Name_____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) To study the effect of air pollution on respiratory health, a group of people in a city with high levels of air pollution and another group in a rural area with low levels of pollution are examined to determine their lung capacity. Is this a randomized experiment or an observational study?

1) _____

   A) randomized experiment   B) observational study

Answer: B

2) Choose the answer below that best completes the following statement.

2) _____

A _____ is a number that describes a population.
   A) sample   B) statistic   C) summary   D) parameter

Answer: D

3) A _____ is a subset of a population.

3) _____

   A) simple random sample   B) sample
   C) cluster   D) sample of convenience

Answer: B

4) An experiment that tends to overestimate or underestimate the true value is said to be _____.

4) _____

   A) biased   B) flagrant
   C) randomized   D) un-randomized

Answer: A

5) In a _____ experiment, subjects do not decide for themselves which treatment they will get.

5) _____

   A) prospective   B) observational   C) randomized   D) double-blind

Answer: C

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

6) Determine whether the statement is true or false.

6) _____

In a case-control study, the outcome has occurred before the subjects are sampled.

Answer: ✔ True   False

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

7) Is the following variable at the interval or the ratio level of measurement?

7) _____

Your age in years
   A) Interval   B) Ratio

Answer: B

8) An electronics manufacturer test every 500th cell phone to verify that it is functioning properly. Identify the kind of sample that is being used.

   A) cluster sample   B) simple random sample
   C) stratified sample   D) systematic sample

8) _____

Answer: D

9) The entire collection of individuals about which information is sought is called a _____.

   A) population   B) simple random sample
   C) sample   D) cluster

9) _____

Answer: A

10) People are reluctant to admit to behavior that may reflect negatively on them. This can lead to ...

   A) sampling bias   B) voluntary response bias
   C) hurt feelings   D) social acceptability bias

10) _____

Answer: D

11) Is the following variable at the interval or the ratio level of measurement?
The year of your birth

   A) Interval   B) Ratio

11) _____

Answer: A

12) A medical researcher wants to determine whether exercising can lower blood pressure. At a health fair, he measures the blood pressure of 100 individuals and interviews them about their exercise habits. He divides the individuals into two categories: those whose typical level of exercise is low, and those whose level of exercise is high. Is this a randomized experiment or an observational study?

   A) Observational study   B) Randomized experiment

12) _____

Answer: A

13) A pollster randomly samples 163 Democrats, 144 Republicans and 15 Independents (all registered voters) in Metro City and asks each poll participant which mayorial candidate he or she prefers. Identify the kind of sample that the pollster is using.

   A) sample of convenience   B) voluntary response sample
   C) stratified sample   D) cluster sample

13) _____

Answer: C

14) A pollster wants to estimate the proportion of voters in a certain town who are Democrats. He goes to a large shopping mall and approaches people to ask whether they are Democrats. Is this a simple random sample?

   A) yes   B) no

14) _____

Answer: B

15) You ask your friends who they plan to vote for in the next congressional election. Based on their responses, you conclude that the candidate you favor cannot lose!

15) _____

This is most likely an example of ...
- A) sampling bias
- B) self-interest bias
- C) voluntary response bias
- D) randomized sampling

Answer: A

16) Which one of the following data are continuous?

16) _____

- A) the number of species of trees in a park
- B) the number of representatives of each species in the park
- C) the rankings of the trees, from most numerous to least numerous
- D) the average height of a sample of trees

Answer: D

17) When experimental units are people, they are sometimes called _____.

17) _____

- A) human units
- B) topics
- C) subjects
- D) personnel

Answer: C

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

18) Determine whether the statement is true or false.

18) _____

Observational studies are generally more reliable than randomized experiments.

Answer: True ✅ False

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

19) Determine which of the following describes ordinal data.

19) _____

    i. In the horse race, Betty's Girl won, Mr. Ed placed, and Wabash showed.
    ii. In the horse race, I bet on Betty's Girl to win, Mr. Ed to place, and Wabash to show
- A) neither i nor ii
- B) i only
- C) both i and ii
- D) ii only

Answer: C

20) Which one of the following data are continuous?

