Graphing Data

What have we learned so far?

1. Randomly collect data.
2. Sort the data.
3. Compute the class width for specific number of classes.
4. Complete a frequency distribution table with the following columns:
   - **Class Limits and Boundaries**
   - **Class Midpoints**
   - **Class Frequencies**
   - **Cumulative Frequencies**
   - **Relative Frequencies**
   - **Percentage Frequencies**

Case Study:

A sample of 40 exams in a math class was randomly taken. Scores are given below:

58	72	100	62	74	53	99	66	75	70
61	55	98	61	57	98	69	69	81	61
78	63	87	67	87	70	77	57	57	90
71	80	70	57	69	64	55	56	56	77

Example:

Complete a **Frequency Distribution Table** using **5 Classes** starting with the minimum value.

Solution:

We used this sample in chapter 2 and made the **Frequency Distribution Table**:

Here is the result:

Class Limits	Class Boundaries	Class Midpoint	Class Frequency	Cumulative Frequency	Relative Frequency	Percentage Frequency
53–62	52.5–62.5	57.5	14	14	.350	35.0%
63–72	62.5–72.5	67.5	12	26	.300	30.0%
73–82	72.5–82.5	77.5	7	33	.175	17.5%
83–92	82.5–92.5	87.5	3	36	.075	7.5%
93–102	92.5–102.5	97.5	4	40	.100	10.0%

We will use specific columns from our **Frequency Distribution Table** to construct the following statistical graphs:

- **Bar Chart.**
- **Histogram.**
- **Ogive.**
- **Frequency Polygon.**
- **Pie Chart.**
- **Stem Plot.**

Constructing a Bar Chart

What do we need to draw a **Bar Chart**?

- **Class Limits**
- **Class Frequencies**

How do we draw the **Bar Chart**?

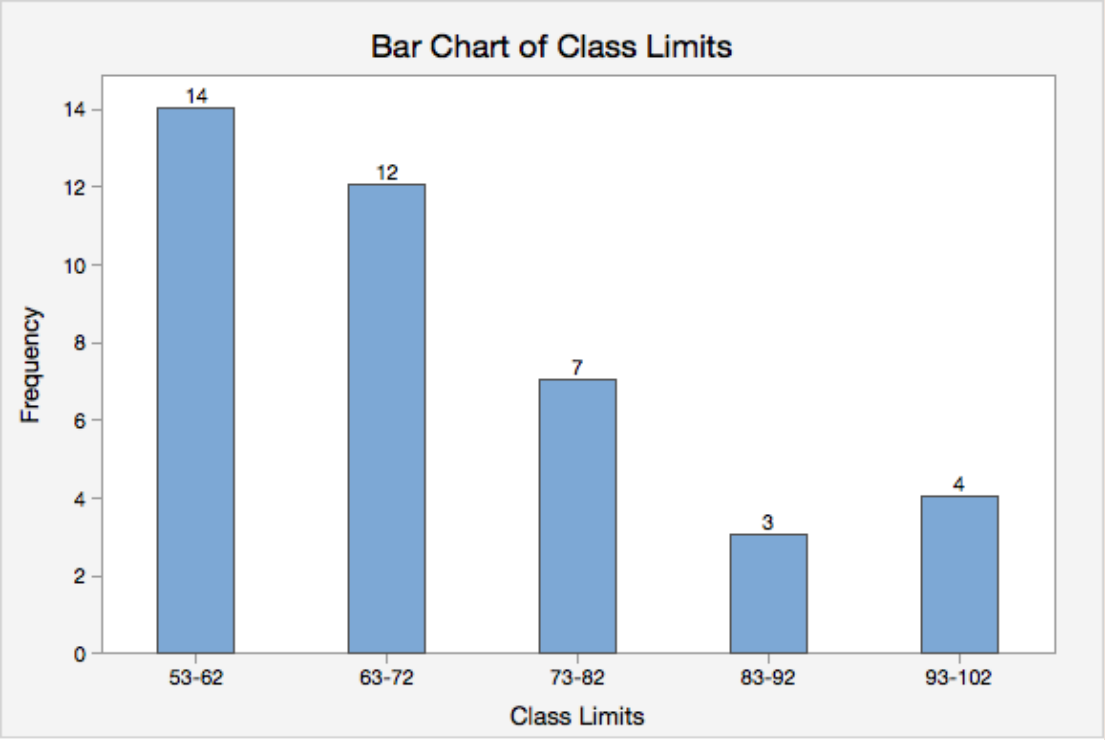
1. Place **Class Limits** on the horizontal axis.
2. Use **Class Frequencies** for the height of each bar.

