Sections 5C & 5D

Statistical Tables and Graphs
&
Graphics in the Media

Frequency Tables

When the results from a statistical study are obtained, they are usually just in a list.

These lists are difficult to interpret and make generalizations from.

Categories – different results or types of results

Frequency – number of times each category appears in the data set

A **frequency table** is a table that has a column for the categories and for the frequency

Relative frequency – frequency expressed as a fraction or percentage of the total

Cumulative frequency – total of frequencies for the given category and all previous categories

Relative frequency and/or cumulative frequency are sometimes included in a frequency table.

Given the exam scores below, create a frequency table.

63, 71, 74, 77, 79, 79, 80, 81, 81, 82, 82, 85, 86, 87, 91, 93

Grade	Frequency	Relative Frequency	Cumulative Frequency
A	2	2/16 = 12.5%	2
B	8	8/16 = 50%	8 + 2 = 10
C	5	5/16 = 31.25%	5 + 8 + 2 = 15
D	1	1/16 = 6.25%	1 + 5 + 8 + 2 = 16
Total	**16**	**1 = 100%**	**16**

Qualitative data – describe qualities or categories

- not numerical data

Quantitative data – represent counts or measurements

- numerical data

Bar Graphs & Pie Charts

Bar graphs and pie charts are commonly used to represent qualitative data.

Pie charts are used primarily for relative frequencies because each wedge (piece of pie) is proportional to the relative frequency of the category it represents.

Important Labels for Graphs

Title/Caption – Should have a title or caption (or both) that explains what is being shown and, if applicable, the source of the data.

Vertical scale and title – Numbers along the vertical axis should clearly indicate the scale. Include a label that describes the variable shown on the vertical axis.
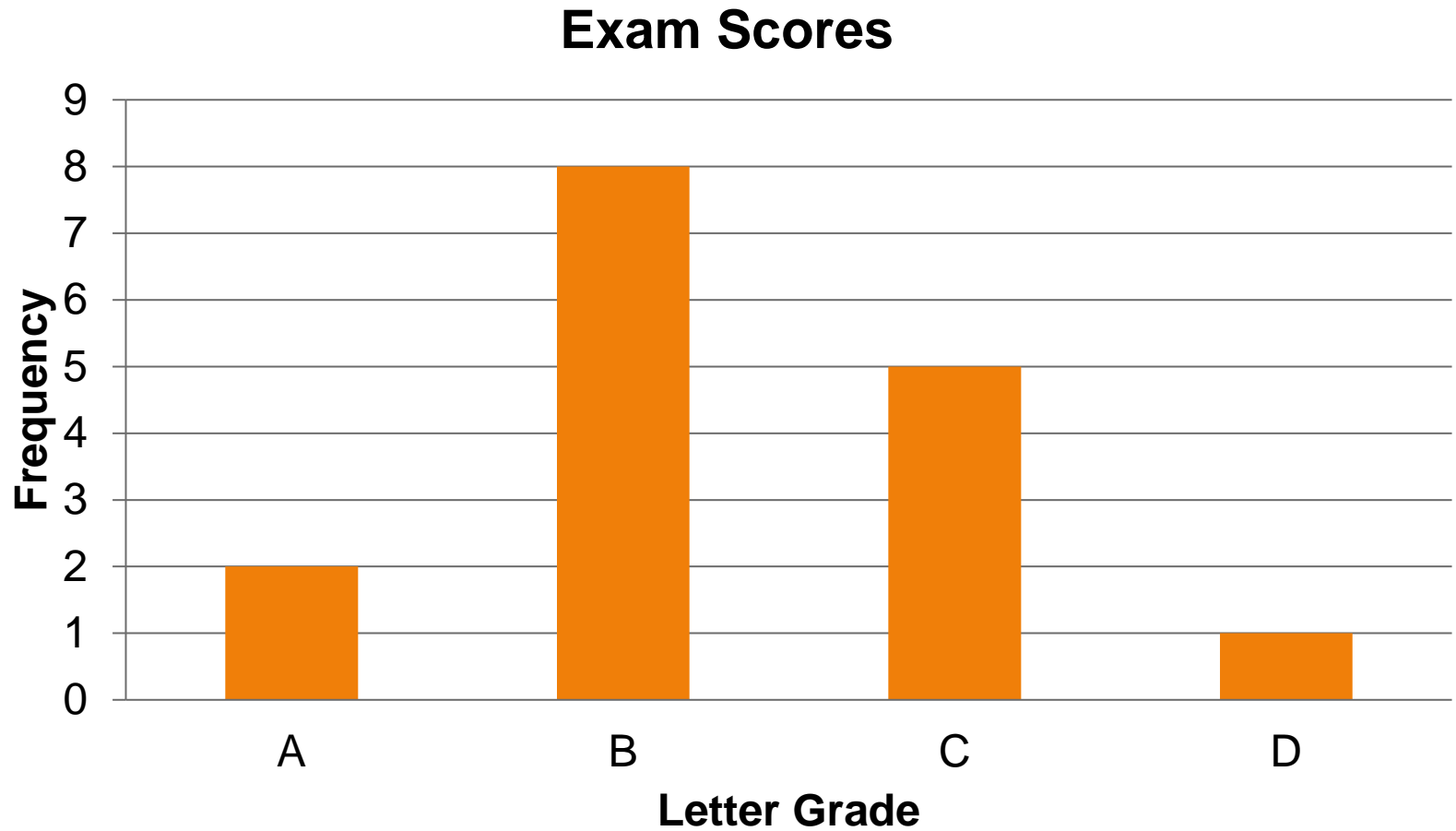
- usually the frequency

