AP Statistics **Your Name:** _____ **Per:** ____
Review Chapters 13, 3, 4

This is a fairly lengthy review, so please write ALL solutions on separate paper.

MULTIPLE CHOICE. Write the letter corresponding to the *best* answer.

__ 1.* The Physicians' Health Study, a large medical experiment involving 22,000 male physicians, attempted to determine whether aspirin could help prevent heart attacks. In this study, one group of about 11,000 physicians took an aspirin every other day, while a control group took a placebo. After several years, it was determined that the physicians in the group that took aspirin had significantly fewer heart attacks than the physicians in the control group. Which of the following statements explains why it would not be appropriate to say that everyone should take an aspirin every other day?

I. The study included only physicians, and different results may occur in individuals in other occupations.
II. The study included only males and there may be different results for females.
III. Although taking aspirin may be helpful in preventing heart attacks, it may be harmful to some other aspects of health.

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

__ 2. A bar graph is most useful when

A) the number of values in the distribution is very small (less than 50).
B) the data is categorical
C) the data values are all very large numbers
D) the number of values in the distribution is large (more than 100).

__ 3. A researcher plans a study to examine the attitudes of residents of California towards a proposal in Congress to declare English to be the official language of the state. He obtains a random sample of 50 residents of one community in California and all agree to participate. Which of the following statements is true?

A) This is a poorly designed survey because it is a voluntary response sample.
B) The design of the study may be biased because the sample may not represent the population of interest.
C) It is a well-designed survey because of the 100% response rate.
D) As long as the respondents were randomly selected, there is no bias.
E) A more accurately designed study would have included opinions on this issue from residents in other states.

__ 4. Which of the following is *not* required in an experimental design?

A) blocking B) control C) randomization D) replication
E) All are required in an experimental design.

__ 5. An experimenter believes that two new exercise programs are more effective than any current exercise routines and wishes to compare the effectiveness of these two new exercise programs on physical fitness. The experimenter is trying to determine whether or not a control group, which follows neither of these new programs but continues with current exercise routines, would be beneficial. Which of the following can be said about the addition of a control group?

A) A control group would eliminate the placebo effect.
B) A control group would eliminate the need for blinding in the study.
C) A control group would allow the experimenter to determine which of the two exercise programs improves physical fitness the most.
D) A control group would allow the experimenter to determine if either of the exercise programs is more effective than current programs for physical fitness.
E) There would be no added benefit to having a control group.

__ 6. Look back at question #5. If that question shows up on the test and it is NOT MULTIPLE CHOICE, would you still know how to answer the question correctly?

A) Yup!
B) No.
C) Maybe?
D) Okay, I can take a hint…
E) Let me look back at #5 one more time…

__7. Obtaining a sample of students in a high school by randomly sampling from each grade level is an example of

A) convenience sampling
B) cluster sampling
C) simple random sampling
D) voluntary response sampling
E) stratified random sampling
H) systematic random sampling

8. Describe each of the following as either a *statistic* or a *parameter*. Then write the appropriate symbol for each.

A) The average number of blue M&M's per bag produced by the M&M/Mars Co.
B) The average number of blue M&M's per bag in a random sample of 30 bags.

9. An article on peanut butter in Consumer Reports reported the following scores for various brands:

Creamy

56	44	62	36	39	53	50	65	45	22
40	56	68	41	30	40	50	56	30	

Crunchy

62	53	75	42	47	40	34	62	52
50	34	42	36	75	80	47	56	62

Construct a comparative stem-and-leaf display *(the use of split stems is **NOT** necessary for this problem).*

10. Madeline and Judy are conducting an experiment to see if students who eat animal crackers before a short memory test will perform better on the test versus students who do not eat any animal crackers. Their subjects will include students in all 4 grade levels in high school, and will also include both males and females. Both of the girls think that performance on this memory test will vary between grade levels (specifically, that the memory scores of 9th and 10th graders will be significantly different than the memory scores of 11th and 12th graders). They also believe that performance on the test will not vary significantly between males and females.

