |



Cumulative Frequency Distribution – is a tabular arrangement of data by class intervals whose frequency is cumulated. In other words, this distribution can be obtained by simply adding the class frequencies.

Two Kinds of Cumulative Frequency Distribution

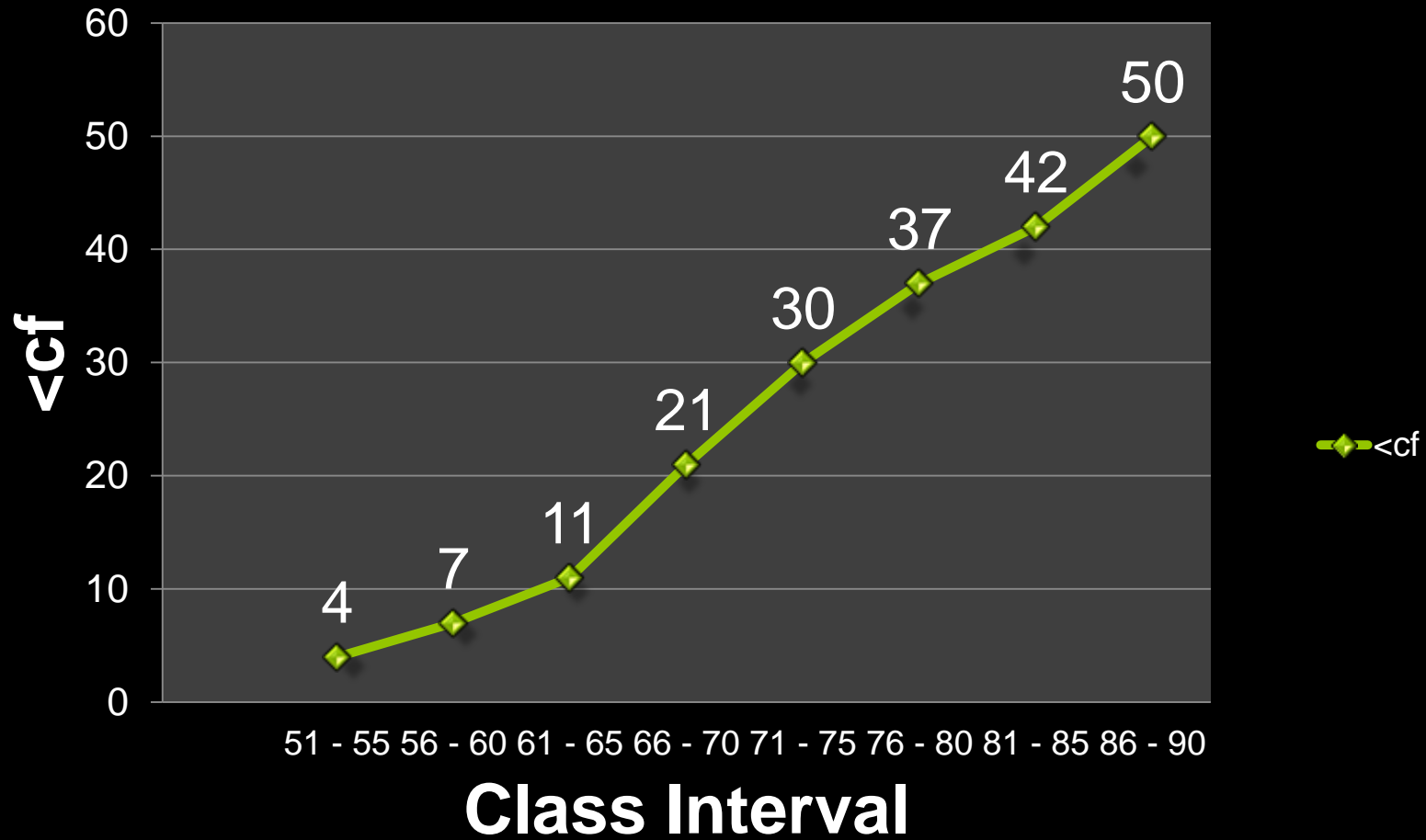
1. **Less than Cumulative Frequency Distribution (<cf)** - refers to the distribution whose frequencies are less than or below the upper class boundary they correspond to.
2. **Greater than Cumulative Frequency Distribution (>cf)** – refers to the distribution whose frequencies are greater than or above the lower class boundary they correspond to.