Horizontal scale and title – Numbers along the horizontal axis should clearly indicate the scale. Include a label that describes the variable shown on the horizontal axis.
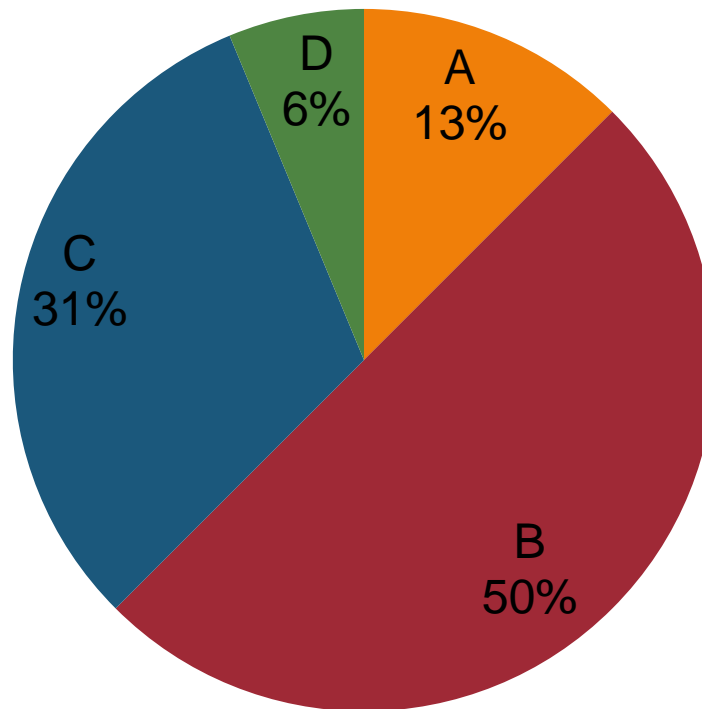
- usually the category

Legend – If multiple data sets are displayed on a single graph, include a legend or key to identify the individual data sets.

Draw a bar graph that represents the test data.

Draw a pie chart that represents the test data.

Histograms

Histogram – a bar graph in which the data categories are quantitative.

The bars on a histogram must follow the natural order of the numerical categories.

The widths of the histogram bars have a specific meaning and all bars must have the *same* width.

There are no gaps between the categories, thus the bars on a histogram must touch each other.

Other Graphs

A **line chart** shows the data value for each category as a dot, and the dots are connected with line segments.

- Each dot is placed above the *center* of the bin it represents.

