Name: _____ Per: _∞_

MULTIPLE CHOICE Write the letter corresponding to the _best_ answer in the blank provided.

_C_ 1. The student council of McNeil High School wants to conduct a survey regarding the dress code for school dances. You have advised them that it might be best to conduct a stratified random sample of the student body. Which of the following is **not** a valid **stratified** design?

    A) Two simple random samples are to be conducted: one of the boys in the student body and the other of the girls in the student body.

    B) Four simple random samples are conducted: one in each of the four grade levels.

    C) A census is conducted in each of 5 randomly selected Zone classes. ← cluster

    D) Two random samples are conducted: one of students whose GPA's are 2.5 or higher and the other of students whose GPA's are less than 2.5.

    E) All of these statements are valid stratified designs.

_C_ 2. Hoping to get information that would allow them to negotiate new rates with their advertisers, Natural Health magazine phoned a random sample of 600 subscribers. 64% of those polled said they use nutritional supplements. Which is true?

    I. The population of interest is the people who read this magazine. probably true.

    II. "64%" is not a statistic; it's the parameter. False!

    III. This sampling design should provide the company with a reasonable estimate of the percentage of all subscribers who use supplements. Perhaps true.

A) I only   B) I and II only   C) I and III only   D) II and III only   E) I, II, and III

_C_ 3. Suppose your local school district decides to randomly test high school students for attention deficit disorder (ADD). There are three high schools in the district, each with grades 9 – 12. The school board pools all of the students together and randomly samples 250 students.   Is this a simple random sample?

    A) Yes, because the students were chosen at random.

    B) Yes, because each student is equally likely to be chosen.

    C) Yes, because they could have chosen any group of 250 students from throughout the district.

    D) No, because we can't guarantee that there are students from each school in the sample.

    E) No, because we can't guarantee that there are students from each grade in the sample.

_D_ 4. Simple random sampling

    A) reduces bias resulting from poorly worded questions. ✗

    B) offsets bias resulting from undercoverage and nonresponse. ✗

    C) reduces bias resulting from the behavior of the interviewer. ✗

    D) None of the above.

_D_ 5. A chemistry professor at Podunk University (known as PU) who teaches a large lecture class surveys his students who attend his class. He wants to get some ideas about how he can make the class more interesting since he notices about 25% of the class is "absent" on any given day. During one class period, he distributes a survey for his students to complete. This survey method suffers from

A) voluntary response   B) nonresponse bias   C) response bias

D) undercoverage   E) None of the these

6. A local radio show wants to know what people in Austin, Round Rock and the surrounding areas think about public education. They ask listeners to call in to answer the question, "Are public school teachers doing a good job teaching our young people?" Of the 724 listeners who responded, 38% said they thought public school teachers were doing a good job.

Population of interest: *People in Austin, Round Rock, and surrounding areas.*

Is there a problem with bias in this situation? Explain.

Voluntary Response.
People with strong opinions are most likely to call in.

AND/OR

Undercoverage
Not everyone listens to this particular radio show.

7. Gallup Poll was asked to estimate the true percent of American adults who are concerned about access to healthcare. In November, 2007, Gallup conducted a survey of 1034 randomly selected American adults and found that 30% of American adults at that time felt that *access* to healthcare was the top healthcare concern.

Is "the true percent of American adults in November, 2007, who were concerned about access to healthcare"...

a (parameter) or statistic (circle answer)   What symbol can be used to represent it? __p__

Gallup found that the 30% felt that access to healthcare was a top concern. Is this number...

a parameter or (statistic) (circle answer)   What symbol can be used to represent it? __$\hat{p}$__

8. Administrators at a hospital are concerned about the possibility of drug abuse by people who work there. They decide to check on the extent of the problem by having a random sample of the employees undergo a drug test. Several plans for choosing the sample are proposed. Name the sampling strategy in each.

   a) There are four employee classifications: doctors, medical staff (nurses, techs, etc), office staff, support staff (custodians, etc) Randomly select 10 from each category.

   Stratified

   b) Each employee has a 4-digit ID number. Use a random digit table to select 40 numbers.

   Simple random sample

   c) At the start of each shift, randomly select a number from 1 to 10, choose that person as they arrive and then test every 10th person after that who arrives for work.

   Systematic

   d) Randomly select a department (like radiology) and test all the people who work in that department – doctors, nurses, technicians, clerks, custodians, etc.

   Cluster

9. <u>Name and describe the kind of bias</u> that might be present if the administration described in the previous problem decides that instead of subjecting people to random testing, they will just interview employees about possible drug use.

Response bias.
Employees that use drugs would just lie about their drug use.

10. Listed below are the names of the pharmacists on the hospital staff. Use the random number table below to select three of the pharmacists to be in the sample. Be very clear with your method. Start at the leftmost digit in the first row of the table and move across. Make your procedure clear so that someone can follow what you did. You must do this by marking directly on or above the table.

01 Amanda	06 Kelsey	11 Alma	16 Becca	21 Allen	26 Nathan	31 Peyton
02 Daniel	07 Reilly	12 Sherry	17 Colleen	22 Sarah	27 Hana	32 Anita
03 Sami	08 Jen	13 Wesley	18 Thomas	23 Jasmine	28 Kit	33 Kat
04 Melody	09 Matthew	14 Bill	19 Megan	24 Jocelyn	29 Sophie	34 Nick
05 Emily	10 Pamela	15 Eric	20 Mason	25 Mitch	30 Ben	35 Katy

ignore repeats, ignore 36 – 99, 00

61303	46699	76423	38449	46438	91579	01907	72146
72749	13347	65030	26128	49067	02904	49953	74674
94617	13317	81638	42709	33717	59943	12027	46547

List the chosen numbers from the random digit table: 30   34   33

List the people chosen: Ben   Nick   Kat

★ ANSWERS MAY VARY

11.* In response to nutrition concerns raised last year about food served in school cafeterias, the Smallville School District entered into a one-year contract with the Healthy Alternative Meals (HAM) company. Under this contract, the company plans and prepares meals for 2,500 elementary, middle, and high school students, with a focus on good nutrition. The school administration would like to survey the students in the district to estimate the proportion of students who are satisfied with the food under this contract.

Two sampling plans for selecting the students to be surveyed are under consideration by the administration. One plan is to take a simple random sample of students in the district and then survey those students. The other plan is to take a stratified random sample of students in the district and then survey those students.

a) Describe a simple random sampling procedure that the administrators could use to select 200 students from the 2,500 students in the district.

The administrators could number an alphabetical list of students from 0001 to 2,500. They could then use a random number generator from a calculator or computer to generate 200 unique random numbers from 0001 to 2,500. The students corresponding to those 200 numbers would be asked to participate in the survey.

b) If a stratified random sampling procedure is used, give one example of an effective variable on which to stratify in this survey. Explain your reasoning.

One could stratify by the school level of the student (elementary, middle, high school).

We would do this because the different age levels may have differing opinions about school cafeteria food.

c) Describe one statistical advantage of using a stratified random sample over a simple random sample in the context of this study.

One advantage is that stratified random sampling guarantees that each of the school-level strata will have some representation, because it is possible that a simple random sample would miss one or more of the strata completely.