Govt_3990_Course_Assessment
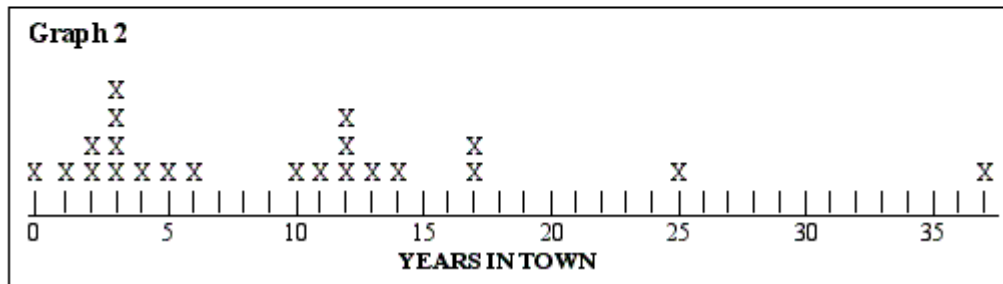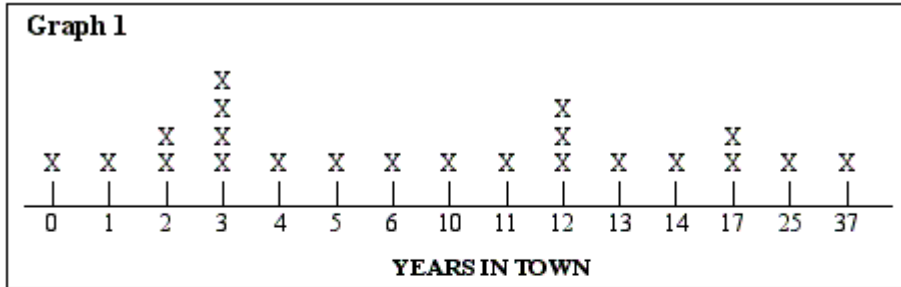
1.   This is a distribution of test scores from a population with a $\mu = 88$ and $\sigma = 10$. What would happen to this graph if we subtract 88 from each test score, then divide the difference by 10? In what ways would the picture of the distribution change? Would the shape stay the same (bell shaped) or change? Would the center stay the same (88) or change? Would the standard deviation stay the same (10) or change?
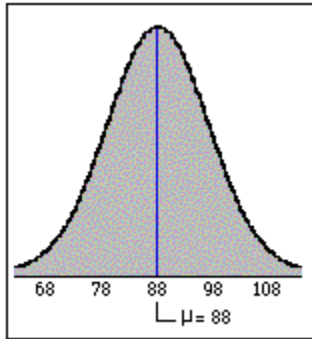

2.   Which of the following statements is NOT true according to the Central Limit Theorem? Select all that apply.

_   An increase in sample size from $n = 16$ to $n = 25$ will produce a sampling distribution with a smaller standard deviation.

_   The mean of a sampling distribution of sample means is equal to the population mean divided by the square root of the sample size.

_   The larger the sample size, the more the sampling distribution of sample means resembles the shape of the population.

_   The mean of the sampling distribution of sample means for samples of size $n = 15$ will be the same as the mean of the sampling distribution for samples of size $n = 100$.

_   The larger the sample size, the more the sampling distribution of sample means will resemble a normal distribution.

3. Imagine that there are 100 different researchers each studying the sleeping habits of college freshmen. Each researcher takes a random sample of size 50 from the same population of freshmen. Each researcher is trying to estimate the mean hours of sleep that freshmen get at night, and each one constructs a 95% confidence interval for the mean. Approximately how many of these 100 confidence intervals will NOT capture the true mean?

    a. None

    b. 1 or 2

    c. 3 to 7

    d. about half

    e. 95 to 100

    f. other

4. Some methods may be used to make a confidence interval wider or narrower. Check the following methods that would decrease the width of a confidence interval for a mean, if all else stays the same. For each choice you select, explain why that would decrease the confidence interval.

    a. Increase the sample size.

    b. decrease the sample size.

    c. increase the level of confidence.

    d. decrease the level of confidence.

5. A class of students recorded the number of years their families had lived in their town. Here are two graphs that students drew to summarize the data. Which graph gives a more accurate representation of the data? Why?

Graph 1

```
                  X
                  X
            X     X                   X
      X     X     X                   X              X
X  X  X     X     X  X  X  X  X  X  X  X  X  X  X     X     X
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
0  1  2  3  4  5  6  10 11 12 13 14 17 25 37
```

YEARS IN TOWN

Graph 2

```
      X
      X
      X X                 X
X X X X X X X      X X X X X       X                 X                               X
|||||||||||||||||||||||||||||||||||||||||||||||||||
0          5          10          15         20          25          30          35
```

YEARS IN TOWN

6. These graphs were part of a newspaper story reporting on boating deaths in Tasmania. Write an interpretation of these graphs and what information they provide about boating deaths in Tasmania.

