Name_____ Period_____ Date_____

Vocabulary: Define each word and give an example.

1. Parameter

2. Control Group

3. Interquartile Range

Short Answer:

4. Describe a method for obtaining a simple random sample.

5. What does it mean to describe a distribution?

Review:
6. Given $\triangle ABC,$ with $m\angle A = 110°, a = 18$ cm and $b = 10$ cm, find $m\angle B.$

7. List the possible rational zeros of the function. Then, find all the zeros of the function.
   $f(x) = 3x^3 + 10x^2 - 7x - 20$

8. Simplify the expression: $3\log_2(x) - 4\log_2(x+3) + \log_2(y)$

Problems:
Be sure to show all work used to obtain your answer. Circle or box in the final answer.

9. In order to estimate the percentage of adult Oakland, California residents who favor the Governor's plan to alleviate the current energy crisis in that state, 900 residents are chosen randomly. These 900 people are asked "Do you favor the Governor's energy plan?" and it turns out that 45% of them said yes.
    In this problem, identify the:

*   population of interest:

*   sample:

*   parameter:

*   statistic:

*   Is this an observational study, sample survey or experiment?

10. Name the *three* kinds of *nonsampling errors* that can affect a survey. Name them and describe each one of them with a short definition and example.

11. A school principal wants to form a student committee to review the lunch menu in the school cafeteria. She would like to select a random sample of 20 students from the 1500 students in the school to serve on the committee.

a. Tell the principal how to go about obtaining an **SRS** of 20 students using the partial random digits table below. Be very specific so she can follow your instructions with ease. How do we start, what do we do, how to pick randomly….

b. Use the partial table of random digits below to select the *__first 3__* students using the method you described in part (a). Mark directly on the table to show your process clearly. List the 3 numbers chosen.

    60940 72024 17868 24943 61790 90656 87964 18883 36001 19365 15412

c. Why might you advise the principal to take a stratified random sample? Clearly explain.

12. You are part of a group of medical researchers planning an experiment to test whether aspirin helps prevent repeated heart attacks. The subjects are 800 male heart attack patients under 60 years old. You hope that taking 325 mg. of aspirin each day will prevent future heart attacks. The subjects will be observed for a five-year period.

a. What will be the explanatory and response variables for your experiment? Be specific.

b. Outline the design of a completely randomized experiment for this study. Do this in diagram or paragraph form. Make sure you discuss randomization.

c. Briefly state how you would use the double-blind technique in this study.

d. Among the 800 subjects, 600 have had only one heart attack, and 200 have had more than one. Knowing this, there is a better design for the study than the completely randomized design in part (b). Outline a better design. You do not have to discuss the randomization.

13. Here are the pulse rates (in beats per minute) of a sample of 36 men:

> Pulse rates:
>
> 140 100 104 100 110 112 115 116 118 92 128 80 70 60 92 66 78
>
> 70 56 72 74 80 66 74 76 76 68 68 80 149 76 84 98 84 68 84

    a. Find the 5-number summary, mean and standard deviation of the pulse rates.

    b. Decide if there are outliers in the data set using the outlier rule.

    c. Construct a boxplot of the data below.

    d. Describe the distribution.

    e. Which is a better measure of center for this distribution and why?

14. Sketch a histogram that would have a mean **smaller** than its median.

Multiple Choice Questions: **Circle the best answer**.

15. We divide our school into two groups: first year students and others. We then take random samples from each group. This is an example of

    (a) simple random sampling.
    (b) clustered sampling.
    (c) multistage sampling.
    (d) stratified random sampling.
    (e) systematic random sampling.

16. To take a sample of students in this class we make a list ordered by social security number and select every 20th student in this list to be in our sample. This is an example of
    (a) systematic sampling
    (b) simple random sampling
    (c) stratified random sampling
    (d) clustered sampling
    (e) multistage sampling

17. An opinion poll asks a sample of 1100 people whether they support reducing the number of legal immigrants to the U.S.; 53% of these 1100 people say "Yes." The number 53% is a
    (a) margin of error.
    (b) statistic.
    (c) bias.
    (d) parameter.
    (e) reliability.

18. Randomization in experimental design is used to
    (a) control for the response variable.
    (b) avoid bias.
    (c) avoid the placebo effect.
    (d) implement the double-blind technique.

19. The essential difference between an experiment and an observational study is
    (a) observational studies may have confounded variables, but experiments never do.
    (b) in an experiment, people must give their informed consent before being allowed to participate.
    (c) observational studies are always biased.
    (d) observational studies cannot have response variables.
    (e) an experiment imposes treatments on the subjects, but an observational study does not.

20. Which of these measures are greatly influenced by extreme values?
    I. Mean
    II. Median
    III. Interquartile Range
    IV. Range

    A.   IV only
    B.   I and IV only
    C.   II and III only
    D.   I, III, and IV only

21. Match the summary statistics with the histograms.
    (a) mean = 4.99, median = 3.13, standard deviation = 5.49   _____
    (b) mean = 4.89, median = 4.83, standard deviation = 7.99   _____
    (c) mean = 5.01, median = 6.87, standard deviation = 5.49   _____
    (d) mean = 4.96, median = 4.93, standard deviation = 0.96   _____

variable 1

variable 2

variable 3

variable 4