The girls wish to conduct a randomized block experimental study, however they cannot agree on an appropriate blocking variable. Judy thinks that they should block by gender, while Madeline thinks they should block by grade level. **Which girl is correct? Explain.**

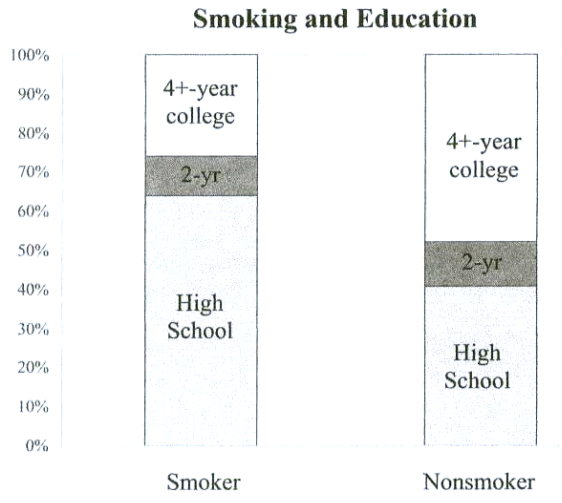
11. Sixty people in a mall were interviewed. They were asked about the highest level of education they had completed and whether or not they smoked cigarettes.

a) Approximately what proportion of smokers completed high school only?

b) Did a greater number of nonsmokers or smokers complete 4 or more years of college?

c) Did a greater proportion of nonsmokers or smokers complete 4 or more years of college?

d) For this group of people is there *an association* between level of education and smoking? Explain.



12. In a survey of airline travelers, subjects were observed in the coach section of airplanes to determine if men or women are bothered by a seatmate of the opposite gender using the common armrest.

Discontentment Felt When Seat-mate Used Common Armrest: Males and Females

	Bothered (B)	Not Bothered (NB)	Total
Females (F)	19	26	45
Males (M)	38	17	55
Total	57	43	100

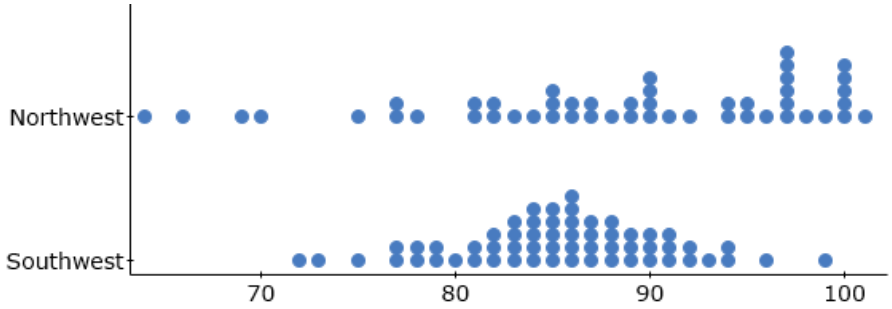
a) What is the percent of males who are bothered by a seatmate using the common armrest?
b) What is the percent of people surveyed that are bothered?

13. A nutritionist wants to study the effect of storage time (6, 12, and 18 months) on the amount of vitamin C present in dried fruit when stored for these lengths of time. Vitamin C is measured in milligrams per 100 milligrams of fruit. The researcher has 60 total packages of dried fruit: 30 of them are dried apple, and the other 30 are dried peach.

a) Identify...
   i. the experimental units:
   ii. the explanatory variable(s) or treatment(s):
   iii. the response variable(s):

b) Explain how you would carry out a completely randomized experiment for this study.
c) Describe the changes that would be made to your experiment in part (B) by incorporating blocking.
d) Can the nutritionist generalize his/her findings to all types of dried fruit? Explain.

14. Temperatures from random samples of cities on a hot summer day from two different regions of the European continent. Write a few sentences to **describe and compare** the distributions of temperatures between the two regions.



15. The dentists in a dental clinic would like to determine if there is a difference between the number of new cavities in people who eat an apple a day and in people who eat less than one apple a week. They are going to conduct a study with 50 people in each group.

Fifty clinic patients who report that they routinely eat an apple a day and 50 clinic patients who report that they eat less than one apple a week will be identified. The dentists will examine the patients and their records to determine the number of new cavities the patients have had over the past two years. They will then compare the number of new cavities in the two groups.

If the mean number of new cavities for those who ate an apple a day was statistically significantly smaller than the mean number of new cavities for those who ate less than one apple a week, could one conclude that the lower number of new cavities can be attributed to eating an apple a day? Explain.