Recreational Boating Deaths - Total: 46

Person Wearing Life Jacket

Alcohol a Factor in Accident
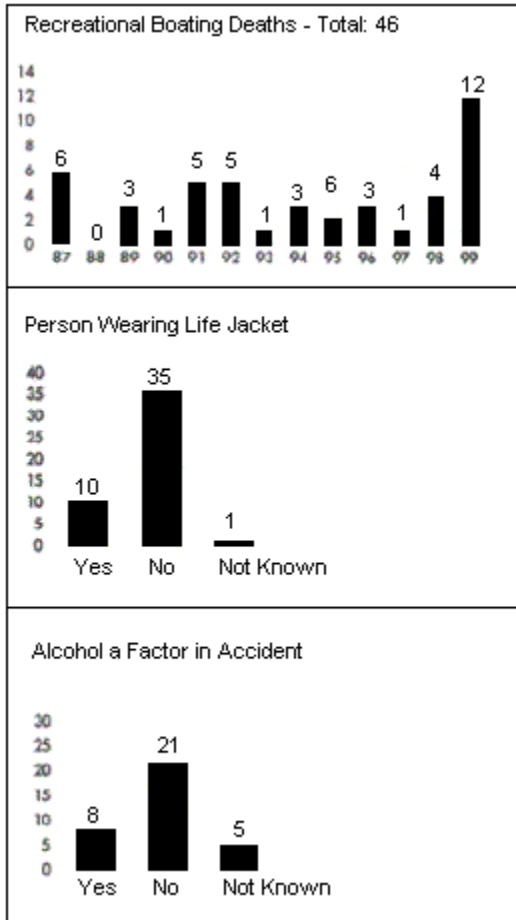
7. What are two possible sources of bias in a survey study? Give an example of a survey study and describe these two sources of bias in the context of the study. How could they be avoided?

8. A 95% confidence interval indicates that:

    a. 95% of the intervals constructed using this process based on samples from this population will include the population mean

    b. 95% of the time the interval will include the sample mean

    c. 95% of the possible population means will be included by the interval

    d. 95% of the possible sample means will be included by the interval

9. Which of the following is true?

    a. It is impossible to prove the null hypothesis.

    b. It is always possible to prove the null hypothesis.

    c. It is possible to prove the null hypothesis under certain conditions.

10. Running multiple hypothesis tests on the same set of data:

    a. can help to show that the experimental treatment had a practical effect in cases when alpha is low.

    b. is recommended only when the experimental results have important implications.

    c. can result in results that appear to be significant but are actually due to chance (and not due to a false null hypothesis).

    d. is recommended when your initial hypothesis fails to find significance.

11. Explain to someone who has not taken a statistics course what statistical significance means.

Items 12 and 13 refer to the following situation:

Here is a histogram for a set of test scores from a 10-item makeup quiz given to a group of students who were absent on the day the quiz was given.
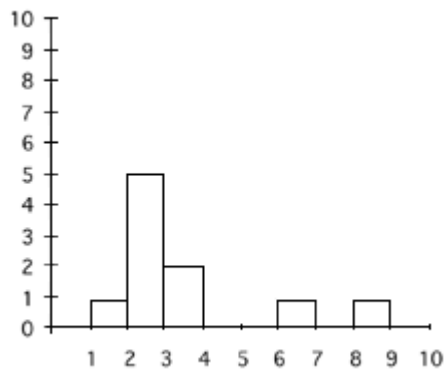

12. What do the numbers on the horizontal axis represent? Please select the best response from the list.

   a. Scores on the test

   b. Independent variable

   c. Dependent variable

   d. Number of Students

13. What percent of students received scores higher than 4?

   a. 5%

   b. 10%

   c. 20%

   d. 40%

   e. 50%

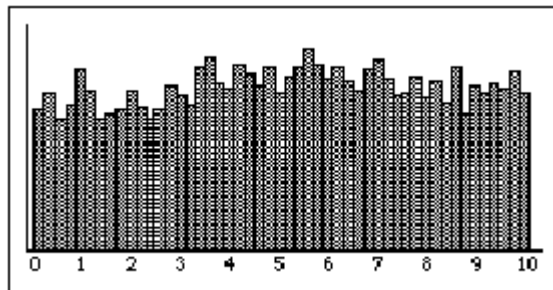**Items 14 and 15 refer to the following situation:**
Two distributions of test scores are presented below. For each distribution, select the one descriptor that best represents the shape of the distribution.

