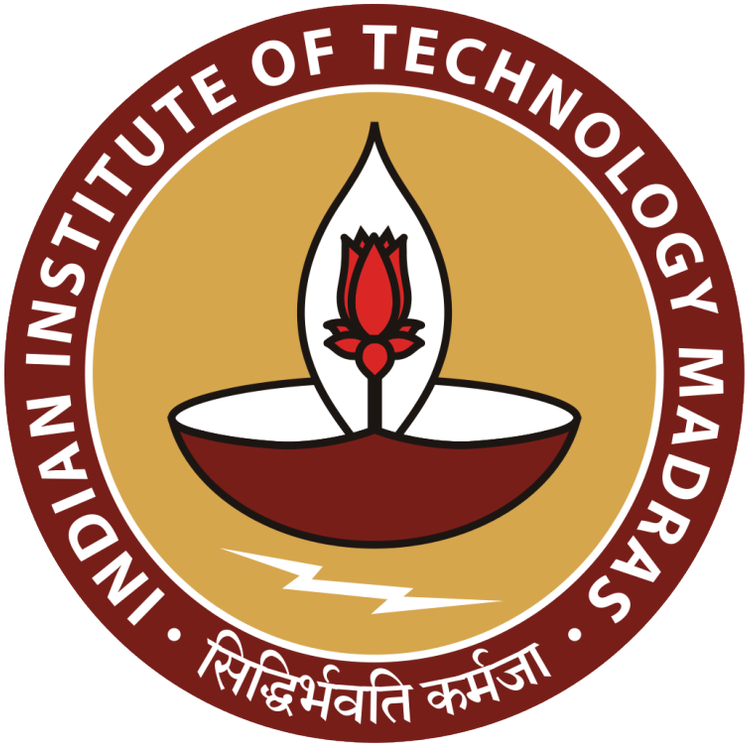

IIT Madras

ONLINE DEGREE

Statistics for Data Science -1

Describing Categorical Data- Single Variable

Usha Mohan

Indian Institute of Technology Madras

Know your purpose

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  - Choose the table/graph to serve the purpose.

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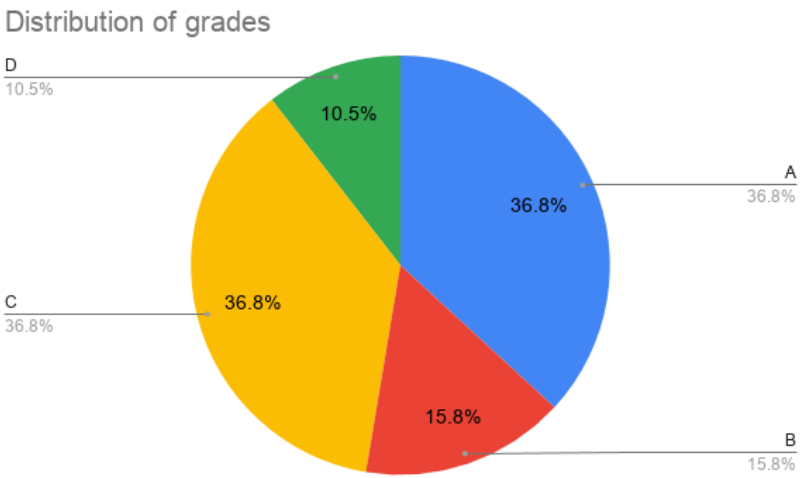
  - Choose the table/graph to serve the purpose.
- Pie charts are best to use when you are trying to compare parts of a whole.
- Bar graphs are used to compare things between different groups.

Label your data

- Label your chart to show the categories and indicate whether some have been combined or omitted.
- Name the bars in a bar chart.
- Name the slices in a pie chart.
- If you have omitted some of the cases, make sure the label of the plot defines the collection that is summarized.