Example:

Draw the **Bar Chart** for the sample of **40 exam results**.

Solution:

We use the class limits and corresponding class frequencies to draw the bar chart:



Constructing A Histogram

What do we need to draw a **Histogram**?

- **Class boundaries or class midpoints**
- **Class frequencies**

How do we draw the **Histogram**?

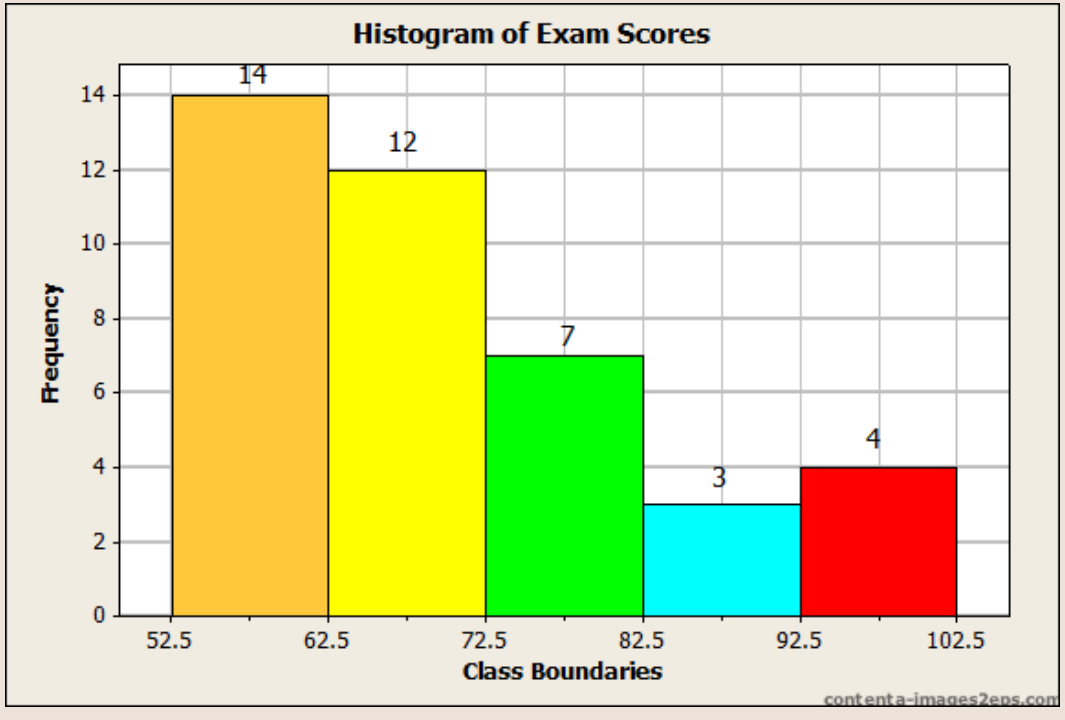
1. Place **Class coundaries or class midpoints** on the horizontal axis.
2. Use **Class frequencies** for the height of each bar.

Example:

Draw a **Histogram** for the sample of **40 exam results**.

Solution:

We use the class boundaries and corresponding class frequencies to draw the histogram:



Constructing an Ogive

What do we need to draw an **Ogive**?

- **Class Boundaries**
- **Cumulative Frequencies**

How do we draw the **Ogive**?