14.
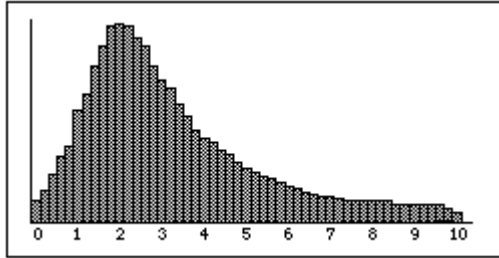
    a.   Normal

    b.   Skewed

    c.   Bimodal

    d.   Uniform

15.

    a.   Normal

    b.   Skewed

    c.   Bimodal

    d.   Uniform

Items 16 to 18 refer to the following situation:

16. If you take a random sample of 100 values from a large population of test scores, what information will you be able to calculate from the sample of data? Select all that apply.

    _ s

    _ standard deviation(SD)

    _ μ

    _ $\bar{x}$

17. Which of the following symbols represent population parameters? Check all that apply.

    _ σ

    _ s

    _ μ

    _ $\bar{x}$

18. Two random samples are selected from a large population of measurements. Some of the statistical measures listed will change from sample to sample and some will stay the same. Check all the ones which are fixed and will not change from sample to sample.

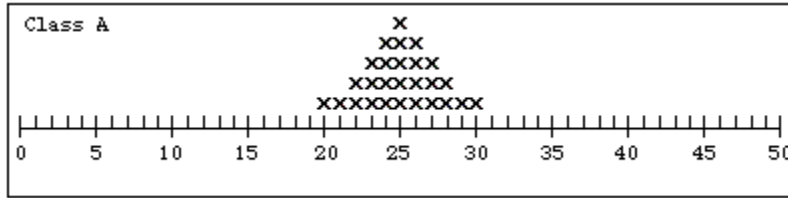   _ σ

    _ s

    _ μ

    _ $\bar{x}$

Items 19 to 21 refer to the following situation:
A class of students tossed 50 pennies and counted the number of heads. They repeated this many times. Imagine that three other classes produced graphs for the same experiment. In some cases, the results were just made up without actually doing the experiment.
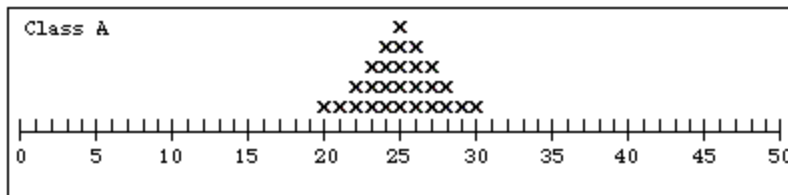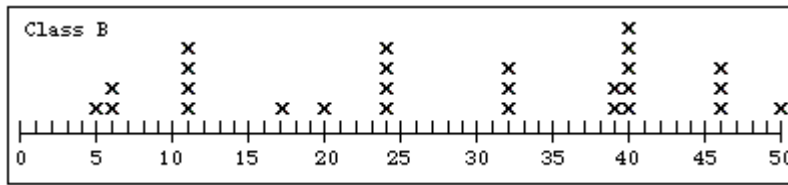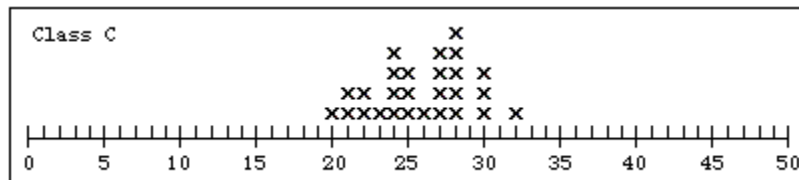
19. Do you think class A's results are made up or really from the experiment? Explain your reasoning.

```
Class A                        x
                             xxx
                            xxxxx
                           xxxxxxx
                          xxxxxxxxxxxx
   |||||||||||||||||||||||||||||||||||||||||||||||||||
   0    5   10   15   20   25   30   35   40   45   50
```

20. Do you think class B's results are made up or really from the experiment? Explain your reasoning.

```
Class B                                    x
                  x           x            x
                  x           x       x    x         x
            x     x           x       x    xx        x
            xx    x     x  x   x       x    xx        x    x
   ||||||||||||||||||||||||||||||||||||||||||||||||||||
   0    5   10   15   20   25   30   35   40   45   50
```

21. Do you think class C's results are made up or really from the experiment? Explain your reasoning.

```
Class C                      x
                        x   xx
                       xx  xx x
                     xx xx xx x
                     xxxxxxxxx x  x
   ||||||||||||||||||||||||||||||||||||||||||||||||||
   0    5   10   15   20   25   30   35   40   45   50
```

Item 22 refers to the following situation:

