Exam II

Test A

STAT 201 - 502

November 3, 2005

Do not open test until instructed to do so.

You should only have a calculator, one page of written notes, and something with which to write.

Read all question very carefully and make sure you have answered all questions fully before turning in your test.

On Multiple Choice, CLEARLY write the corresponding letter for your answer to the left of the question.

On Written Section, ALWAYS SHOW YOUR WORK!! You will be graded for how you arrived at an answer not just for the answer. If you don't have room in the space provided use scratch paper.

GOOD LUCK!!!

Name:

UIN:

Part 1: Multiple Choice (3 points each)

1. A public opinion poll in Ohio wants to determine whether registered voters in the state approve of a measure to ban smoking in all public areas. They select a simple random sample of 50 registered voters from each county in the state and ask whether they approve or disapprove of the measure.

Fill in the blank. The proportion of registered voters in the state who approve of banning smoking in public areas is an example of ______.

- (A) a sample proportion
- (B) a statistic
- (C) a parameter
- (D) an unbiased statistic
- (E) a lurking variable

For each of the following scenarios, determine wither the binomial distribution is the appropriate distribution for the random variable X.

- 2. A fair coin is flipped ten times. Let X=the number of times the coin comes up tails.
 - (A) Binomial
 - (B) Not binomial
- 3. A fair coin is flipped multiple times. Let X=the number of times the coin needs to be flipped until we see ten tails.
 - (A) Binomial
 - (B) Not binomial
- 4. A roulette wheel with one ball in it is turned six times. Let X=the number of times the ball lands on red.
 - (A) Binomial
 - (B) Not binomial
- 5. There are ten people in the room: five men and five women. Three people are to be selected at random to form a committee. Let X=the number of men on the three-person committee.
 - (A) Binomial
 - (B) Not binomial

Use the following for the next 3 questions:

Fill in the blanks:

- 6. What should $\heartsuit \heartsuit \heartsuit \heartsuit \heartsuit \heartsuit \heartsuit \oslash \oslash \oslash$ be?
 - (A) Limit
 - (B) Linear
 - (C) Association
 - (D) Mean
 - (E) Median
- 7. What should $\bullet \bullet \bullet \bullet \bullet \bullet \bullet \bullet$ be?
 - (A) a normally distributed
 - (B) a sufficiently large
 - (C) s symmetric
 - (D) a skewed
 - (E) any
- 8. What should ********** be?
 - (A) the population mean
 - (B) the population median
 - (C) the sample mean
 - (D) the sample median
 - (E) the standard error

Use the following to answer the next 2 questions:

Researchers wish to determine if a new experimental medication will reduce the symptoms of allergy sufferers without the side effect of drowsiness. To investigate this question, the researchers gave the new medication to 50 adult volunteers who suffer from allergies. Forty-four of these volunteers reported a significant reduction in their allergy symptoms without any drowsiness.

- 9. How could this study be improved?
 - (A) Include people who do not suffer from allergies in the study in order to represent a more diverse population
 - (B) Repeat the study with only the 44 volunteers who reported a significant reduction in their allergy symptoms without any drowsiness, giving them a higher dosage this time
 - (C) Give the spouses of the volunteers a placebo
 - (D) Use randomization to divide the volunteers into 2 groups one to receive the experimental medication and one to receive the placebo
 - (E) This study is perfect and cannot be improved
- 10. What are the experimental units in this study?
 - (A) The researchers
 - (B) The 50 adult volunteers
 - (C) The 44 volunteers who reported a significant reduction in their allergy symptoms without any drowsiness
 - (D) The 6 volunteers who did not report a significant reduction in their allergy symptoms without any drowsiness
 - (E) The experimental medication

11. A simple random sample of 1200 adult Americans is selected and each person is asked the following question:

"In light of the huge national deficit, should the government at this time spend additional money to establish a national system of health insurance?"

Only 39% of those responding answered yes. Which of the following statements regarding this survey is true.

- (A) This survey is reasonably accurate because it used a large, simple random survey
- (B) This survey probably overstates the percentage of people who favor a system of national health insurance
- (C) This survey is very inaccurate, but neither understates nor overstates the percentage of people who favor a system of national health insurance. Because a simple random sample was used, it is unbiased.
- (D) This survey probably understates the percentage of people who favor a system of national health insurance
- (E) This survey sucks because all surveys suck.

Use the following to answer the next 2 questions:

The statistics of a particular basketball player state that he makes 4 out of 5 free-throw attempts.