Cumulative Frequency Distribution

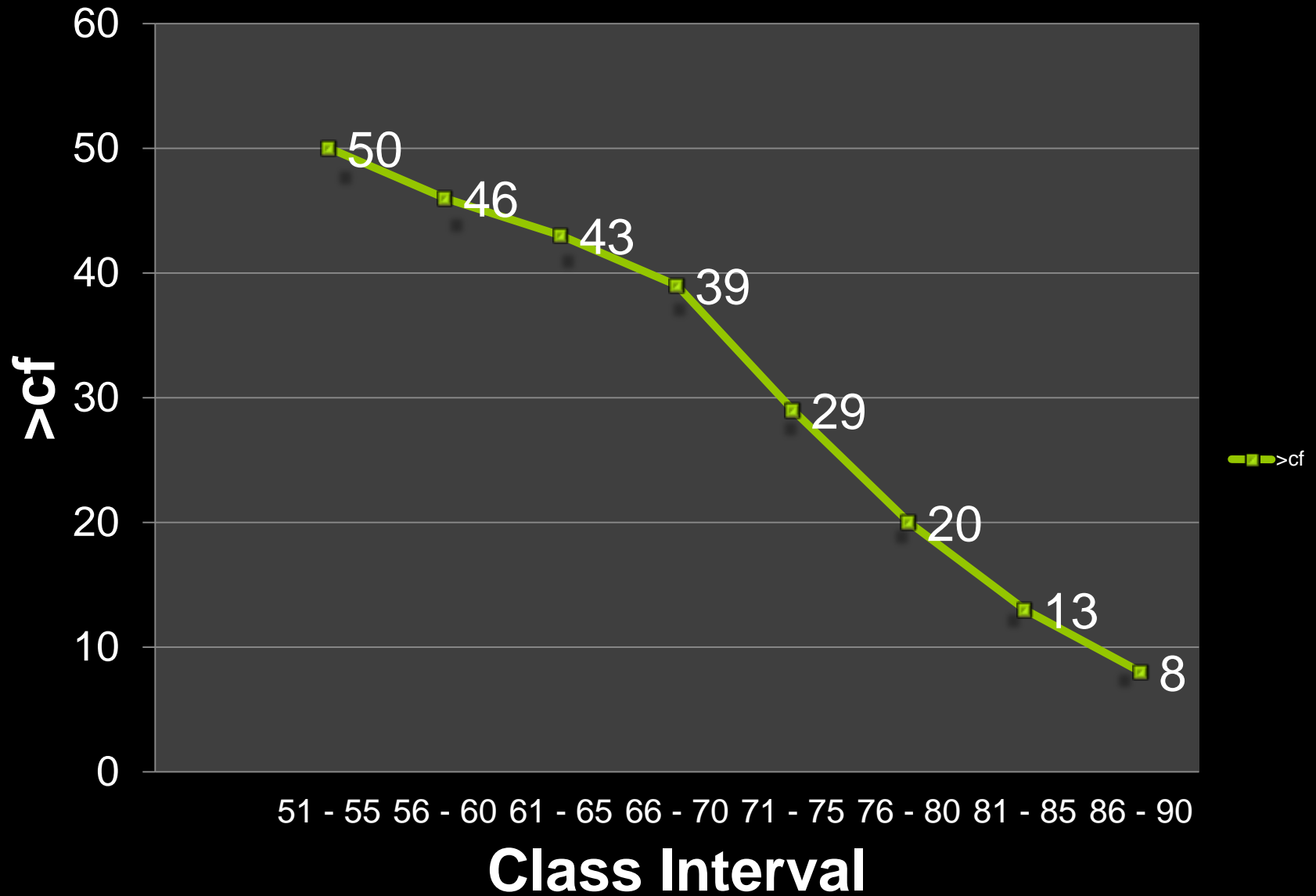
The Frequency Distribution of the Statistics Score of 50 Students

| Class Interval | f | x | Class Boundary | | <cf | >cf |
|----------------|-----------|----|----------------|-------|-----|-----|
| | | | Lower | Upper | | |
| 51 - 55 | 4 | 53 | 50.5 | 55.5 | 4 | 50 |
| 56 - 60 | 3 | 58 | 55.5 | 60.5 | 7 | 46 |
| 61 - 65 | 4 | 63 | 60.5 | 65.5 | 11 | 43 |
| 66 - 70 | 10 | 68 | 65.5 | 70.5 | 21 | 39 |
| 71 - 75 | 9 | 73 | 70.5 | 75.5 | 30 | 29 |
| 76 - 80 | 7 | 78 | 75.5 | 80.5 | 37 | 20 |
| 81 - 85 | 5 | 83 | 80.5 | 85.5 | 42 | 13 |
| 86 - 90 | 8 | 88 | 85.5 | 90.5 | 50 | 8 |
| | 50 | | | | | |

