



Graphing Statistical Data

ID1050– Quantitative & Qualitative Reasoning

Definitions

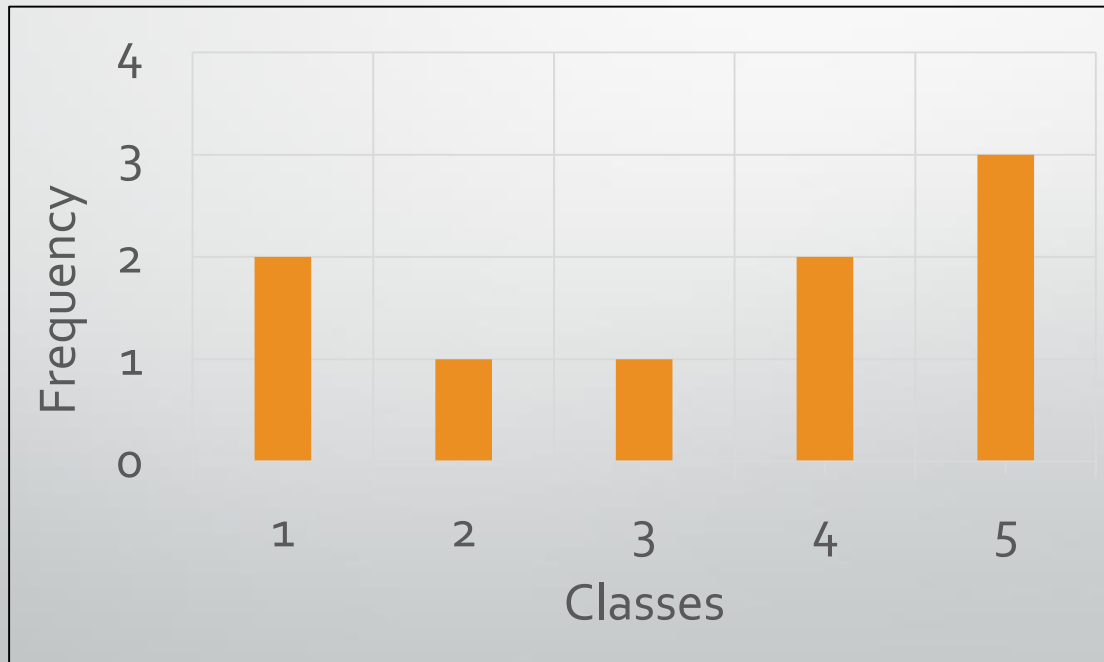
- Classes
 - This is another word for the groups to which the data can belong.
 - Classes can be:
 - Nominal (or 'name-based', like US state of birth or hair color)
 - Ordinal (or 'order-based', like high/medium/low or all/some/none)
 - Numerical (integers, like 1, 2, 3, ..., or ranges, like 1-2, 2-3, 3-4, etc.)
- Frequency
 - This is another word for the number or the count of members in each class.

Bar Graph

- Bar graphs are used for discrete data, which includes data grouped by name (nominal), order (ordinal), or integers.
- It is assumed that grouping rules have been established that enable individual data to be unambiguously placed into a group. (For hair color, where do we place an individual with greying black hair?)
- Since the data itself is discrete the bars that represent each group are separated from each other with gaps.

Bar Graph: Example

- Data: 1, 1, 2, 3, 4, 4, 5, 5, 5
- Center each bar over its class label.
- Here the classes are numbers, but they could also be names or ranking words.



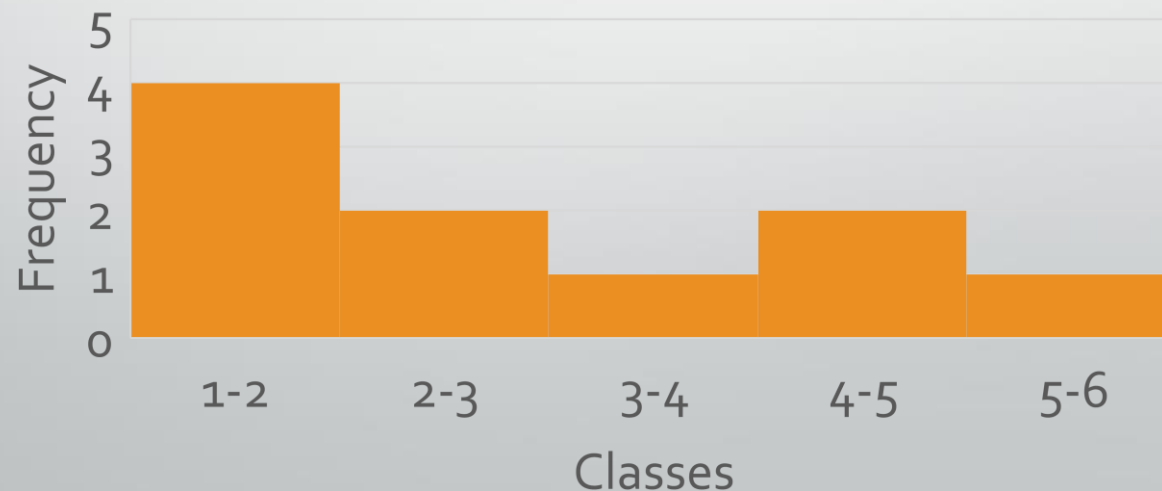
Class	Frequency
1	2
2	1
3	1
4	2
5	3

Histogram

- Histograms look very similar to bar graphs.
- Histograms are used for continuous numerical data.
- A class (group) for a histogram is a range of numbers.
- It is assumed that rules have been established that determine which class a number on the border between two classes should be placed.
 - Example: If the classes are 1-2 and 2-3, where should 2.0 be placed?
 - Usually, the rule is to promote the 'fence-sitter' to the higher class.
- Since the data itself is continuous the bars that represent each group are touching each other, with no gaps between.

Histogram: Example

- Data: 1.1, 1.2, 1.3, 1.8, 2.0, 2.6, 3.1, 4.6, 4.8, 5.1
- We have chosen the ranges shown so that each class has a reasonable number of members. Choice of class ranges can have profound effects on how the histogram appears.
- Here, we will use the 'promote the fence-sitter', so that 2.0 will belong to the class with range 2-3.



Class	Frequency
1-2	4
2-3	2
3-4	1
4-5	2
5-6	1

Conclusion

- Graphing statistical data is a good deal less complicated than graphing of functions.
- Bar graphs and histograms are the two main types of graphing, and they are very similar:
 - The x-axis has the classes (groupings) of the data.
 - A vertical bar is placed over each class, with a height that is the frequency.
- Bar graphs and histograms are different:
 - Bar graphs are used for discrete data, while histograms are used for continuous data.
 - Each column of a bar graph has a gap between its neighbors, reflecting the discrete nature of the data.
 - Each column of a histogram touches its neighbors, reflecting the continuous nature of the data.