Box A and Box B are filled with red and blue marbles as follows. Each box is shaken. You want to get a blue marble, but you are only allowed to pick out one marble without looking.

```
BOX A           BOX B

6  RED          60  RED

4  BLUE         40  BLUE
```
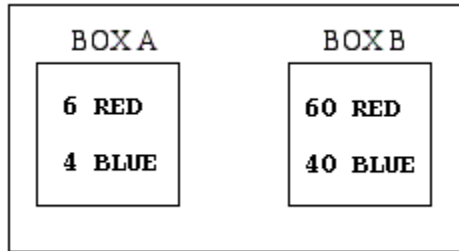
22. Which box should you choose?

    a. Box A (with 6 red and 4 blue)

    b. Box B (with 60 red and 40 blue)

    c. It does not matter

**Item 23 refers to the following situation:**
The latest reality show "I'm a Celebrity, Get Me Out of Here!" features 10 celebrities who have been stranded in the Australian jungle for 15 days. The celebrities must survive on beans and rice and must sleep on cots in tents (a lifestyle they are clearly unaccustomed to!). Each time the show is broadcast, an announcer comes on near the end of the show and says "It's now time for you, the viewing audience, to phone in and vote for the celebrity you'd like to kick off the show. If you call our toll free number-1-800-BYE-STAR-sometime in the next two hours, you can vote for the celebrity you'd like to see leave the show. Calls are free and you can vote as many times as you'd like. Once the two-hour calling period is over, we will tally the votes and announce the results on tomorrow night's show".

23. Imagine that we consider those people who call the number 1-800-BYE-STAR to be our sample. What kind of sample is this?

24. Which of the following sequences is most likely to result from flipping a fair coin 5 times in a row?

    a.   H H H T T
    b.   T H H T H
    c.   T H T T T
    d.   H T H T H
    e.   All four sequences are equally likely

Items 25 to 27 refer to the following situation:
All four scatterplots show 1990 vehicle-related deaths per 100,000 residents on the y-axis for 16 southern states(open circles) and the District of Columbia (x). Each plot shows a different predictor on the x-axis.
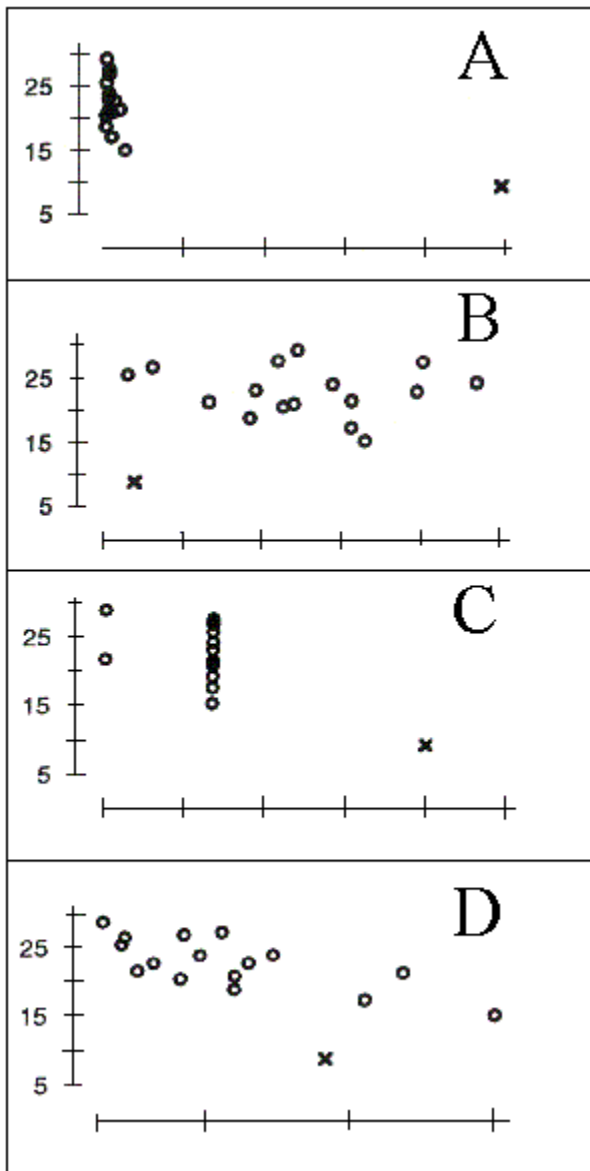
25. Number of cars per person. Eliminating DC changes the correlation from .16 to -.17. Determine which plot goes with this predictor and description.

    a. A

    b. B

    c. C

    d. D

26. Population density. Eliminating DC changes the fitted slope from -.0015 to -.018. (The shape of the plot suggests transforming the predictor variable to logarithms as a possible alternative to regarding DC as a separate case.) Determine which plot goes with this predictor and description.

    a. A

    b. B

    c. C

    d. D

27. Median family income. DC is an outlier, but only moderately influential. Eliminating DC improves the fit, and changes the slope from -.59 to -.49. Determine which plot goes with this predictor and description.

    a. A

    b. B

    c. C

    d. D