Homework #1

1.14 Employee application data. The personnel department keeps records on all employees in a company. Here is the information that they keep in one of their data files: employee identification number, last name, first name, middle initial, department, number of years with the company, salary, education (coded as high school, some college, or college degree), and age.

(a) What are the cases for this data set?

(b) Describe each of these items as label, a quantitative variable, or a categorical variable.

1.16 Survey of students. A survey of students in an introductory statistics class asked the following questions: (a) age; (b) do you like to dance? (yes, no); (c) can you play a musical instrument (not at all, a little, pretty well); (d) how much did you spend on food last week? (e) height; (f) do you like broccoli? (yes, no). Classify each of these variables as categorical or quantitative and give reasons for your answers.

1.22 Mobile browsing and iPhones. Users of iPhones were asked to respond to the statement, "I do a lot more browsing on the iPhone than I did on my previous mobile phone" and responded as follows:[9] BROWSING

Response	Percent (%)
Strongly agree	54
Mildly agree	22
Mildly disagree	16
Strongly disagree	8

(a) Make a bar graph to display the distribution of the responses.

(b) Display the distribution with a pie chart.

(c) Summarize the information in these charts.

(d) Do you prefer the bar chart or the pie chart? Give a reason for your answer.

1.23 What did the iPhone replace? The survey in the previous exercise also asked iPhone users what phone, if any, did the iPhone replace. Here are the responses:

Response	Percent (%)	Response	Percent (%)
Motorola Razr	23.8	BlackBerry	13.0
Symbian	3.9	Windows Mobile	13.9
Sidekick	4.1	Replaced nothing	10.0
Palm	6.7	Other phone	24.5

Make a bar graph for these data. Carefully consider how you will order the responses. Explain why you made the ordering that you chose. PHONEREPLACE

1.27 Spam. Email spam is the curse of the Internet. Here is a compilation of the most common types of spam:[12]

Type of spam	Percent (%)
Adult	14.5
Financial	16.2
Health	7.3
Leisure	7.8
Products	21.0
Scams	14.2

Make two bar graphs of these percents, one with bars ordered as in the table (alphabetical) and the other with bars in order from tallest to shortest. Comparisons are easier if you order the bars by height. A bar graph ordered from tallest to shortest bar is sometimes called a **Pareto chart,** after the Italian economist who recommended this procedure.

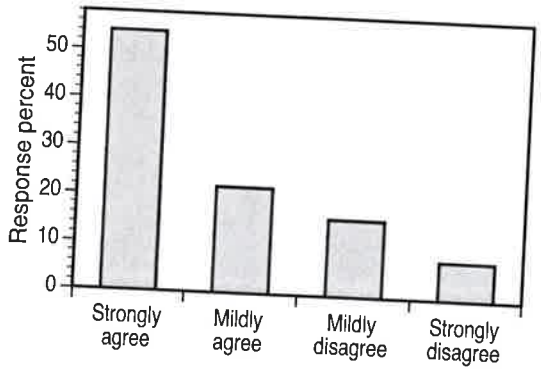
Solutions

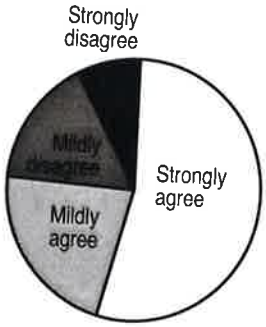
1.14. **(a)** The cases are the individual employees. **(b)** The first four (employee identification number, last name, first name, and middle initial) are labels. Department and education level are categorical variables; number of years with the company, salary, and age are quantitative variables.

1.16. Recall that categorical variables place individuals into groups or categories, while quantitative variables "take numerical values for which arithmetic operations... make sense."

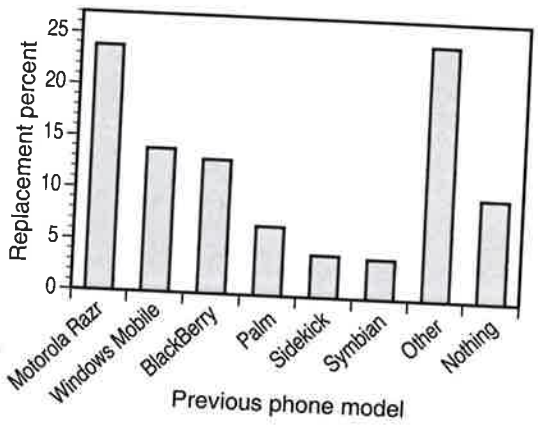
Variables (a), (d), and (e)—age, amount spent on food, and height—are quantitative. The answers to the other three questions—about dancing, musical instruments, and broccoli—are categorical variables.

1.22. **(a)** & **(b)** The bar graph and pie charts are shown below. **(c)** A clear majority (76%) agree or strongly agree that they browse more with the iPhone than with their previous phone. **(d)** Student preferences will vary. Some might prefer the pie chart because it is more familiar.





1.23. Ordering bars by decreasing height shows the models most affected by iPhone sales. However, because "other phone" and "replaced nothing" are different than the other categories, it makes sense to place those two bars last (in any order).



1.27. The two bar graphs are shown below.