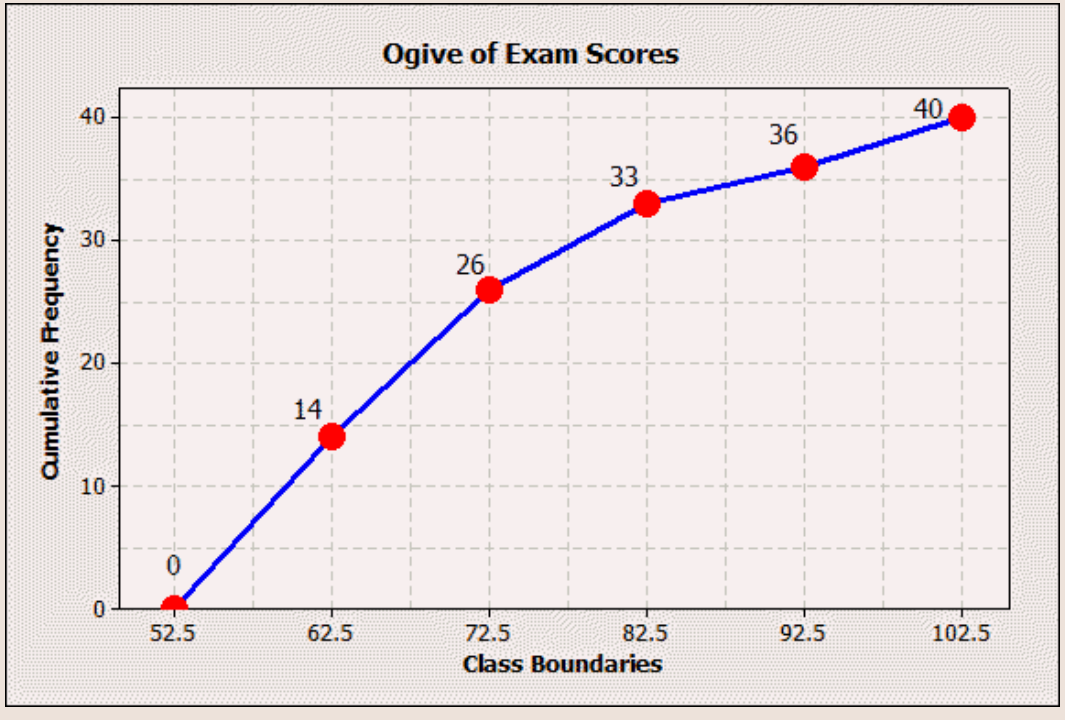
1. Place **Class Boundaries** on the horizontal axis.
2. Use **Cumulative Frequencies** for the height of each point.
3. Use **Connect** these points to complete the **Ogive** graph.

Example:

Draw an **Ogive** for the sample of **40 exam results**.

Solution:

We use the class boundaries and corresponding cumulative frequencies to draw the ogive:



Constructing a Frequency Polygon

What do we need to draw a **Frequency Polygon**?

- **Class Midpoints**
- **Class Frequencies**

How do we draw the **Frequency Polygon**?

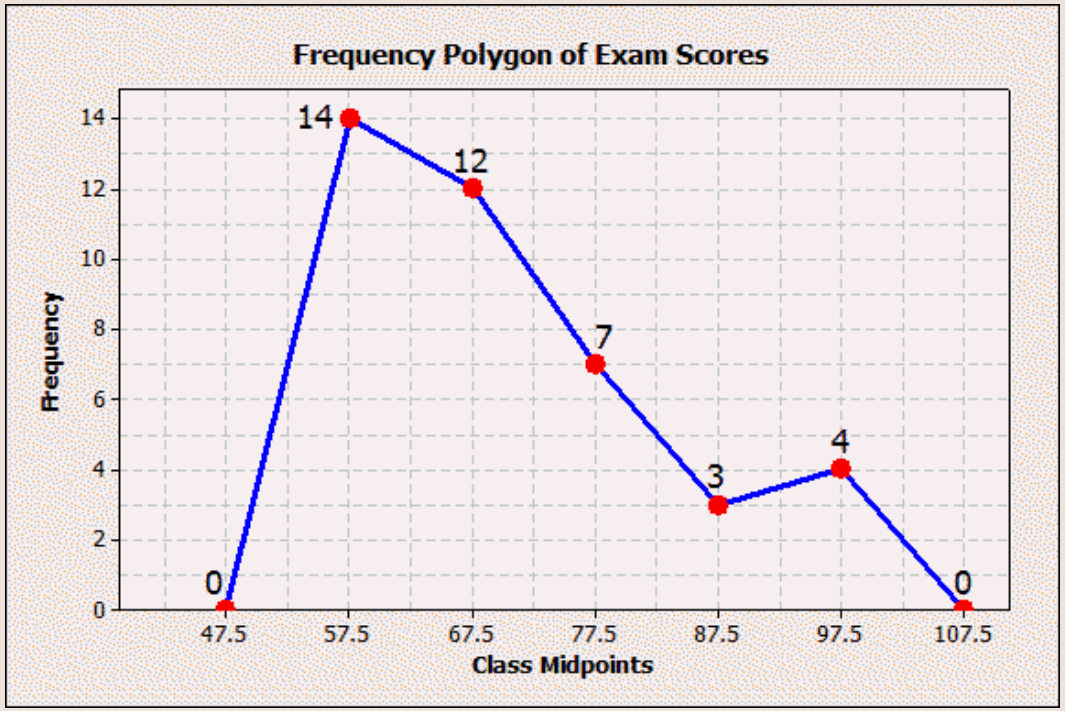
1. Place **Class midpoints** with two additional ones on each side, before the first class midpoint and after the last class midpoint on the horizontal axis.
2. Use **Class Frequencies** for the height of each class midpoints.
3. **Connect** these points to complete the **Frequency Polygon** graph.

