Name:_____   Date:_____

Period:_____   Probability & Statistics

Chapter 2 Homework

1) Marcie conducted a study of the cost of breakfast cereal. She recorded the costs of several boxes of cereal. However, she neglected to take into account the number of servings in each box. Someone told her not to worry because she just had some sampling error. Comment on that advice.

2) Consider the students in your statistics class as the population and suppose they are seated in four rows of 10 students each. To select a sample, you toss a coin. If it comes up heads, you use the 20 students sitting in the first two rows as your sample. If it comes up tails, you use the 20 students sitting in the last two rows as your sample.
(a) Does every student have an equal chance of being selected for the sample? Explain.

(b) Is it possible to include students sitting in row 3 with students sitting in row 2 in your sample? Is your sample a simple random sample? Explain.

(c) Describe a process you could use to get a simple random sample of size 20 from a class of size 40.

3) Suppose you are assigned the number 1, and the other students in your statistics class call out consecutive numbers until each person in the class has his or her own number. Explain how you could get a random sample of four students from your statistics class.
(a) Explain why the first four students walking into the classroom would not necessarily form a random sample.

(b) Explain why four students coming in late would not necessarily form a random sample.

(c) Explain why four students sitting in the back row would not necessarily form a random sample.

(d) Explain why the four tallest students would not necessarily form a random sample.

4) Use a random-number table or your calculator to generate a list of eight random numbers from 1 to 976. Explain your work.

5) Use a random-number table or your calculator to simulate the outcomes of tossing a quarter 25 times. Assume that the quarter is balanced (i.e., fair).

6) An important part of employee compensation is a benefits package, which might include health insurance, life insurance, child care, vacation days, retirement plan, parental leave, bonuses, etc. Suppose you want to conduct a survey of benefits packages available in private businesses in Hawaii. You want a sample size of 100. Some sampling techniques are described below. Categorize each technique as *simple random sample, stratified sample, systematic sample, cluster sample,* or *convenience sample.*

(a) Assign each business in the Island Business Directory a number, and then use a random-number table or your calculator to select the businesses to be included in the sample.

(b) Use postal ZIP Codes to divide the state into regions. Pick a random sample of 10 ZIP Code areas and then include all the businesses in each selected ZIP Code area.

(c) Send a team of five research assistants to Bishop Street in downtown Honolulu. Let each assistant select a block or building and interview an employee from each business found. Each researcher can have the rest of the day off after getting responses from 20 different businesses.

(d) Use the Island Business Directory. Number all the businesses. Select a starting place at random, and then use every 50th business listed until you have 100 businesses.

(e) Group the businesses according to type: medical, shipping, retail, manufacturing, financial, construction, restaurant, hotel, tourism, other. Then select a random sample of 10 businesses from each business type.

7) A personnel office is gathering data regarding working conditions. Employees are given a list of five conditions that they might want to see improved. They are asked to select the one item that is most critical to them. Which type of graph, circle graph or Pareto chart would be most useful for displaying the results of the survey? Why?

8) It is costly in both time and money to go to college. Does it pay off? According to the Bureau of Census, the answer is yes. The average annual income (in thousands of dollars) of a *household* headed by a person with the stated education level is as follows: 16.1 if ninth grade is the highest level achieved, 34.3 for high school graduates, 48.6 for those holding associate degrees, 62.1 for those with bachelor's degrees, 71.0 for those with master's degrees, and 84.1 for those with doctoral degrees. Make a bar graph showing household income for each education level.

9) It's not an easy life, but it's a good life! Suppose you decide to take the summer off and sign on as a deck hand for a commercial fishing boat in Alaska that specializes in deep-water fishing for groundfish. What kind of fish can you expect to catch? One way to answer this question is to examine government reports on groundfish caught in the Gulf of Alaska. The following list indicates the types of fish caught annually in thousands of metric tons (Source: *Report on the Status of U.S. Living Marine Resources,* National Oceanic and Atmospheric Administration): flatfish, 36.3; Pacific cod, 68.6; sablefish, 16.0; Walleye pollock, 71.2; rockfish, 18.9. Make a Pareto chart showing the annual harvest for commercial fishing in the Gulf of Alaska.

10) A survey of 1000 adults (reported in *USA Today*) uncovered some interesting housekeeping secrets. When unexpected company comes, where do we hide the mess? The survey showed that 68% of the respondents toss their mess in the closet, 23% shove things under the bed, 6% put things in the bathtub, and 3% put the mess in the freezer. Make a circle graph to display this information.

11) Pyramid Lake, Nevada, is described as the pride of the Paiute Indian Nation. It is a beautiful desert lake famous for very large trout. The elevation of the lake surface (feet above sea level) varies according to the annual flow of the Truckee River from Lake Tahoe. The U.S. Geological Survey provided the following data:

Year	Elevation	Year	Elevation	Year	Elevation
1986	3817	1992	3798	1998	3811
1987	3815	1993	3797	1999	3816
1988	3810	1994	3795	2000	3817
1989	3812	1995	3797		
1990	3808	1996	3802		
1991	3803	1997	3807		

Make a time-series graph displaying the data.

12) How long does it take to finish the 1161-mile Iditarod Dog Sled Race from Anchorage to Nome, Alaska (*see* Viewpoint)? Finish times (to the nearest hour) for 57 dogsled teams are shown below.

261	271	236	244	279	296	284	299	288	288	247	256
338	360	341	333	261	266	287	296	313	311	307	307
299	303	277	283	304	305	288	290	288	289	297	299
332	330	309	328	307	328	285	291	295	298	306	315
310	318	318	320	333	321	323	324	327			

Use five classes.

(a) Find the class width.

(b) Make a cumulative frequency table showing class limits, class boundaries, midpoints, frequencies, relative frequencies, and cumulative frequencies.

(c) Draw an ogive.

The U.S. Open Golf Tournament was played at Congressional

13) Country Club, Bethesda, Maryland, with prizes ranging from $465,000 for first place to $5000. Par for the course is 70. The tournament consists of four rounds played on different days. The scores for each round of the 32 players who placed in the money (more than $17,000) were given on a web site.

The scores for the first round were as follows:

71	65	67	73	74	73	71	71	74	73	71
70	75	71	72	71	75	75	71	71	74	75
66	75	75	75	71	72	72	73	71	67	

The scores for the fourth round for these players were as follows:

69	69	73	74	72	72	70	71	71	70	72
73	73	72	71	71	71	69	70	71	72	73
74	72	71	68	69	70	69	71	73	74	

(a) Make a back-to-back stem-and-leaf display for the first-round scores.

(b) Compare the two distributions. How do the highest scores compare? How do the lowest scores compare?