20) _____

- A) the time remaining for an MP3 music download
- B) the number of musicians performing in the MP3 file
- C) the number of times the file has been downloaded
- D) all of these represent continuous data

Answer: A

21) In a randomized experiment, if there are large differences in outcomes among the treatment groups, we can conclude that the differences are due to _____.

21) _____

- A) random luck
- B) deliberate data manipulation
- C) experimental error
- D) the treatments

Answer: D

22) The question...

"Do you favor a higher standard of living, even though it produces unclean air and water?"

... is an example of ...

A) framing　　　　　　　　　　　　　B) sampling bias
C) leading question bias　　　　　　D) random sampling

Answer: C

23) Which of the following is the best description of a double-blind experiment?

A) an experiment in which both the investigators and the subjects are hidden from the others' views
B) an experiment in which the subjects are blindfolded so they cannot see which treatment is applied to them
C) an experiment in which neither the investigators nor the subjects know how the treatments have been assigned
D) an experiment in which neither the investigators nor the subjects know the others' names

Answer: C

24) When rolling two six-sided dice, your total roll ranges from 2 (double ones) to 12 (double sixes). Characterize the nature of the roll total.

A) quantitative and continuous　　　B) qualitative and continuous
C) qualitative and discrete　　　　　D) quantitative and discrete

Answer: D

25) In an experiment, subjects are put into two categories according to sex, and then each subject is randomly assigned a treatment . This is an example of...

A) observational studies　　　　　　B) randomized blocking
C) gender bias　　　　　　　　　　　D) confounding

Answer: B

26) A pollster asks a group of six voters about their political affiliation (Republican, Democra or Independent), their age, and whether they voted in the last election. The results are shown in the following table.

Voter	Political affiliation	Age	Voted in Last Election?
1	Republican	34	Yes
2	Democrat	56	Yes
3	Democrat	21	No
4	Independent	28	Yes
5	Republican	61	No
6	Independent	46	Yes

Identify the variables.
- A) age
- B) Political affiliation
- C) voted in last election
- D) Political affiliation, age, voted in last election

Answer: D

27) Is the following variable at the interval or the ratio level of measurement?
The year you started school
- A) Interval
- B) Ratio

Answer: A

28) In a recent study, Z. Zhao and colleagues measured the levels of formaldehyde in the air in 34 classrooms in the schools in the city of Taiyuan, China. On the same day, they gave questionnaires to 1993 students aged 11–15 in those schools, asking them whether they had experienced respiratory problems (such as asthma attacks, wheezing, or shortness of breath). They found that the students in the classrooms with higher levels of formaldehyd reported more respiratory problems. Was the study prospective, cross-sectional, or retrospective?
- A) Retrospective
- B) Cross-sectional
- C) Prospective

Answer: B

29) By visiting homes door-to-door, a municipality surveys all the households in 104 randomly-selected neighborhoods to see how residents feel about a proposed property tax increase. Identify the type of sample that is being used.
- A) systematic sample
- B) cluster sample
- C) voluntary response sample
- D) stratified sample

Answer: B

30) In a small town, 84% of the residents, aged 16 or more years old, own a car. Is this an example of statistic or a parameter?

    A) Statistic   B) Parameter

Answer: B

30) _____

31) In a study conducted at the University of Southern California, J. Peters and colleagues studied elementary school students in 12 California communities. Each year for 10 years, they measured the respiratory function of the children and the levels of air pollution in the communities. Was the study prospective, cross-sectional, or retrospective?

    A) Cross-sectional   B) Prospective   C) Retrospective

Answer: C

31) _____

32) The names of all 117 students in a professor's class are written on identical slips of paper, and the slips are placed into a large glass jar. Then, the professor selects 8 random slips from the jar. Identify the kind of sample that is being used.

    A) simple random sample   B) systematic sample
    C) cluster sample   D) sample of convenience

Answer: A

32) _____

33) A _____ is a type of sample that is analogous to a lottery.

    A) simple random sample   B) cluster
    C) sample of convenience   D) population

Answer: A

33) _____

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

34) Determine whether the statement is true or false.
In a cross-sectional study, measurements are made at only one point in time.

Answer: ☑ True   False

34) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

35) Which of the following sample types should you always regard as unreliable?