Label your data



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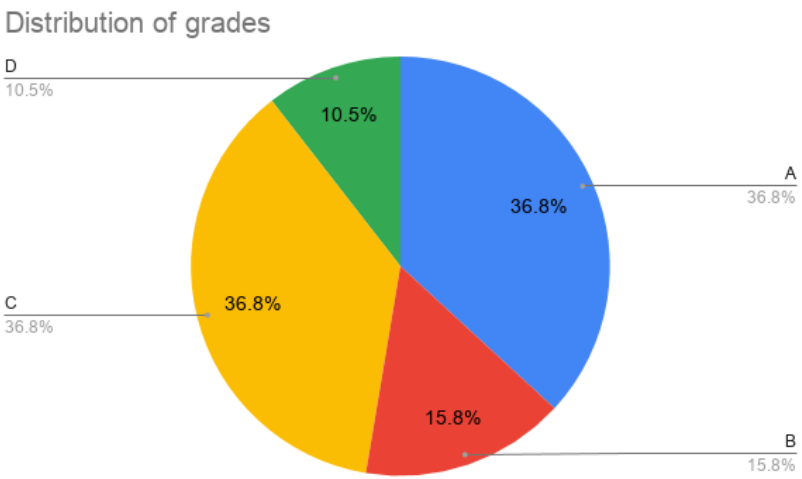
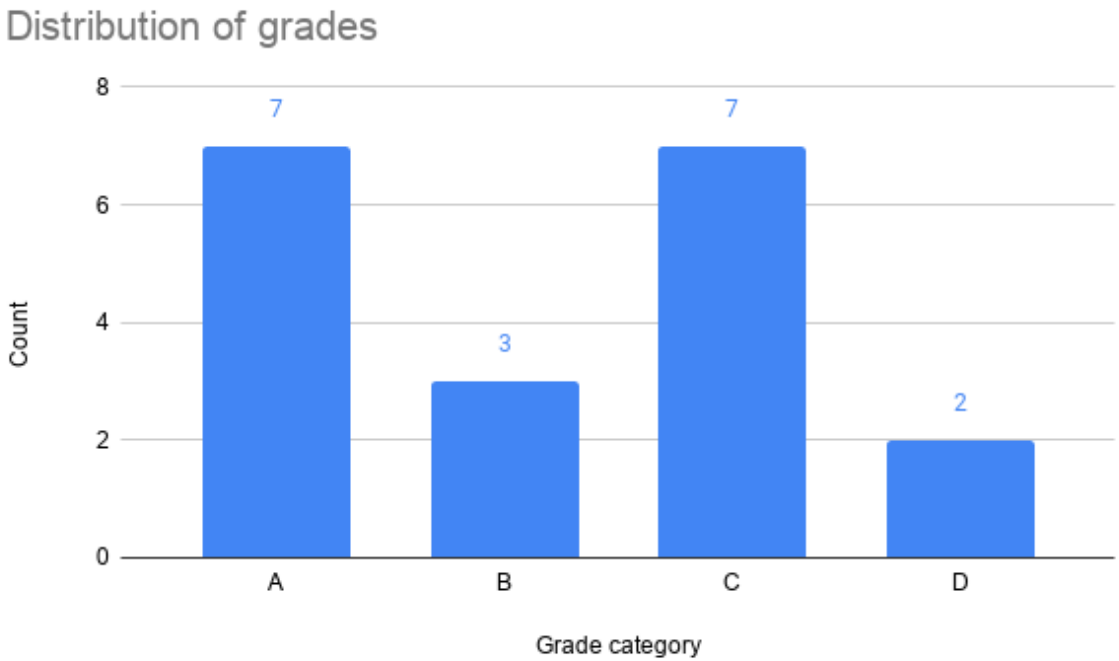
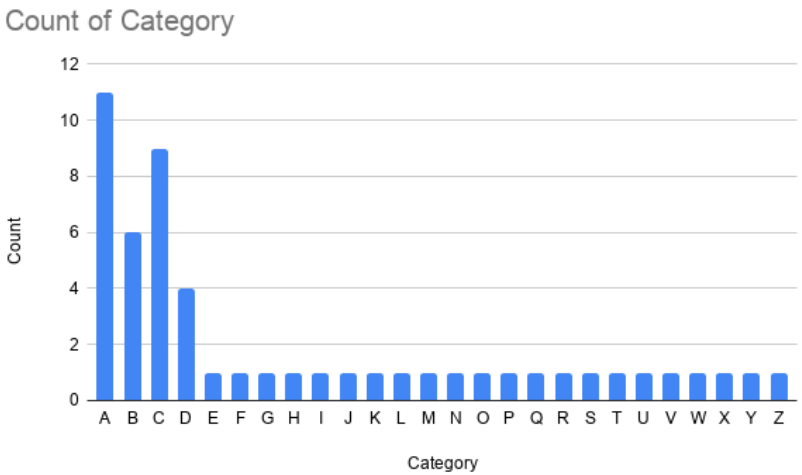




