Chapter 3: Graphical Methods for Describing Data

Name _____

1. One interesting aspect of surveys is that the order of the questions can affect the results. This is thought to occur because one question can alter the response to a subsequent question. In 1948 many people in the United States were concerned about the spread of communism as a political and economic philosophy. A survey given that year contained both of the following two questions:

    1. Do you think the United States should let Communist newspaper reporters from other countries come in here and send back to their papers the news as they see it?

    2. Do you think a Communist country like Russia should let American newspaper reporters come in and send back to American the news as they see it?

    The table below contains the percentages of the Yes/No answers given by respondents when asked these two questions in different orders.

Responses to reporter question in 1948

Question order	% Yes	% No
Question #1 asked first	37	63
Question #1 asked second	73	27

(a) Construct a comparative bar chart for these response percentages,

(b) Interpret the results of the 1948 survey. Do you think the order of the questions made a difference in the responses? Explain.

2. In a survey of 300 working adults who earn less than $6000 per year, investigators asked about job satisfaction and income. The responses are summarized in the following table:

Job Satisfaction of <$6,000 annual income

Very Dissatisfied	Little Dissatisfied	Moderately Satisfied	Very Satisfied
60	75	150	15

Construct and sketch a pie chart for these data.

3. A "lek" is a site where many members of one gender of a species locate themselves to be found by members of the other gender for purposes of reproduction. In the article, "Why insects swarm: testing the models for lek mating systems on swarming *Empis borealis* females," the authors report 22 "swarm sites" in Sweden. The sizes of the swarms (in cubic meters) are listed below:

```
45, 10, 25, 11, 17,  3,  9, 16, 3, 22, 17, 15, 31, 23,
 40, 36, 11,  5, 11,  3,  4,  1
```

(a) Construct a stem and leaf plot of swarm size.

(b) In a few sentences, describe the distribution of the data.

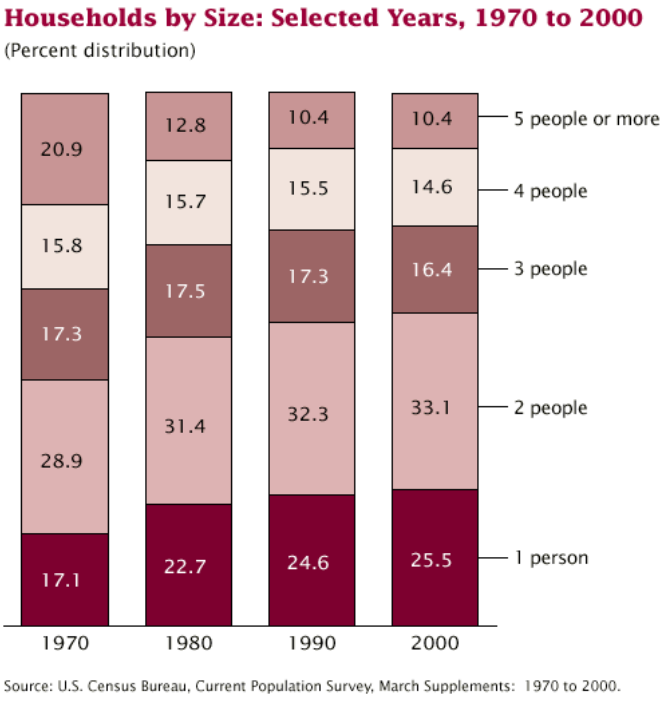
4. In the article, "Reducing complex diets to simple rules: food selection by olive baboons," the authors compare the percent of protein in 7 plants eaten by Kenyan baboons and in 7 plants that were ignored (not eaten) by the baboons. They think that these animals choose plants high in protein rather than randomly select plants to eat. The percent protein for the preferred and ignored plants is listed below.

Preferred	21.0	12.9	49.2	47.0	39.9	24.3	22.2
Ignored	13.8	12.5	18.6	11.8	10.8	17.5	12.8

a) Construct a comparative (back to back) stem & leaf plot for protein content for the two groups of plants.

(b) Do the data support the researchers, views about food choice by the baboons? What specific aspects of the plot in part (a) support your answer?

5. As part of the United States Census, data is also collected on the number of persons in each household. The census data for four decades is summarized below.