    A) voluntary response samples   B) cluster samples
    C) stratified samples   D) simple random samples

Answer: A

35) _____

36) A recent study compared the heart rates of 19 infants born to nonsmoking mothers with those of 17 infants born to mothers who smoked an average of 15 cigarettes a day while pregnant and after giving birth. The heart rates of the infants at one year of age were 20% slower on the average for the smoking mothers. Was the study prospective, cross-sectional, or retrospective?

    A) Retrospective   B) Prospective   C) Cross-sectional

Answer: B

36) _____

37) The characteristics of individuals about which we collect information are called

 _____.
    A) variables   B) samples   C) data   D) clusters

Answer: A

37) _____

38) Is the following variable at the interval or the ratio level of measurement?
 The time that your first class starts
    A) Interval   B) Ratio

Answer: A

38) _____

39) A _____ is a variable related to both the treatment and the outcome.
    A) perplexer   B) cohort   C) confounder   D) dependent

Answer: C

39) _____

40) Is the following variable at the interval or the ratio level of measurement?
 The price of a loaf of bread
    A) Interval   B) Ratio

Answer: B

40) _____

41) Choose the answer below that best completes the following statement.

 A _____ is a number that describes a sample.
    A) population   B) statistic   C) parameter   D) measurement

Answer: B

41) _____

42) A pollster asks a group of six voters about their political affiliation (Republican, Democrat or Independent), their age, and whether they voted in the last election. The results are shown in the following table.

Voter	Political affiliation	Age	Voted in Last Election?
1	Republican	34	Yes
2	Democrat	56	Yes
3	Democrat	21	No
4	Independent	28	Yes
5	Republican	61	No
6	Independent	46	Yes

How many individuals are there?
    A) 21   B) 6   C) 246   D) 74

Answer: B

42) _____

43) A sign in a grocery store claims that 92% of their customers believe them to have the freshest produce in the city. Specify the type of bias involved.
  A) Self-interest
  B) Social acceptability
  C) Leading question
  D) Voluntary response

43) _____

Answer: A

44) In a recent study, Z. Zhao and colleagues measured the levels of formaldehyde in the air in 34 classrooms in the schools in the city of Taiyuan, China. On the same day, they gave questionnaires to 1993 students aged 11–15 in those schools, asking them whether they had experienced respiratory problems (such as asthma attacks, wheezing, or shortness of breath). They found that the students in the classrooms with higher levels of formaldehyde reported more respiratory problems. Was this a cohort study or a case-control study?
  A) Cohort study
  B) Case-control study

44) _____

Answer: A

45) In a recent poll, 64% of the respondents supported stricter gun laws. Is this an example of statistic or a parameter?
  A) Statistic
  B) Parameter

45) _____

Answer: A

46) A study in which the assignment to treatment groups is not made by the investigator is called _____.
  A) prospective
  B) double-blind
  C) observational
  D) randomized

46) _____

Answer: C

47) Which of the following is the best description of a randomized experiment?
  A) an experiment in which the experimental units are selected at random
  B) an experiment in which the outcomes are random
  C) an experiment in which the treatments are assigned randomly to experimental units
  D) an experiment in which the investigators are chosen at random

47) _____

Answer: C

48) In a study conducted at the University of Colorado, J. Ruttenber and colleagues studied people who had worked at the Rocky Flats nuclear weapons production facility near Denver, Colorado. They studied a group of workers who had contracted lung cancer and another group who had not contracted lung cancer. They looked back at plant records to determine the amount of radiation exposure for each worker. The purpose of the study was to determine whether the people with lung cancer had been exposed to higher levels of radiation than those who had not gotten lung cancer. Was the study prospective, cross-sectional, or retrospective?
  A) Retrospective
  B) Prospective
  C) Cross-sectional

48) _____

Answer: A

49) A radio talk show invites people to call in and state whether or not they think that sexual harassment in the work place is a common problem.

    A) Social acceptability   B) Voluntary response

    C) Sampling   D) Self-interest

49) _____

Answer: B

50) Which one of the following data are discrete?