Less Than Ogive



Greater Than Ogive



Relative Frequency Distribution

The relative frequency distribution is a tabular arrangement of the data showing the proportion in percent of each frequency. In simple terms, it indicates how many percent the data fall within each category. The relative frequency for each class interval is obtained by dividing the class frequency by the total frequency and multiplying the result by 100%.

Relative Frequency Distribution

The Frequency Distribution of the Statistics Scores of 50 Students

| Class Interval | f | x | Class Boundary | | <cf | >cf | RF% |
|----------------|-----------|----|----------------|-------|-----|-----|------------|
| | | | Lower | Upper | | | |
| LL - UL | | | | | | | |
| 51 - 55 | 4 | 53 | 50.5 | 55.5 | 4 | 50 | 8 |
| 56 - 60 | 3 | 58 | 55.5 | 60.5 | 7 | 46 | 6 |
| 61 - 65 | 4 | 63 | 60.5 | 65.5 | 11 | 43 | 8 |
| 66 - 70 | 10 | 68 | 65.5 | 70.5 | 21 | 39 | 20 |
| 71 - 75 | 9 | 73 | 70.5 | 75.5 | 30 | 29 | 18 |
| 76 - 80 | 7 | 78 | 75.5 | 80.5 | 37 | 20 | 14 |
| 81 - 85 | 5 | 83 | 80.5 | 85.5 | 42 | 13 | 10 |
| 86 - 90 | 8 | 88 | 85.5 | 90.5 | 50 | 8 | 16 |
| | 50 | | | | | | 100 |

Relative Frequency Distribution



Example 2:

Suppose, a statistics class with 60 students were given an examination and the results are shown below.

| | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 48 | 73 | 57 | 57 | 69 | 88 | 11 | 80 | 82 | 47 |
| 46 | 70 | 49 | 45 | 75 | 81 | 33 | 65 | 38 | 59 |
| 94 | 59 | 62 | 36 | 58 | 69 | 45 | 55 | 58 | 65 |
| 30 | 49 | 73 | 29 | 41 | 53 | 37 | 35 | 61 | 48 |
| 22 | 51 | 56 | 55 | 60 | 37 | 56 | 59 | 57 | 36 |
| 12 | 36 | 50 | 63 | 68 | 30 | 56 | 70 | 53 | 28 |

Solution:

1. $R = HS - LS$

$$R = 94 - 11$$

$$\mathbf{R = 83}$$

2. $k = 1 + 3.3 \log n$

$$k = 1 + 3.3 \log 60$$

$$k = 6.867899126$$

$$\mathbf{k = 7}$$

3. $i = R/k$

$$i = 83/7$$

$$i = 11.85714286$$

$$\mathbf{i = 12}$$

Solution:

The Frequency Distribution of the Examination Results of Sixty Students
in a Statistics Class

| Class Interval | | f | x | Class Boundary | | <cf | >cf | RF% |
|----------------|----|-----------|------|----------------|-------|-----|-----|------------|
| LL | UL | | | Lower | Upper | | | |
| 11 | 22 | 3 | 16.5 | 10.5 | 22.5 | 3 | 60 | 5 |
| 23 | 34 | 5 | 28.5 | 22.5 | 34.5 | 8 | 57 | 8 |
| 35 | 46 | 11 | 40.5 | 34.5 | 46.5 | 19 | 52 | 18 |
| 47 | 58 | 19 | 52.5 | 46.5 | 58.5 | 38 | 41 | 32 |
| 59 | 70 | 14 | 64.5 | 58.5 | 70.5 | 52 | 22 | 23 |
| 71 | 82 | 6 | 76.5 | 70.5 | 82.5 | 58 | 8 | 10 |
| 83 | 94 | 2 | 88.5 | 82.5 | 94.5 | 60 | 2 | 3 |
| | | 60 | | | | | | 100 |