Many categories



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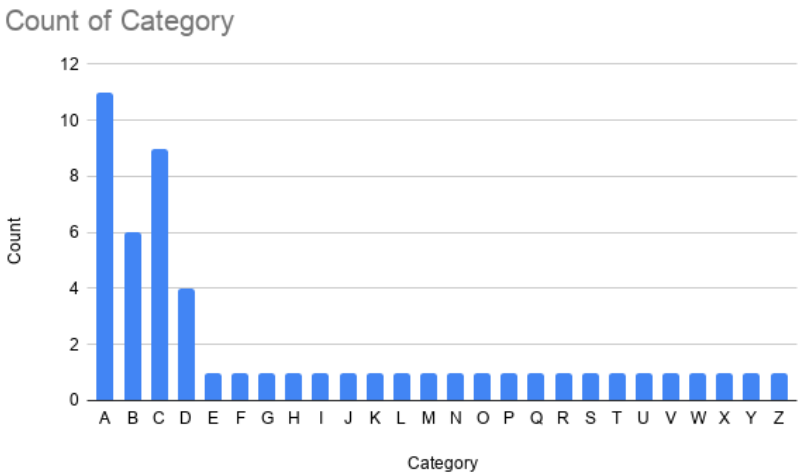

A bar chart or pie chart with too many categories might conceal the more important categories. In some case, grouping other categories together might be done.

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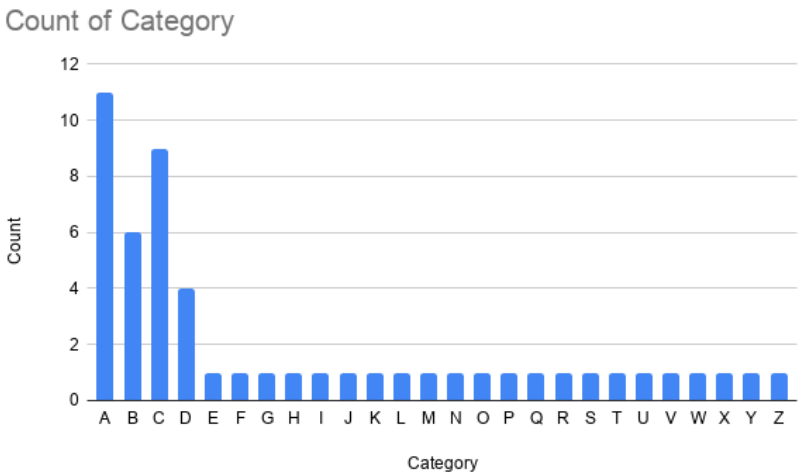