- 12. The basketball player is just about to attempt a free throw. What do you estimate the probability that the player makes this next free throw to be?
 - (A) 0.16
 - (B) 50-50. Either he makes it or he doesn't
 - (C) 0.80
 - (D) 1.2
 - (E) 0.08
- 13. During a season, the basketball player makes an average of about 200 freethrow attempts. On how many of these throws would you estimate he will actually score a point?
 - (A) 80
 - (B) 100
 - (C) 120
 - (D) 160
 - (E) 140

- 14. Which of the following conditions is not true of the binomial function?
 - (A) Each trial must be independent of all other trials
 - (B) The probability remains the same in each trial
 - (C) The number of trials are fixed
 - (D) Each trial must result in either a success or failure
 - (E) Each probability must be significant

Use the following to answer the next 2 questions:

A television station is interested in predicting whether or not voters in its listening area are in favor of federal funding for abortions. It asks its viewers to phone in and indicate whether they are in favor of or opposed to this. Of the 2241 viewers who phoned in, 1574 (70.24%) were opposed to federal funding for abortions.

- 15. Fill in the blank. The number 70.24% is a _____.
 - (A) statistic
 - (B) parameter
 - (C) sample
 - (D) population
 - (E) factor
- 16. What type of sampling method was used to collect the data?
 - (A) A simple random sample
 - (B) A stratified random sample
 - (C) A probability sample in which each person in the population has the same chance of being in the sample
 - (D) Voluntary response
 - (E) Multistage sample

Use the following to answer the next 3 questions:

The proportion of students who own a cell phone on college campuses across the country has increased tremendously over the past few years. It is estimated that approximately 90% of students now own a cell phone. Fifteen students are to be selected at random from Texas A&M University. Assume that the proportion of students who own a cell phone at this university is the same as nationwide. Let X=the number of students in the sample of 15 who own a cell phone.

- 17. What is the appropriate distribution?
 - (A) $X \sim N(15, 0.9)$
 - (B) $X \sim B(15, 0.9)$
 - (C) $X \sim B(15, 13.5)$
 - (D) $X \sim N(13.5, 1.16)$
 - (E) $X \sim B(15, .10)$
- 18. On average, how many students will own a cell phone in simple random samples of 15 students?
 - (A) 9
 - (B) 13
 - (C) 13.5
 - (D) 14
 - (E) 10
- 19. What is the standard deviation of the number of students who own a cell phone in simple random samples of 15 students?
 - (A) 0.077
 - (B) 0.09
 - (C) 1.16
 - (D) 1.35
 - (E) 1.25

Use the following to answer the next 2 questions:

Chocolate bars produced by a certain machine are labeled 8.0 oz. The distribution of the actual weights of these chocolate bars is claimed to be normal with mean of 8.1 oz and a standard deviation of 0.1 oz.

- 20. A quality control manager initially plans to take a simple random sample of size n from the production line. If he were to double his sample size (to 2n), by what factor would the standard deviation of the sampling distribution of \bar{X} change?
 - (A) 1/2
 - (B) $1/\sqrt{2}$
 - (C) $\sqrt{2}$
 - (D) 2
 - (E) $\sqrt{1}$
- 21. The quality control manager plans to take a simple random sample of size n from the production line. How big should n be so that the sampling distribution of \bar{X} has standard deviation 0.01 oz?
 - (A) 10
 - (B) 100
 - (C) 1000
 - (D) Cannot be determined unless we know the population follows a normal distribution
 - (E) 3

- 22. A penny is tossed. We observe whether it lands heads up or tails up. Suppose the penny is a fair coin, i.e., the probability of heads is 1/2 and the probability of tails is 1/2. What does this mean?
 - (A) Every occurrence of a head must be balanced by a tail in one of the next two or three tosses.
 - (B) If the coin is tossed many, many times, the proportion of tosses that land on heads will be approximately 1/2 and this proportion will tend to get closer and closer to 1/2 as the number of tosses increases.
 - (C) Regardless of the number of flips, half will be heads and half tails.
 - (D) All of the above.
 - (E) In 20 flips, exactly 10 will be heads and 10 will be tails.

Part 2: Written Section

- 1. An economist is studying the price of commercials and radio advertisements. he wishes to determine if the locations of the TV station (West Coast, Midwest, Northeast, or Southeast) and affiliation of the TV station (ABC, NBC, CBS) have any effect on the price of a one-minute commercial during the early-evening local news broadcast.
 - (A) What type of study is this? (3 points)

(B) What is the response variable in this study? (3 points)

(C) What is/are the factor(s) in this study? List the levels of the factor(s).(4 points)

(D) How many treatment combinations is the economist looking at? (3 points)

- 2. The *National Geographic News* stated in April 2000, that 15% of Americans have at least one tattoo. I take an SRS of 10 people where T represents the number of people with at least one tattoo in the sample.
 - (A) What is the distribution of T? (7 points)

(B) What is the probability that no more than 2 people in my sample have a tattoo? (7 points)

(C) What is the probability that more than 5 people in my sample do not have a tattoo? (7 points)