

Answer all questions using complete sentences.

1. Consider these types of graphs: histogram, bar graph, Pareto chart, pie chart, stem-and-leaf display.

a. Which are suitable for qualitative data?

Bar graphs, Pareto charts, and pie charts are suitable for qualitative data.

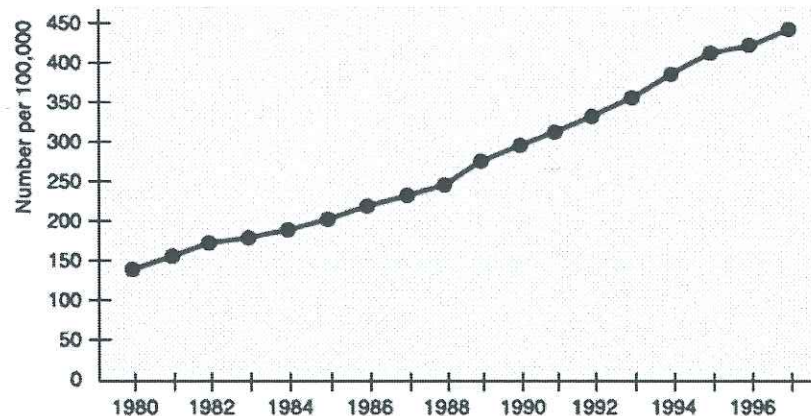
b. Which are suitable for quantitative data?

All are suitable for quantitative data.

2. Describe how data outliers might be revealed in histograms and stem-and-leaf plots.

Any large gaps between bars or stems with leaves at the beginning or end of the data set might indicate that the extreme data values are outliers.

3. The time plot below gives the number of state and federal prisoners per 100,000 population.



- a. Estimate the number of prisoners per 100,000 people for 1980 and for 1997.

In 1980 there were approximately 140 prisoners per 100,000 population and in 1997 there were approximately 440 prisoners per 100,000 population.

- b. During the time period shown, there was increased prosecution of drug offense, longer sentences for common crimes, and reduced access to parole. What does the time-series graph say about the prison population change per 100,000 people?

The prison population from 1980 to 1997 increased per 100,000 population.

- c. In 1997, the U.S. population was approximately 266,574,000 people. At the rate of 444 prisoners per 100,000 population, about how many prisoners were in the system? The projected U.S. population for the year 2020 is 323,724,000. If the rate of prisoners per 100,000 stays the same as in 1997, about how many prisoners do you expect will be in the system in 2020?

In 1997 there were approximately 1,183,588 prisoners.

In 2020 the projected prisoner population is 1,437,335 prisoners.

4. Driving under the influence of alcohol (DUI) is a serious offense. The following data give the ages of a random sample of 50 drivers arrested while driving under the influence of alcohol. This distribution is based on the age distribution of DUI arrests given in the *Statistical Abstract of the United States* (112th Edition).

46	16	41	26	22	33	30	22	36	34
63	21	26	18	27	24	31	38	26	55
31	47	27	43	35	22	64	40	58	20
49	37	53	25	29	32	23	49	39	40
24	56	30	51	21	45	27	34	47	35

- a. Make a stem-and-leaf display of the age distribution.

```

4 | 6 9 7 1 3 5 0 9 7 0
6 | 3 4
3 | 1 7 0 5 3 2 1 0 8 4 9 6 4 5
2 | 4 1 6 7 5 6 1 9 7 2 4 2 7 3 2 6 0
5 | 6 3 1 8 5
1 | 6 8
  
```

```

1 | 6 8
2 | 0 1 1 2 2 2 3 4 4
2 | 5 6 6 6 7 7 7 9
3 | 0 0 1 1 2 3 4 4
3 | 5 5 6 7 8 9
4 | 0 1 3
4 | 5 6 7 7 9 9
5 | 1 3 5 6 8
6 | 3 4
  
```

Key
1|6 = 16

- b. Make a frequency table with seven classes.

$$C.W. = \frac{64 - 16}{7} = 6.857 = 7$$

DON'T NECESSARILY
NEED WHEN YOU
HAVE

CLASS Boundaries	tally	frequency
16 - 22		8
23 - 29		11
30 - 36		11
37 - 43		6
44 - 50		6

CLASS Boundaries	TALLY	Frequency
51 - 57		4
58 - 64		3

- c. Make a histogram showing class boundaries.



- d. Identify the shape of the distribution.

