Data Displays   NAME:

This worksheet provides practice and some instruction for pie charts, bar graphs, line graphs, histograms, stem-and-leaf plots, and data tables.

1. **Pie charts** are used to display information that shows the parts of the whole. Draw a pie chart for the following data. Try your best to make the pieces correctly proportional to the whole. Label it clearly as though you were introducing the data to me. Provide a title as well. (The cross-hairs on the circle below are there merely as guides to help draw the appropriate angles.)

| Region of USA	East	West	South	North	Midwest
Percentage of Gross National Product	20	25	15	15	25
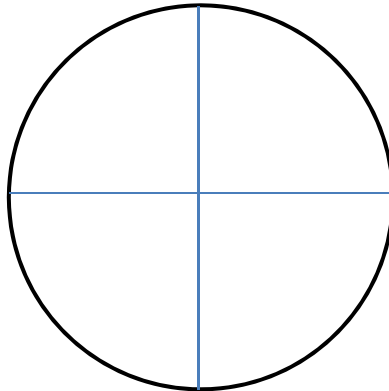
2. Create a **bar graph** for the above data. Label the axes clearly as though you are introducing the data to me. Provide a title as well.

3a. **Line graphs** are used to show data over time. Draw a line graph on the provided graph paper using the following information. Be sure to label your axes and title your graph.

Year	1960	1970	1980	1990
Divorced women per 1000 married women	45	51	100	148
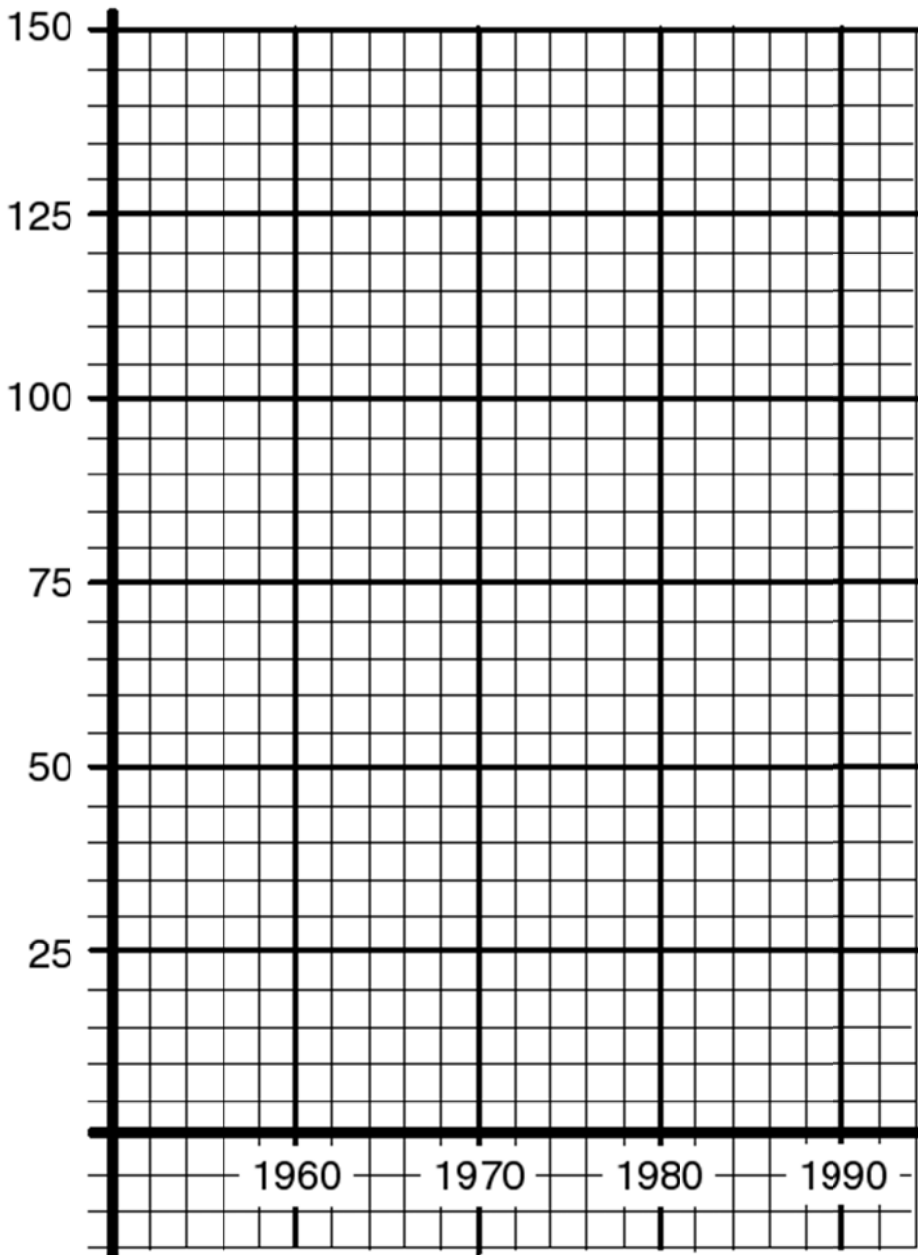
3b. Now plot these same points on the graph paper below.
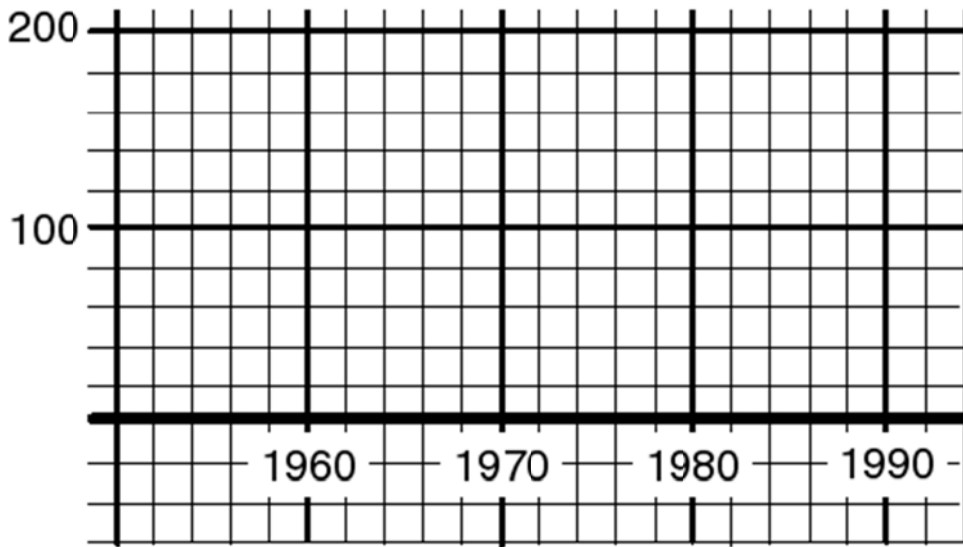
Notice the scale here is dramatically different than that of the first graph. What effect does this have on the appearance of the graphs? If you were going to argue that the divorce rate was soaring out of control, which graph would you likely use? Why?