A **time-series diagram** is a histogram or line chart in which the horizontal axis represents time.
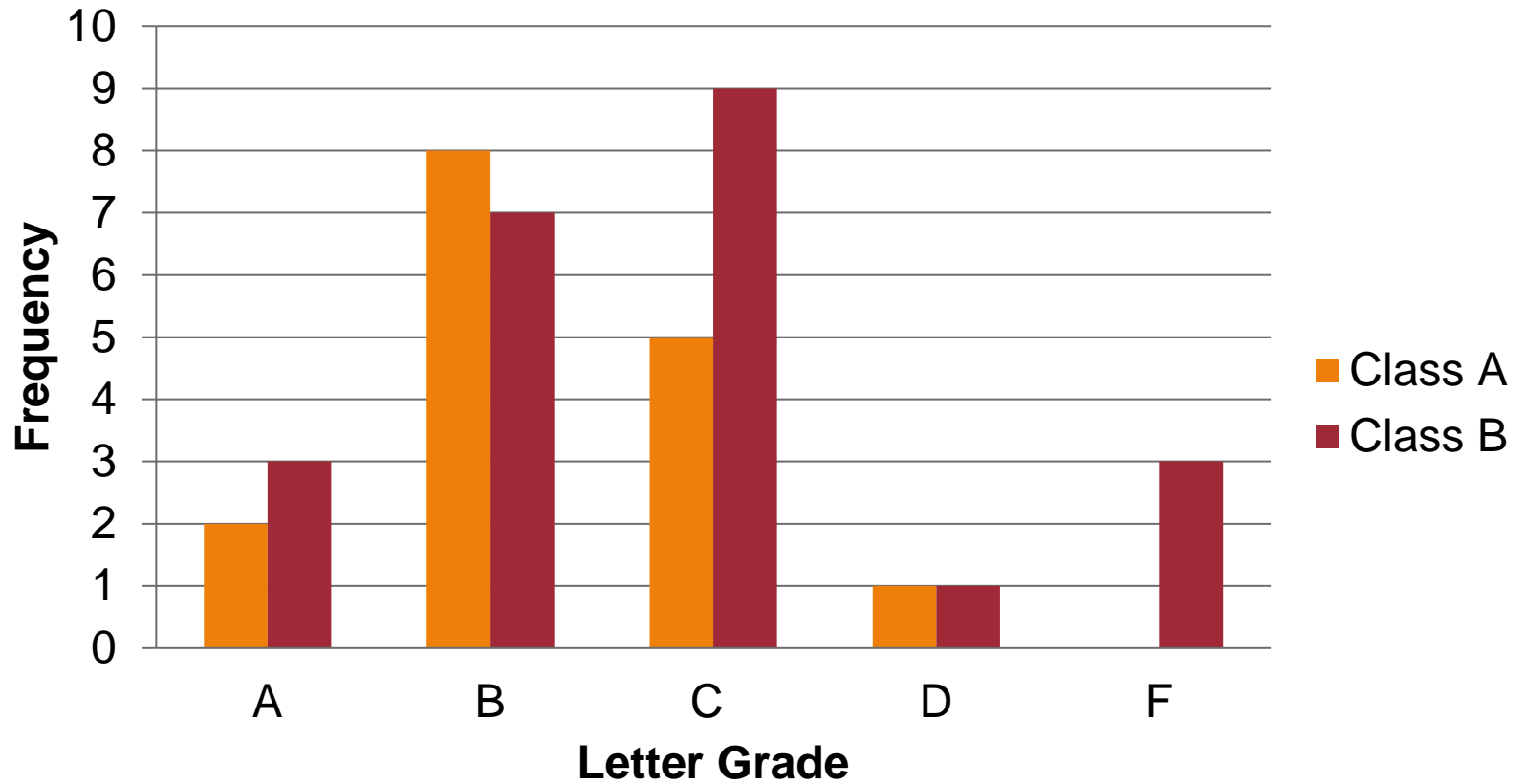
A **<u>multiple bar graph</u>** is an extension of a regular bar graph that has two or more sets of bars that allow comparison between two or more sets of data.

All the data sets must involve the same categories so that they can be displayed on the same graph.

Class A: 63, 71, 74, 77, 79, 79, 80, 81, 81, 82, 82, 85, 86, 87, 91, 93
Class B: 51, 54, 56, 62, 70, 73, 73, 74, 74, 74, 76, 78, 78, 81, 81, 82, 86, 86, 86, 87, 90, 95, 100

Exam Scores

A **stack plot** shows different data sets in a vertical stack.

They usually use either stacked bars or stacked line graphs.

Each bar is divided into sections, and the meaning of each section is listed in the key.

Cautions about Graphics

Be careful about graphics that are drawn in a way that distorts our perception of them.

When trying to compare trends in data sets, watch the scales that are being used on the graphs. It sometimes looks like there is a larger (or smaller) change than what really occurs.

Be careful about "percentage change graphs" – a flat graph means that it increased by the same percentage each year, not that the amount held steady.

Pictographs are graphs embellished with additional artwork, which may be more visually appealing but can also distract or mislead.