Example:

Draw a **Frequency Polygon** for the sample of **40 exam results**.

Solution:

We use the class midpoints and corresponding class frequencies to draw the frequency polygon:



Constructing a Pie Chart

What do we need to draw a **Pie Chart**?

- **Percentage Frequency**
- **Relative Frequency**

How do we draw the **Pie Chart**?

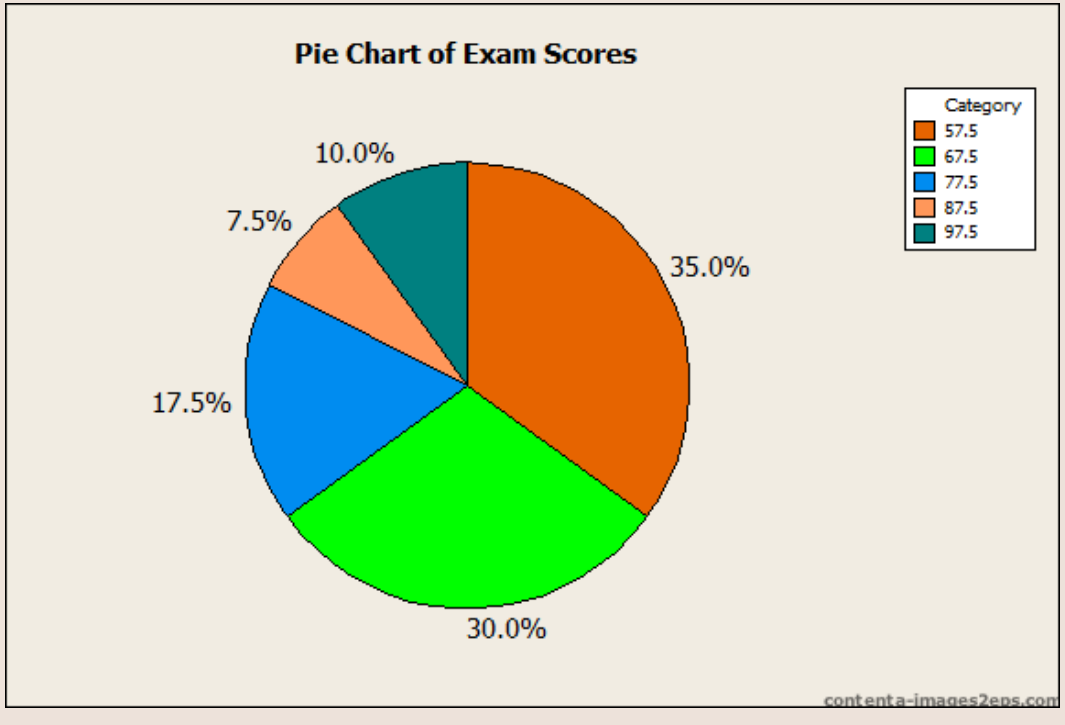
1. Compute the **Central Angle** for each slice.
   - **Central Angle** = **Relative Frequency** $\times 360°$.
2. Divide and label the circle by using the **Central Angle** and **Percentage Frequency**.

Example:

Draw a **Pie Chart** for the sample of **40 exam results**.

Solution:

We use the relative frequencies to compute the measure of central angle for each slice of the pie chart:



Constructing a Stem Plot

What do we need to draw a **Stem Plot**?

- **Sorted Raw Data**

How do we draw the **Stem Plot**?

1. Identify the **Leaf**(right most digit).
2. Identify the **Stem**(rest of the digits).

Stem Plot of Exam Scores Key: $5|3 = 53, 10|0 = 100$

Stem(tens)	Leaf(units)										
5	3	5	5	6	6	7	7	7	7	8	
6	1	1	1	2	3	4	6	7	9	9	9
7	0	0	0	1	2	4	5	7	7	8	
8	0	1	7	7							
9	0	8	8	9							
10	0