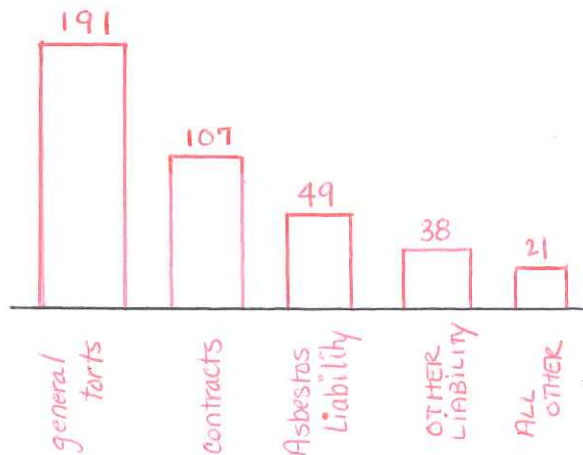
The distribution appears to be skewed right.

5. Many people say the civil justice system is overburdened. Many cases center on suits involving businesses. The following data are based on a *Wall Street Journal* report. Researchers conducted a study of lawsuits involving 1908 businesses ranked in the Fortune 1000 over a 20-year period. They found the following distribution of civil justice caseloads brought before the federal courts involving the businesses:

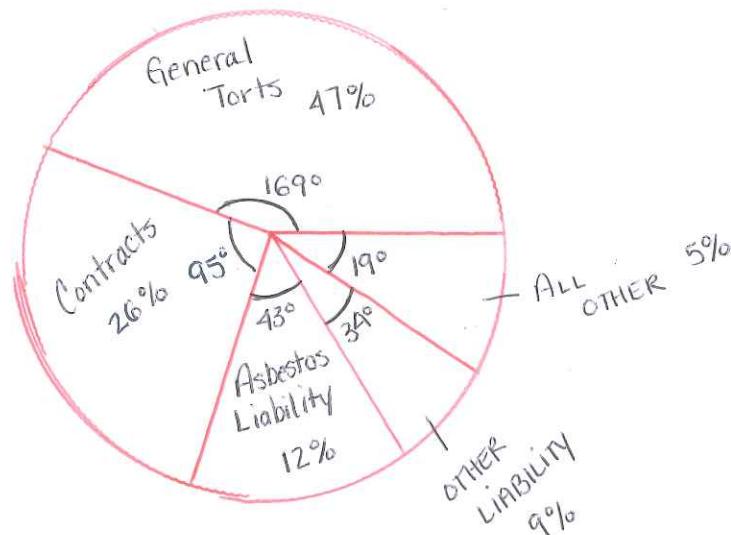
Case Type	Number of Filings (in thousands)
Contracts	107
General torts (personal injury)	191
Asbestos liability	49
Other product liability	38
All other	21

Note: Contracts cases involve disputes over contracts between businesses.

- a. Make a Pareto chart of the caseloads. Which type of cases occur most frequently?



- b. Make a pie chart showing the percentage of cases of each type.



6. *The Sand Canyon Archaeological Project*, edited by W.D. Lipe and published by Crow Canyon Archaeological Center, contains the stem-and-leaf diagram shown at the right. The study uses tree rings to accurately determine the year in which a tree was cut. The figure give the tree-ring-cutting dates for samples of timbers found in the architectural units at Sand Canyon Pueblo. The text referring to the

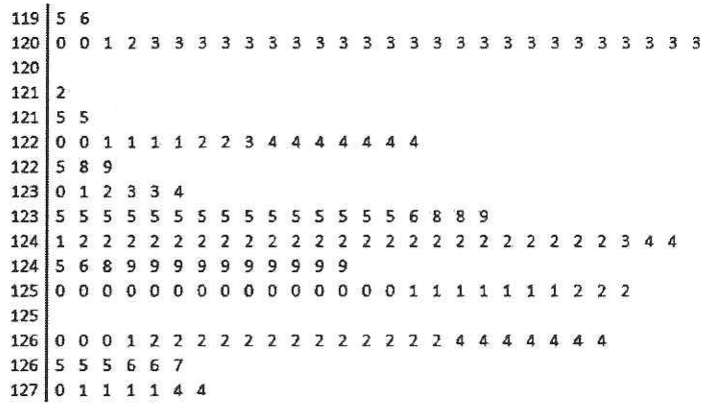


figure says, "The three-digit numbers in the left column represent centuries and decades A.D. The numbers to the right represent individual years, with each number derived from an individual sample. Thus, 142|2 2 2 represents three samples dated to A.D. 1242." Use the figure and the verbal description to answer the following questions.

- a. Which decade contained the most samples?

The decade from 1240AD - 1249 AD contained the most samples.

- b. How many samples had a tree-ring-cutting date between 1200 A.D. and 1239 A.D., inclusive?