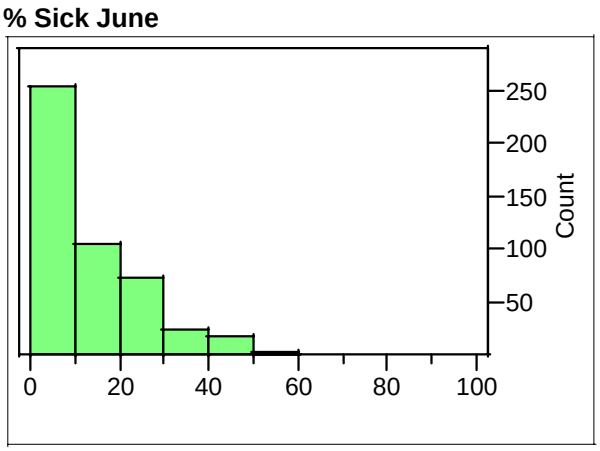


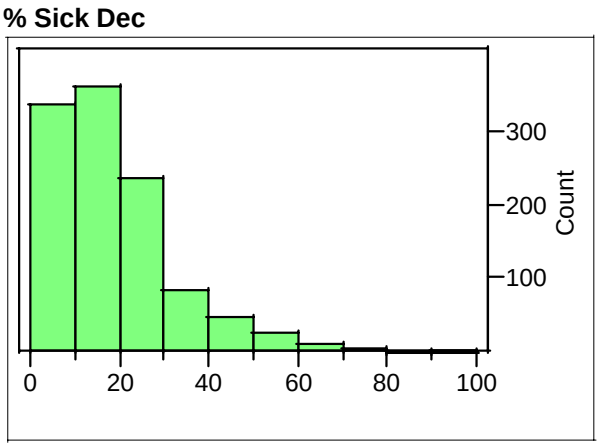
(a) In a few sentences describe how the proportion of households with 5 people or more has changed from 1970 to 2000.

(b) What size of household appears to have increased the most from 1970 to 2000?

6. In the second half of 1861 the American Civil War was just beginning. The several Confederate States recruited soldiers and sent many of them to Virginia for training. The soldiers traveled in groups called "companies" and camped together when they arrived in Virginia. In their new surroundings the men were exposed to stress, strain, and disease, and as a result would be reported as "sick" on the bi-monthly company report. The histograms below display the numbers of companies with different percentages of men reported sick in June and in December. For example, about 250 companies reported between 0% and 10% sick at the end of June.

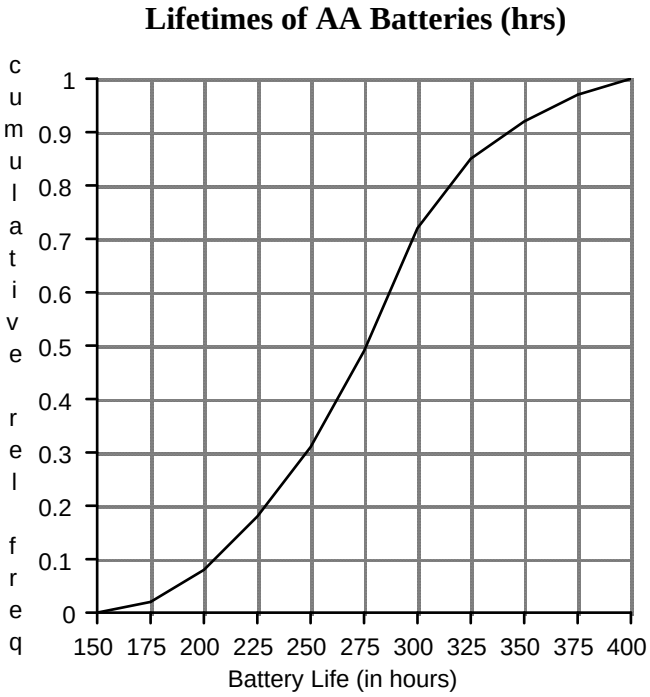
(a) Describe the differences in the distributions of percentages of men reported sick at the end of June and at the end of December.