    A) the pre-season ranking of Duke University's men's basketball team

    B) the average preseason ranking of the University of Connecticut's women's basketball team over the past 10 years

    C) the average height of players on the University of Connecticut's women's basketball team

    D) the height of the tallest player on Duke University's men's basketball team

50) _____

Answer: A

51) Determine which of the following describes nominal data.

    i. My favorite days of the week are Friday, Saturday, and Tuesday.

    ii. My favorite day of the week is Friday, my second-favorite is Saturday, and third-favorite is Tuesday.

    A) both i and ii   B) ii only   C) i only   D) neither i nor ii

51) _____

Answer: C

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

52) Determine whether the statement is true or false.

A sample of convenience is never acceptable.

52) _____

Answer: True   ● False

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

53) A telephone company wants to estimate the proportion of customers who are satisfied with their service. They use a computer to generate a list of random phone numbers and call those people to ask them whether they are satisfied. Is this a simple random sample?

    A) yes   B) no

53) _____

Answer: A

54) A middle school student passes out leaflets to the adults at a school function. The leaflets ask the recipient to indicate whether they believe in anthropogenic global warming. The bottom of the leaflet indicates that the completed leaflet should be returned to the student. Identify the kind of sample that is being used.

    A) cluster sample   B) systematic sample

    C) sample of convenience   D) stratified sample

54) _____

Answer: C

55) In a study conducted at the University of Southern California, J. Peters and colleagues studied elementary school students in 12 California communities. Each year for 10 years, they measured the respiratory function of the children and the levels of air pollution in the communities. Was this a cohort study or a case-control study?

    A) Case-control study   B) Cohort study

55) _____

Answer: B

56) Of the televisions offered at an electronics store, 42% cost less than $500.00. Is this an example of statistic or a parameter?

    A) Statistic   B) Parameter

56) _____

Answer: B

57) Determine which of the following describes ordinal data.

       i. My best friends are Georgia, Amithaba, and Raphael.

       ii. My favorite numbers are 2, 7 and 13.

    A) both i and ii   B) ii only   C) i only   D) neither i nor ii

57) _____

Answer: D

58) In a study conducted at the University of Colorado, J. Ruttenber and colleagues studied people who had worked at the Rocky Flats nuclear weapons production facility near Denver, Colorado. They studied a group of workers who had contracted lung cancer and another group who had not contracted lung cancer. They looked back at plant records to determine the amount of radiation exposure for each worker. The purpose of the study was to determine whether the people with lung cancer had been exposed to higher levels of radiation than those who had not gotten lung cancer. Was this a cohort study or a case-control study?

    A) Case-control study   B) Cohort study

58) _____

Answer: A

59) Determine which of the following describes qualitative data.

       i). the volume of a shipping container, in gallons

       ii). the name of the material from which the container is made

       iii). the shape of the container

    A) i, ii, and iii   B) ii and iii only   C) i and ii only   D) i and iii only

59) _____

Answer: B

60) Is the following variable at the interval or the ratio level of measurement?
The sales price of a car

    A) Interval   B) Ratio

60) _____

Answer: B

61) Is the following variable at the interval or the ratio level of measurement?
The score on an SAT exam (range is 200 to 800 points)

    A) Interval   B) Ratio

61) _____

Answer: A

62) Determine which of the following describes qualitative data.

     i). the make of the car with license plate number VNS-862

     ii). the license plate number VNS-862

     iii). the number of vehicles whose license plate number begins with "VNS"

  A) neither i, nor ii, nor iii   B) i only

  C) iii only   D) i and ii only

62) _____

Answer: D

63) In an experiment, the _____ is what is measured on each experimental unit.

  A) category   B) treatment   C) subject   D) outcome

63) _____

Answer: D

64) In a survey of 1000 teenagers, 23% of them said they use tobacco products. Is this an example of statistic or a parameter?

  A) Statistic   B) Parameter

64) _____

Answer: A

65) A pollster asks a group of six voters about their political affiliation (Republican, Democrat or Independent), their age, and whether they voted in the last election. The results are shown in the following table.

65) _____

Voter	Political affiliation	Age	Voted in Last Election?
1	Republican	34	Yes
2	Democrat	56	Yes
3	Democrat	21	No
4	Independent	28	Yes
5	Republican	61	No
6	Independent	46	Yes

What are the data for individual #3?