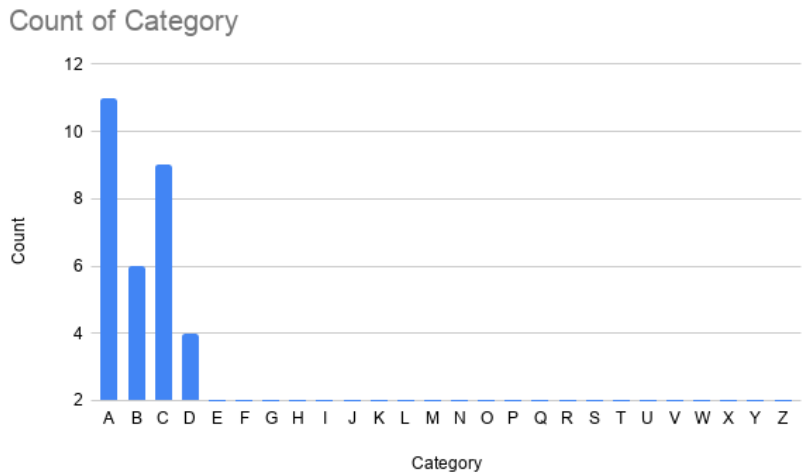

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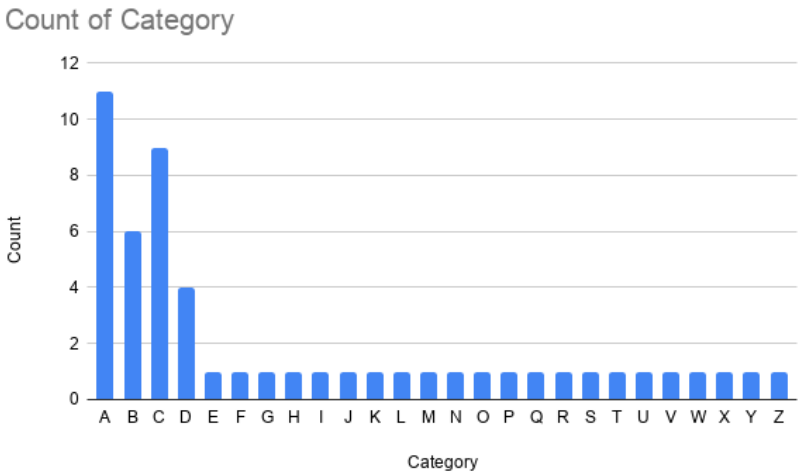

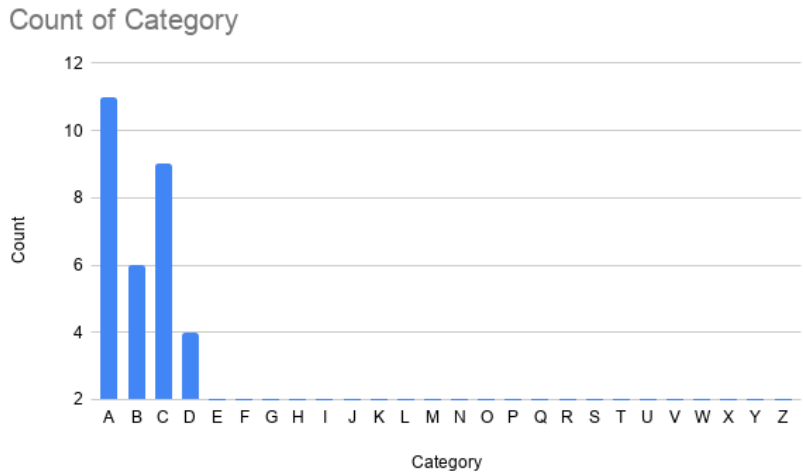

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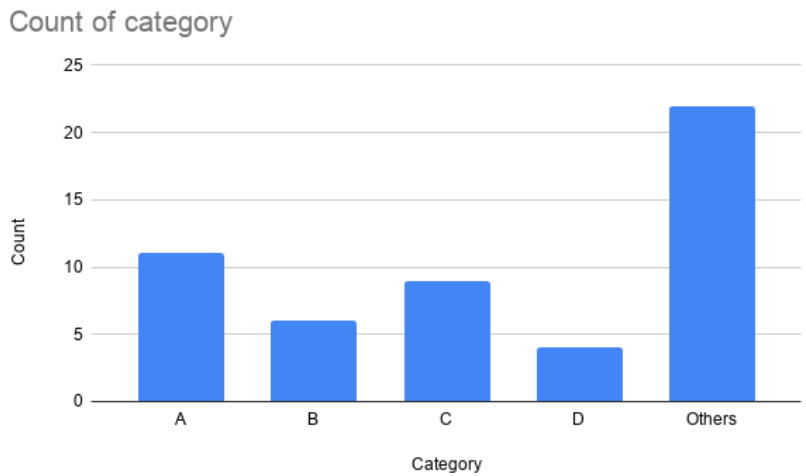

The area principle

- Displays of data must obey a fundamental rule called the area principle[1].

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- The area principle says that the area occupied by a part of the graph should correspond to the amount of data it represents.
- Violations of the area principle are a common way to mislead with statistics.