3

4a. A **histogram** is a specific kind of bar graph that describes the distribution of a variable. The distribution of a variable tells us what values the variable takes and how often it takes these values.

We will use the data below to make a histogram. Notice this is a sample of US states detailing the percentage of each state that is 65 or over. (source: *Statistical Abstract of US*, 1995)

State	Percent of population 65 years old and over
Alabama	12.9
Alaska	4.6
Arizona	13.4
Arkansas	14.8
California	10.6
Colorado	10.1
Connecticut	14.2
Delaware	12.7
Florida	18.4
Georgia	10.1
Hawaii	12.1
Idaho	11.6
Illinois	12.6
Indiana	12.8
Iowa	15.4
Kansas	13.9
Kentucky	12.7

We start by looking at the total range of values. Notice the percentages range from 4.6 to 18.4.

We need to divide this range into classes of equal width. We will make our classes 4.1 – 5.0, 5.1 – 6.0, 6.1 – 7.0, … and 18.1 – 19.0.

The next step is to count how many of our sample is in each class. Use the table on the next page to tally the observations.

Class	Tally
4.1 – 5.0	
5.1 – 6.0	
6.1 – 7.0	
7.1 – 8.0	
8.1 – 9.0	
9.1 – 10.0	
10.1 – 11.0	
11.1 – 12.0	
12.1 – 13.0	
13.1 – 14.0	
14.1 – 15.0	
15.1 – 16.0	
16.1 – 17.0	
17.1 – 18.0	
18.1 – 19.0	

Again, notice how these classes do *not* overlap.

You might want to be sure that you have 17 tally marks.

4b. Next we will draw the histogram. Some histograms use the percentage of the whole that is in each class for the vertical axis. Ours will have the counts (the number of observations in each class) along the vertical axis.

For each class, draw a box that is as wide as the class itself (**so the boxes touch**) and as high as the class' tally. The boxes should be centered on the midpoint of each class.

The first two boxes for the classes 4.1 – 5.0 (with a count of 1) and 10.1 – 11.0 (with a count of 3) are drawn in for you. Notice these boxes are centered around 4.5 and 10.5, respectively.