  A) Political affiliation

  B) Democrat, 21

  C) Democrat, 21, no

  D) Political affiliation, age, voted in last election

Answer: C

66) A medical researcher wants to determine whether exercising can lower blood pressure. She recruits 100 people with high blood pressure to participate in the study. She assigns a random sample of 50 of them to pursue an exercise program that includes daily swimming and jogging. She assigns the other 50 to refrain from vigorous activity. She measures the blood pressure of each of the 100 individuals both before and after the study. Is this a randomized experiment or an observational study?

66) _____

   A) Observational study   B) Randomized experiment

Answer: B

67) A(n) _____ makes it difficult to determine whether an experimental outcome is due to the applied treatment.

67) _____

   A) perplexer   B) uncooperative subject
   C) counfounder   D) error

Answer: C

68) The values of variables are called _____.

68) _____

   A) variables   B) samples   C) data   D) clusters

Answer: C

69) Which one of the following data are discrete?

69) _____

   A) the latitude and longitude of the boat's port of departure
   B) the speed of the boat's propeller, in revolutions per minute
   C) the number of crew members on the boat
   D) the latitude and longitude of a boat at sea

Answer: C

70) A recent study compared the heart rates of 19 infants born to nonsmoking mothers with those of 17 infants born to mothers who smoked an average of 15 cigarettes a day while pregnant and after giving birth. The heart rates of the infants at one year of age were 20% slower on the average for the smoking mothers. Was this a cohort study or a case-control study?

70) _____

   A) Case-control study   B) Cohort study

Answer: B

71) A small brew pub sent out questionnaires to a simple random sample of 250 customers asking whether they would like the brewery to include an imperial stout in their regular offerings. Of the 250 questionnaires, 12 were returned and 10 of those were in favor of including the stout. Specify the type of bias involved.

71) _____

   A) Self-interest   B) Voluntary response
   C) Sampling   D) Nonresponse

Answer: D

72) In a study conducted at the University of Southern California, J. Peters and colleagues   72) _____
    studied elementary school students in 12 California communities. Each year for 10 years,
    they measured the respiratory function of the children and the levels of air pollution in
    the communities. Was the study prospective, cross-sectional, or retrospective?
       A) Cross-sectional   B) Retrospective   C) Prospective
    Answer: B

73) Is the following variable at the interval or the ratio level of measurement?   73) _____
    The weight in pounds of a sack of potatoes
       A) Interval   B) Ratio
    Answer: B

74) Determine which of the following describes quantitative data.   74) _____
       i). the name of a chemical sample
       ii). the mass of a chemical sample
       iii). the color of a chemical sample
       A) i, ii, and iii   B) i only   C) ii only   D) i and ii only
    Answer: C

75) Determine which of the following describes nominal data.   75) _____
       i. Michaelangelo's sells small, medium, large, and jumbo pizzas.
       ii. Michaelangelo's most-requested toppings are pepperoni, black olives, and
    mushrooms.
       A) both i and ii   B) i only   C) ii only   D) neither i nor ii
    Answer: A

76) Determine which of the following describes quantitative data.   76) _____
       i). the length of an object in feet
       ii). the speed of an object in meters per second
       iii). the number of objects that are blue
       A) i only   B) i and ii only   C) i, ii, and iii   D) iii only
    Answer: C

1) B
2) D
3) B
4) A
5) C
6) TRUE
7) B
8) D
9) A
10) D
11) A
12) A
13) C
14) B
15) A
16) D
17) C
18) FALSE
19) C
20) A
21) D
22) C
23) C
24) D
25) B
26) D
27) A
28) B
29) B
30) B
31) C
32) A
33) A
34) TRUE
35) A
36) B
37) A
38) A
39) C
40) B
41) B
42) B
43) A
44) A
45) A
46) C
47) C
48) A
49) B
50) A

51) C
52) FALSE
53) A
54) C
55) B
56) B
57) D
58) A
59) B
60) B
61) A
62) D
63) D
64) A
65) C
66) B
67) C
68) C
69) C
70) B
71) D
72) B
73) B
74) C
75) A
76) C