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Misleading graphs: violating area principle

- Decorated graphics: Charts decorated to attract attention often violate the area principle[2]

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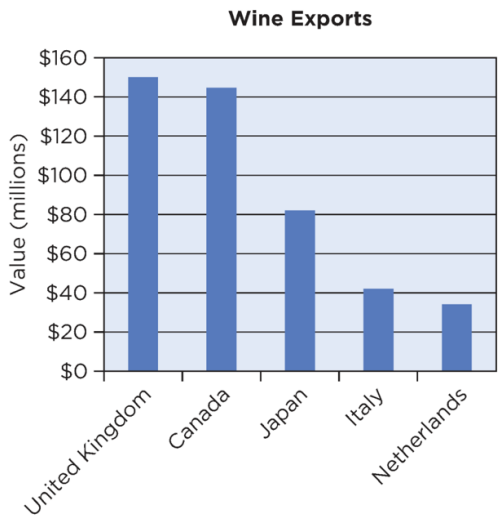

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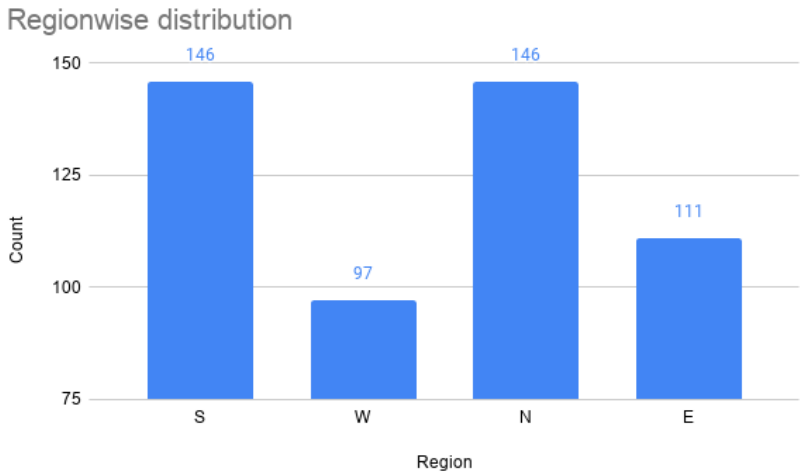

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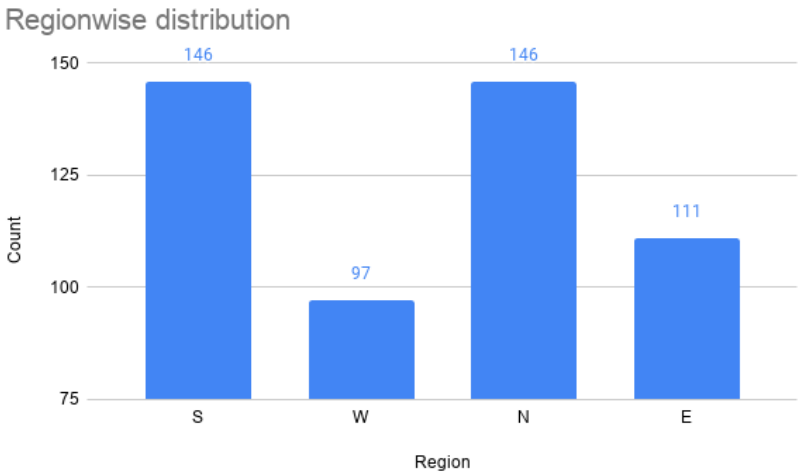