(b) Some historians believe that as more companies were sent into Virginia later in 1861, more soldiers would become sick due to the crowded and unsanitary conditions. Considering both the shapes of the distributions and the vertical scales, does it appear that a higher proportion of companies reported more sickness in their ranks?

7. The following cumulative relative frequency graph (ogive) displays the distribution of the lifetime (in hours) of a AA battery.



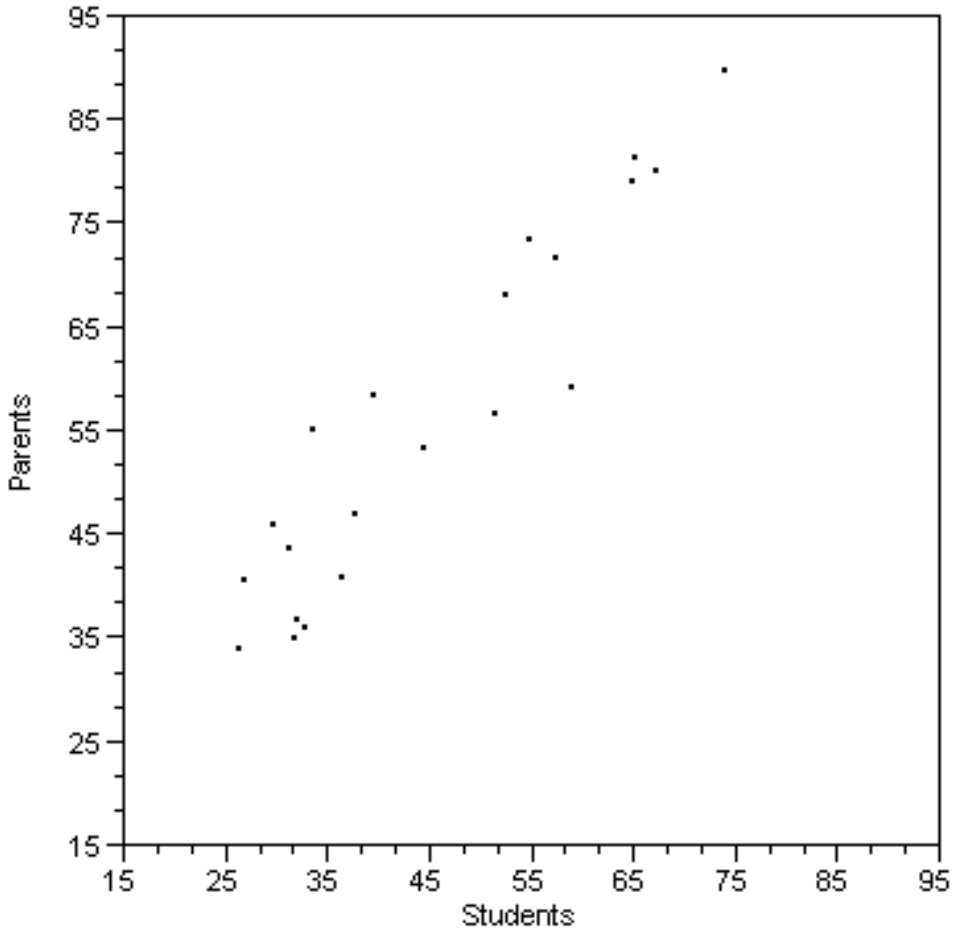
(a) Approximately what percent of the batteries will last fewer than 250 hours?

(b) Approximately what proportion of batteries will last 300 hours or more?

(c) 50% of batteries will have lifetimes below what approximate value?

8. Investigators writing in the Journal of Early Adolescence were interested in the communication about sex and related topics between parents and 12-14 year olds. The investigators asked students and parents whether or not they had communicated with their child/parent about topics such as pregnancy, how to say "no," and methods of contraception. A scatter plot of their data is presented below. Each point represents one topic listed by the investigators. For example, 72.4% of parents and 57.6% of adolescents said the parents had discussed childbirth. This would be recorded as the point (57.6, 72.4).

Parents vs. Adolescents reporting of Discussion:
Sex Education Topics (% Yes)



(a) On the graph above, sketch the line $y = x$, representing a line of "perfect agreement" between the parents and adolescents.

(b) What explanation do you have for the placement of the points in the scatter plot relative to the line you sketched in part (a)?