

## 1.3 Frequency, Frequency Tables, and Levels of Measurement

### Learning Objective:

In this section, you will:

- Use rounding rules to round final answers.
- Determine the levels of measurement for data.
- Use frequency tables to organize and analyze data.

### Answers and Rounding Off

- Carry your final answer one more decimal place than was present in the original data.
- Round off only the final answer. Do not round off any intermediate results, if possible.

### Levels of Measurement

Data can be classified into four levels of measurement.

- **Nominal scale level:** Categories, colors, names, labels, yes or no responses. Nominal scale data are not ordered.
- **Ordinal scale level:** Data can be ordered, but differences are meaningless.
- **Interval scale level:** Data can be ordered, but differences are meaningful. Data does not have a starting point.
- **Ratio scale level:** Ratio scale data is like interval scale data, but it has a 0 point and ratios can be calculated.

### Frequency Tables

- A **frequency** is the number of times a value of the data occurs.
- A **relative frequency** is the ratio (fraction or proportion) of the number of times a value of the data occurs in the set of all outcomes to the total number of outcomes.

o To find the relative frequencies, divide each frequency by the total number of students in the sample.

- **Cumulative relative frequency** is the accumulation of the previous relative frequencies.

o To find the cumulative relative frequencies, add all the previous relative frequencies to the relative frequency for the current row

### Example 1:

Complete the frequency table with the following information. Twenty students are asked how many hours they worked per day. Their responses, in hours, are as follows: 5, 6, 3, 3, 2, 4, 7, 5, 2, 3, 5, 6, 5, 4, 4, 3, 5, 2, 5, 3.

Hours Worked per Day	Frequency	Relative Frequency	Cumulative Relative Frequency

- What percent of students work exactly 4 hours?
- What percent of students that work less than 3 hours?

- What is the percent of students that work from 4 to 6 hours?
- Find the number of students that work from 3 to 5 hours?
- What fraction of the students work from 6 to 7 hours?
- What is the frequency of students that work from 3 to 6 hours?
- What is the relative frequency of students that work 3 or less?
- What is the cumulative relative frequency for 4? Explain what this number tells you about the data.

For more information and examples see online textbook OpenStax Introductory Statistics pages 26-35.

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