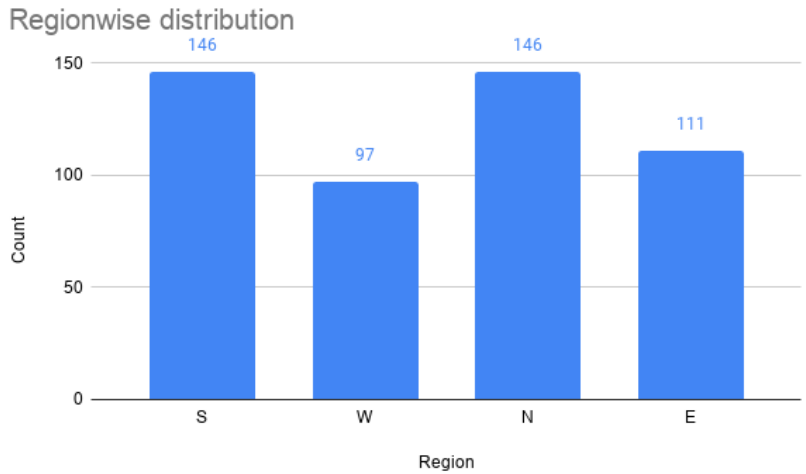

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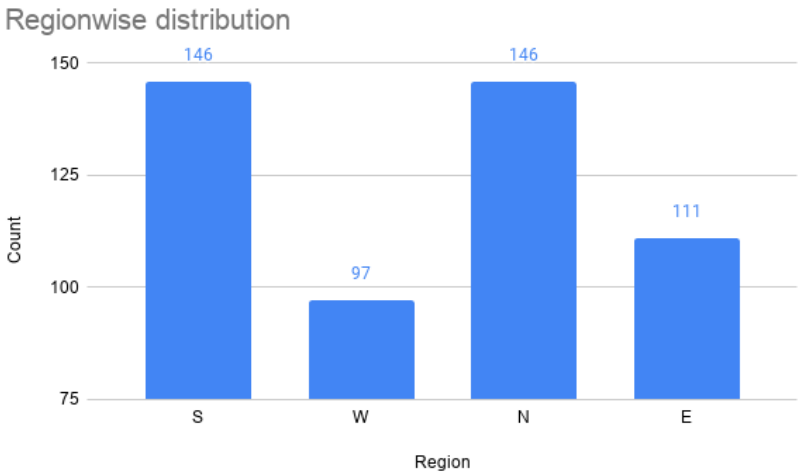

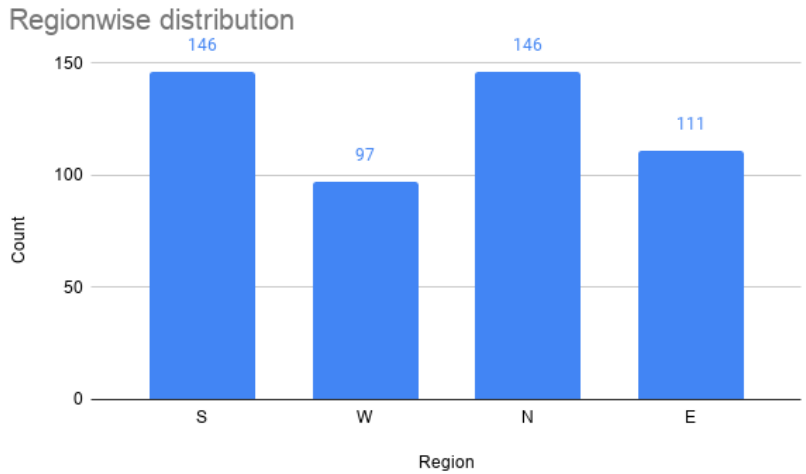

Left graph exaggerates the number coming from the South and North. Graph on right shows same data with the baseline at zero.

Indicating a y- axis break

Round-off errors

- Important to check for round-off errors.

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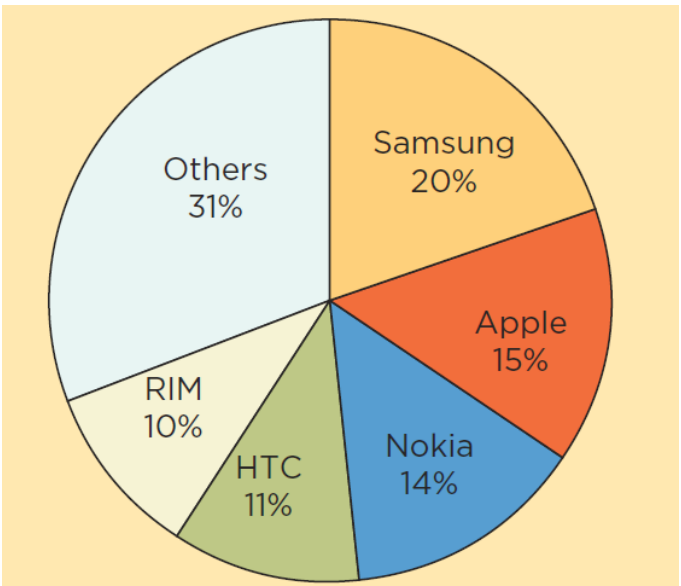
Round-off errors

- Important to check for round-off errors.
- When table entries are percentages or proportions, the total may sum to a value slightly different from 100% or 1. This might result in a pie chart where the total does not add up[3].



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Sectional summary

1. Know your purpose and choose table/graph appropriately
2. Label your charts
3. Handle multiple categories appropriately.
4. Respect area principle
   - 4.1 Avoid overly decorated graphs
   - 4.2 Avoid truncated graphs- use special symbols to indicate vertical axis has been modified.
   - 4.3 Check for round-off errors