75 samples were cut between 1200 AD. and 1239 AD.

- c. What are the dates of the longest interval during which no tree-cutting samples occurred? What might this indicate about new construction or renovation of the pueblo structures during this period?

from 1203 to 1212 had no tree-cutting.
Little if any repairs or new construction.

7. *Forbes Richest People* gives the profile of the world's wealthiest men and women. Do you have to be old to be worth at least \$2 billion? You can answer this question yourself by studying the following data – ages of men and women worth at least \$2 billion:

40 66 43 82 52 58 77 52 50 48 47
 68 66 73 76 53 67 88 40 79 73 66
 65 70 72 77 48 75 82 54 76 41 93
 65 60 57 74 70 83 67 68 77 66 34
 66 59 48 56 71 40 53 63 52 57 83
 52 60 56 71 64 61 53 53 73 70

- a. Make a stem-and-leaf display.

```

4 | 0 3 8 7 0 8 1 8 0
6 | 6 6 7 6 8 5 6 8 7 0 5 6 1
8 | 2 8 2 3 3
5 | 2 8 2 0 3 4 7 9 6 3 2 7 3 3 6 2
7 | 7 3 9 6 3 0 2 7 5
7 | 6 7 0 4 1 0 3 1
9 | 3
3 | 4
6 | 3 4 0
  
```

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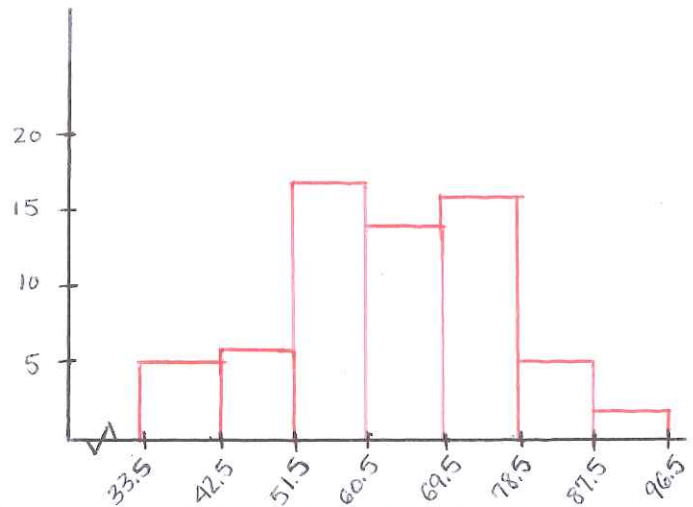
3 | 4
4 | 0 0 0 1 3 7 8 8 8
5 | 0 2 2 2 2 3 3 3 3 4
5 | 6 6 7 7 8 9
6 | 0 0 1 3 4
6 | 5 5 6 6 6 6 6 7 7 8 8
7 | 0 0 0 1 1 2 3 3 3 4
7 | 5 6 6 7 7 7 9
8 | 2 2 3 3 8
9 | 3
  
```

Key 3|4 = 34

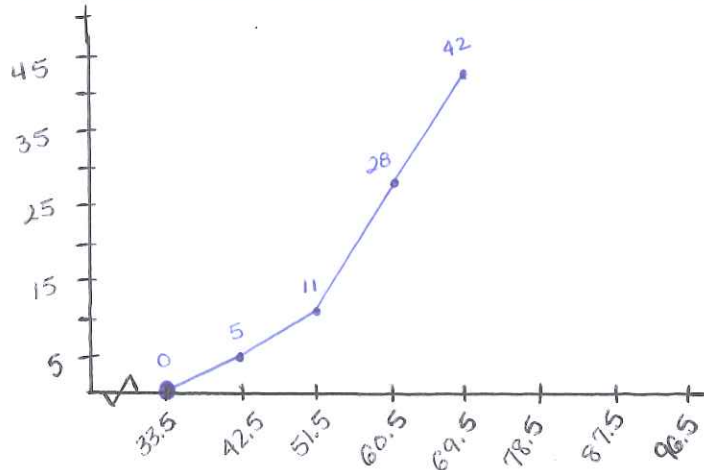
- b. Make a histogram using seven classes. Describe the shape of the distribution (symmetrical, skewed, or bimodal).

$$CW = \frac{93 - 34}{7} = 8.4 = 9$$

CLASS Boundaries	Freq.
34 - 42	5
43 - 51	6
52 - 60	17
61 - 69	14
70 - 78	16
79 - 87	5
88 - 96	2



- c. Make an ogive. Estimate the percentage of these very rich people aged 51 or under.



approximately 17% are aged 51 or under