

Displaying Distributions - Qualitative Variables

Lecture 12

Sections 4.3.1 - 4.3.2

Robb T. Koether

Hampden-Sydney College

Tue, Sep 16, 2008

Outline

Displaying
Distributions -
Qualitative
Variables

Robb T.
Koether

Homework
Review

Introduction

Pie Charts

Bar Graphs

Assignment

- 1 Homework Review
- 2 Introduction
- 3 Pie Charts
- 4 Bar Graphs
- 5 Assignment

Homework Review

Displaying
Distributions -
Qualitative
Variables

Robb T.
Koether

Homework
Review

Introduction

Pie Charts

Bar Graphs

Assignment

Exercise 4.2, p. 219

Determine whether the following variables are qualitative, quantitative discrete, or quantitative continuous:

- (a) The total number of high-school students graduation in 2005 in the state of Virginia.
- (b) The average combined SAT score of undergraduate applications to Michigan's Department of Mathematics.
- (c) The number of students who apply to universities in the country that are women.
- (d) The average GPA (grade point average) for undergraduate applicants to the Medical School in New York.

Homework Review

Displaying
Distributions -
Qualitative
Variables

Robb T.
Koether

Homework
Review

Introduction

Pie Charts

Bar Graphs

Assignment

Solution

- (a) The total number of high-school students graduation in 2005 in the state of Virginia is quantitative discrete. It must be a whole number.
- (b) The average combined SAT score of undergraduate applications to Michigan's Department of Mathematics is quantitative continuous. Any number within a reasonable range is a possible average.

Homework Review

Displaying
Distributions -
Qualitative
Variables

Robb T.
Koether

Homework
Review

Introduction

Pie Charts

Bar Graphs

Assignment

Solution

- (c) The number of students who apply to universities in the country that are women is discrete. It must be a whole number.
- (d) The average GPA (grade point average) for undergraduate applicants to the Medical School in New York is quantitative continuous. Any number from 0.0 to 4.0 is a possible value for the average.

Introduction

Displaying
Distributions -
Qualitative
Variables

Robb T.
Koether

Homework
Review

Introduction

Pie Charts

Bar Graphs

Assignment

- Often data are most easily understood if they are presented graphically (in a picture).
- How do we present qualitative data in a graph?
- Because the data are qualitative, we should first summarize them as percentages (or proportions or counts).
- Then we may present the percentages in a graph.

Introduction

Displaying
Distributions -
Qualitative
Variables

Robb T.
Koether

Homework
Review

Introduction

Pie Charts

Bar Graphs

Assignment

- Often data are most easily understood if they are presented graphically (in a picture).
- How do we present qualitative data in a graph?
- Because the data are qualitative, we should first summarize them as percentages (or proportions or counts).
- Then we may present the percentages in a graph.

Introduction

Displaying
Distributions -
Qualitative
Variables

Robb T.
Koether

Homework
Review

Introduction

Pie Charts

Bar Graphs

Assignment

- Often data are most easily understood if they are presented graphically (in a picture).
- How do we present qualitative data in a graph?
- Because the data are qualitative, we should first summarize them as percentages (or proportions or counts).
- Then we may present the percentages in a graph.

Introduction

Displaying
Distributions -
Qualitative
Variables

Robb T.
Koether

Homework
Review

Introduction

Pie Charts

Bar Graphs

Assignment

- Often data are most easily understood if they are presented graphically (in a picture).
- How do we present qualitative data in a graph?
- Because the data are qualitative, we should first summarize them as percentages (or proportions or counts).
- Then we may present the percentages in a graph.

Pie Charts

Displaying
Distributions -
Qualitative
Variables

Robb T.
Koether

Homework
Review

Introduction

Pie Charts

Bar Graphs

Assignment

Definition (Pie chart)

A **pie chart** is a display of qualitative data in which each category is represented by a slice of a pie. The size of each pie slice is proportional to the number of observations in that category.

- Use the percentage associated with the category to compute the central angle of the pie slice.
- For example, 25% of $360^\circ = 90^\circ$.
- A pie chart facilitates the comparison of one category to the whole.

Example

- How was the weather in Farmville in January 2008?
- According to the National Weather Service:

Weather Conditions	No. of Days
Clear	12
Scattered Clouds	6
Partly Cloudy	1
Fog	1
Rain	8
Snow	3

- Use Excel to draw a pie chart of the data.

Example

Displaying
Distributions -
Qualitative
Variables

Robb T.
Koether

Homework
Review

Introduction

Pie Charts

Bar Graphs

Assignment

- How was the weather in Farmville in July 2008?
- According to the National Weather Service:

Weather Conditions	No. of Days
Clear	10
Scattered Clouds	9
Partly Cloudy	0
Fog	2
Rain	10
Snow	0

- Use Excel to draw a pie chart of the data.

Example

Displaying
Distributions -
Qualitative
Variables

Robb T.
Koether

Homework
Review

Introduction

Pie Charts

Bar Graphs

Assignment

- How did the Farmville weather in January compare to the Farmville weather in July?
- It is not a good idea to try to compare the two pie charts.
- Instead, a bar graph should be used.

Bar Graphs

Displaying
Distributions -
Qualitative
Variables

Robb T.
Koether

Homework
Review

Introduction

Pie Charts

Bar Graphs

Assignment

Definition (Bar graph)

A **bar graph** is a display of qualitative data in which each category is represented by a rectangle. The height of the rectangle is proportional to the number of observations in that category.

- The horizontal scale shows the categories.
- The vertical scale shows the counts or percentages.
- The horizontal/vertical orientation may be reversed.
- A bar graph facilitates the comparison of one category to another.

Example

Displaying
Distributions -
Qualitative
Variables

Robb T.
Koether

Homework
Review

Introduction

Pie Charts

Bar Graphs

Assignment

- How was the weather in Farmville in January 2008?

Weather Conditions	No. of Days
Clear	12
Scattered Clouds	6
Partly Cloudy	1
Fog	1
Rain	8
Snow	3

- Use Excel to draw a bar graph of the data.

Example

- Now use a bar graph to compare the January weather to the July weather.

Weather Conditions	Jan	Jul
Clear	12	10
Scattered Clouds	6	9
Partly Cloudy	1	0
Fog	1	2
Rain	8	10
Snow	3	0

- Use Excel to draw a bar graph of the data.

Assignment

Displaying
Distributions -
Qualitative
Variables

Robb T.
Koether

Homework
Review

Introduction

Pie Charts

Bar Graphs

Assignment

Homework

- Read Section 4.3.1 - 4.3.2, pages 220 - 225.
- Let's Do It! 4.3, 4.4, 4.5.
- Page 226, exercises 6 - 10.