

5. same as #3
7. There will be 8 columns, with 1 title row followed by 36 rows of data.
9. There will be 6 columns, with 1 title row followed by 30 rows of data.
11. Clicking on the **help** cue on the top line activates an interactive help icon that asks for a question. Typing the word **save** leads to a series of prompting questions to click on. The path indicating a desire to **save a workbook** and then save a **copy of a workbook using a different name or in a different location** leads to the desired information -- viz., click on the **file** cue on the top line, then click on the **save as** option and follow the directions.

### Review Exercises

1.
  - a. Discrete, since the number of shares held must be an integer.  
NOTE: Even if partial shares are allowed (e.g.,  $5\frac{1}{2}$  shares), the number of shares must be some fractional value and not any value on a continuum -- e.g., a person could not own  $\pi$  shares.
  - b. Ratio, since differences between values are consistent and there is a natural zero.
  - c. Stratified, since the set of interest (all stockholders) was divided into subpopulations (by states) from which the actual sampling was done.
  - d. Statistic, since the value is determined from a sample and not the entire population.
  - e. There is no unique correct answer, but the following are reasonable possibilities.  
(1) The proportion of stockholders holding above that certain number of shares (which would vary from company to company) that would make them "influential." (2) The proportion of stockholders holding below that certain number of shares (which would vary from company to company) that would make them "insignificant." (3) The numbers of shares (and hence the degree of influence) held by the largest stockholders.
  - f. There are several possible valid answers. (1) The results would be from a self-selected group (i.e., those who chose to respond) and not necessarily a representative group. (2) If the questionnaire did not include information on the numbers of shares owned, the views of small stockholders (who are probably less knowledgeable about business and stocks) could not be distinguished from those of large stockholders (whose views should carry more weight).
2.
  - a. Systematic, since the selections are made at regular intervals.
  - b. Convenience, since those selected were the ones who happened to attend.
  - c. Cluster, since the stockholders were organized into groups (by stockbroker) and all the stockholders in the selected groups were chosen.
  - d. Random, since each stockholder has the same chance of being selected.
  - e. Stratified, since the stockholders were divided into subpopulations from which the actual sampling was done.
3. Let  $N$  be the total number of full-time students and  $n$  be the desired sample size.
  - a. Random. Obtain a list of all  $N$  full-time students, number the students from 1 to  $N$ , select  $n$  random numbers from 1 to  $N$ , and poll each student whose number on the list is one of the random numbers selected.
  - b. Systematic. Obtain a list of all  $N$  full-time students, number the students from 1 to  $N$ ,

## 6 Chapter 1

let  $m$  be the largest integer less than the fraction  $N/n$ , select a random number between 1 and  $m$ , begin with the student whose number is the random number selected, and poll that student and every  $m$ th student thereafter.

- c. Convenience. Select a location (e.g., the intersection of major campus walkways) by which most of the students usually pass, and poll the first  $n$  full-time students that pass by.
  - d. Stratified. Obtain a list of all  $N$  full-time students and the gender of each, divide the list by gender, and randomly select and poll  $n/2$  students from each gender.
  - e. Cluster. Obtain a list of all the classes meeting at a popular time (e.g., 10 am Monday), estimate how many of the classes would be necessary to include  $n$  students, select that many of the classes at random, and poll all of the students in each selected class.
- 4.
- a. Blinding occurs when those involved in an experiment (either as subjects or evaluators) do not know whether they are dealing with a treatment or a placebo. It might be used in this experiment by (a) not telling the subjects whether they are receiving Sleepeze or the placebo and/or (b) not telling any post-experiment interviewers or evaluators which subjects received Sleepeze and which ones received the placebo. Double-blinding occurs when neither the subjects nor the evaluators know whether they are dealing with a treatment or a placebo.
  - b. The data reported will probably involve subjective assessments (e.g., "On a scale of 1 to 10, how well did it work?") that may be subconsciously influenced by whether the subject was known to have received Sleepeze or the placebo.
  - c. In a completely randomized block design, subjects are assigned to the groups (in this case to receive Sleepeze or the placebo) at random.
  - d. In a rigorously controlled block design, subjects are assigned to the groups (in this case to receive Sleepeze or the placebo) in such a way that the groups are similar with respect to extraneous variables that might affect the outcome. In this experiment it may be important to make certain each group has approximately the same age distribution, degree of insomnia, number of males, number users of alcohol and/or tobacco, etc.
  - e. Replication involves repeating the experiment on a sample of subjects large enough to ensure that atypical responses of a few subjects will not give a distorted view of the true situation.
5. The sample is essentially a convenience sample that might not be representative of the student body. In particular, students likely to drop out may exhibit certain common characteristics (e.g., sleeping in and/or cutting classes) that would make them under-represented in the sample because they would be less likely to pass by the polling location.
- 6.
- a. Ratio, since differences are meaningful and zero milligrams of tar has a natural meaning.
  - b. Ordinal, since the ratings give relative position in a hierarchy.
  - c. Nominal, since the classifications only identify categories and not relative positions on a scale.
  - d. Ordinal, since the scores give relative position in a hierarchy but differences are not meaningful -- i.e., the difference in intelligence between IQ's of 40 and 50 is not the same as the difference in intelligence between IQ's of 100 and 110.
  - e. Ratio, since differences are meaningful and zero points scored has a natural meaning.

## Cumulative Review Exercises

NOTE: Throughout the text intermediate mathematical steps will often be shown in Excel format as an aide to those who may be having difficulty with the calculations.

1.  $\frac{1.23 + 4.56 + 7.89}{5} = (1.23+4.56+7.89)/3 = 4.56$
2.  $\sqrt{\frac{(5-7)^2 + (12-7)^2 + (4-7)^2}{3-1}} = \text{SQRT}(((5-7)^2+(12-7)^2+(4-7)^2)/(3-1))$   
 $= 4.358898944$
3.  $\frac{1.96^2 \cdot (0.4)(0.6)}{0.025^2} = (1.96^2 \cdot .4 \cdot .6) / .025^2 = 1475.1744$
4.  $\frac{98.20 - 98.60}{0.62/\sqrt{106}} = (98.20-98.60)/(.62/\text{SQRT}(106)) = -6.642342026$
5.  $\frac{25!}{16!9!} = \text{FACT}(25)/(\text{FACT}(16)*\text{FACT}(9)) = 2042975$
6.  $\sqrt{\frac{10(513.27) - 71.5^2}{10(10-1)}} = \text{SQRT}((10*513.27-71.5^2)/(10*(10-1))) = .476678322$
7.  $\frac{8(151,879) - (516.5)(2176)}{\sqrt{8(34,525.75) - 516.5^2} \cdot \sqrt{8(728,520) - 2176^2}}$   
 $= (8*151879-516.5*2176)/(\text{SQRT}(8*34525.75-516.5^2)*\text{SQRT}(8*728520-2176^2))$   
 $= .89735239$
8.  $\frac{(183 - 137.09)^2}{137.09} + \frac{(30 - 41.68)^2}{41.68} = (183-137.09)^2/137.09+(30-41.68)^2/41.68$   
 $= 18.64787$
9.  $0.95^{500} = 7.27449\text{E-}12 = .00000000000727449$ ; moving the decimal point left 12 places
10.  $25^8 = 1.52588\text{E+}11 = 152,588,000,000$ ; moving the decimal point right 11 places
11.  $52^8 = 5.34597\text{E+}13 = 53,459,700,000,000$ ; moving the decimal point right 13 places
12.  $.25^{10} = 9.53764\text{E-}07 = .000000953674$ ; moving the decimal point left 7 places