Finish the rest of the boxes and add appropriate labels and a title.
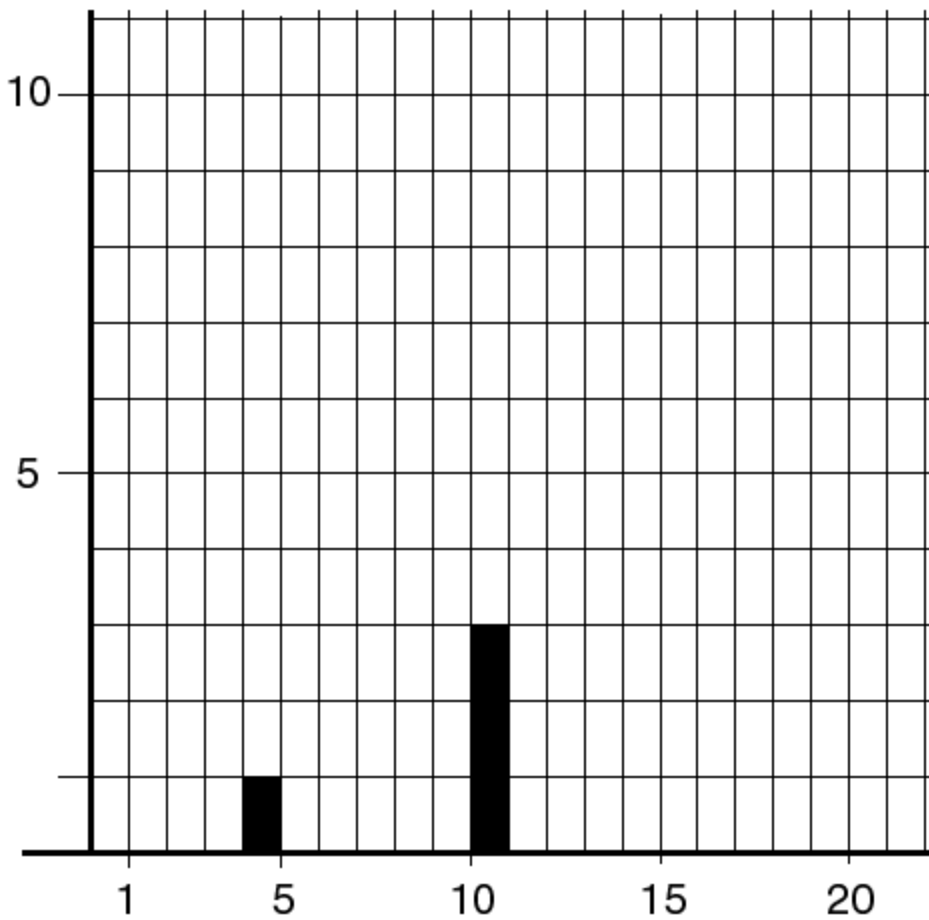
5. Histograms are often useful in discerning the distribution of the variable, the percent of elderly (65 or older) citizens in the various states. Answer the following questions.

a.) What is the class with the most observations? How many observations does this class have?

b.) What are the classes with the least observations? How many observations do these classes have? (Do *not* count classes with zero entries.)

6. An **outlier** is an observation that falls outside the overall pattern of the data, meaning it is either much smaller or much larger than the other observations.

Refer back to the *original* data on page 4, *not* your histogram. Are any of the observations outliers? Which are they? Think about the context of the data. Does it make sense these observations would be outliers? Explain. (HINT: Again, look at the *individual* observations given in the table for question 4, *not* your histogram.)

7. Similar to histograms, **stemplots** (or **stem-and-leaf plots**) are useful in showing the distribution of a variable. Unlike histograms, stemplots do this while recording every single observation, instead of clumping them together as a histogram does. Make a stemplot for the data given in question 4. Use the ones and tens digits as the stem and the digits to the right of the decimal points as the leaves. Do *not* forget a title and legend. (Usually, we make an unordered stemplot and then organize that into an ordered stemplot, complete with title and legend.)

8. **Data tables** are used to organize and present data in a clearly labeled, structured table. The information below about adult American women would be more accessible in table form. Make a data table with this information. Include the marital status, the count, the percent of total women in each category (you'll need to calculate; round to the nearest tenth of a percent), and any other information you deem necessary including labels and a title.

"The *Statistical Abstract* tells us that as of 1998 there were (the numbers are in thousands) 21,043 women who had never been married, 59,255 women who were married, 11,027 women who were widowed, and 11,078 women who were divorced."