MTH 111, Le Moyne College

Fall 2011- Exam 1

Solutions

**Question 1:**

A doctor wants to know whether Vioxx helps reduce pain as well as other drugs, so he randomly assigns some patients to take Vioxx, some to take aspirin, some to ibuprofen, and some to a placebo.  The type of drug these patients take is what kind of variable? Circle the correct answer.  
a) quantitative  
b) categorical and binary  
c) categorical and non-binary.  
e.) None of the above

**Question 2:**

Which of the following best describes a categorical variable?

A. The data can only be described with words, never numbers.

B. You can calculate a median but not a mean for the data.

C. You cannot calculate anything from this data, not even proportions; you can only display it in some graphs.

D. You can create histograms for categorical variables.

E. None of the above are correct.

**Question 3:**

Which of the following is TRUE?

A. Zip code is a categorical variable, but major is a discrete numeric variable.

B. Major is a discrete numeric variable, but gender is a categorical variable.

C. Zip code is a categorical variable, but height is a continuous numeric variable.

D. Zip code is a discrete numeric variable, and phone number is also a discrete numeric variable.

E. Phone number is a categorical variable, but color of eyes is a discrete numeric variable.

**Question 4:**

Classify each of the following as quantitative or categorical (or state that the quantity is NOT a variable):

1. What kind of cuisine do you and your classmates most prefer?

categorical

1. Amount your classmates and you spend on food every week.

quantitative

1. Number of trips you and your classmates make to restaurants every month.

quantitative

1. Whether or not your classmates think being a vegetarian/vegan helps with fitness.

Categorical binary

1. Proportion of students in your MTH 110 class who are vegetarians.

quantitative

**Question 5:**

A recent study by a research group based near Seattle found that students who received instruction in classrooms with Windows computers scores as much as 10% higher on standardized tests than students who received instruction in classrooms with Apple (Mac) computers in the same school district.

1. Identify the observational units in this study. (1 point)

students

1. Identify the two primary variables of interest. (2 points)
2. Computer students used and 2. Standardized test scores
3. Indicate whether or not you believe that the variables in part b were measured as categorical or quantitative data. (2 points)
4. Categorical (categorical binary is okay) and 2. Quantitative

**Question 6:**

The Gallup Poll organization recently conducted a poll of 200 voters and asked them which party they would vote for in the 2012 Presidential elections. 60% of the voters responded with “Democratic Party”, 25% of the voters said “Republican Party”, 10% of them were undecided, and 5% said that they would not vote. Construct a well-labeled bar graph to display these results.

**Question 7:**

In a recent study, doctors sampled records from several states and found that the average weight for 12-year-old children living in the US was 85 pounds, compared to the 12-year-old children living in France, who had an average weight of 82 pounds. Doctors’ records from across the country suggest that the true average weight of 12-year-old children living in the US is 86 pounds. Which of the following is true?

(A) 86 is a parameter in this study, and 85 is a statistic

(B) 82 is a parameter in this study, and 85 is a statistic.

(C) 85 is a parameter in this study, and 86 is a statistic.

(D) 12 is a parameter in this study, and 82 is a statistic.

(E) 86 is a parameter in this study, and 12 is a statistic.

**Question 8:**

In 2001, the Annals of Internal Medicine reported a study designed to find out whether taking an antidepressant would help smokers quit. 429 men and women over 18 who were highly motivated to quit smoking were randomly assigned to one of two groups: One group took 300 mg per day of an antidepressant, and the other group took a placebo. Neither the patients taking the drugs nor the attending physicians knew which patients were taking the antidepressant.

What types of populations might the researcher be able to make conclusions about?

A.) Only men, since no women were in the study.

B.) Only adults, since no one younger than 18 was included in the study.

C.) All smokers, since every smoker was equally likely to be included in the study.

D.) All adult smokers who are motivated to quit.

E.) None of the above.

**Question 9:**

1. Suppose you want to investigate whether the expression, “The pen is mightier than the sword” holds any weight. For each of the following three approaches identify if the approach is an experiment, an observational study or an anecdote.
2. You recall that your uncle, who was a professor and hence very scholarly and demure, was once attacked by a bear and he was able to fight the bear and kill it.

Anecdote

1. You take a random sample of 20 professors in your college and of 20 professional wrestlers from the state of New York and record how much maximum weight the subjects in both groups can lift and then compare them.

Observational study

1. You make both the groups mentioned in part b undergo a two-month fitness training program and then conduct the same study with respect to the maximum amount of weights they can lift.

Experiment

1. With respect to the random sample of professors, you decide to see if their field of study has an effect on the maximum amount of weight they can lift. For this study state:
2. The explanatory variable:

Field of study

1. The response variable:

Maximum amount lifted

**Question 10:**

With respect to the study mentioned in part b of question 9, which of the following could be a confounding variable in this situation? Choose the BEST possible answer.

1. The amount the professor spends on his car in a month.
2. The amount of time the professor spends in the gym in a week.
3. Whether or not the professor is single, married, in a relationship or divorced.
4. Whether or not the professor likes rock music.
5. None of the above.