# Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Math 201 Exam I**

**Please work out each of the given problems. Credit will be based on the steps that you show towards the final answer. Show your work.**

**Problem 1** (1 Point Each) Circle true or false

1. A researcher wants to implement the systematic sampling technique to identify 40 of the 2000 hotel guests who have already made a reservation for this summer. Then the researcher should list the guests in order of when they made the reservation and then survey every 50th guest on the list.
**True False**
2. The survey question, “How much gas was put into the gas tank at the gas station?” results in a continuous variable. **True False**
3. A box plot can be used for very large data sets, while a stem and leaf plot cannot.
 **True False**
4. If the shape of the histogram for ages of students is uniform, then the standard deviation of the ages of students is zero.
 **True False**
5. If the expected value for the number of hats people own is 4.27, then since it makes no sense to own 4.27 hats, we must round to 4 in order for the expected value to make any sense. **True False**
6. Let A be the event that a person is unemployed and B be the event that a person works at LTCC. Then A and B are mutually exclusive events.
 **True False**
7. Ten percent of all people are left handed. Thus the probability that both a mother and her daughter will be left handed is one percent. **True False**
8. A survey is taken of 65 randomly selected Americans asking them, “Have you ever been to Europe?” The distribution of possible responses of the 65 Americans is an example of a binomial distribution. **True False**

**Problem 2** (10 Points) You will be conducting a study of the housing situation of LTCC students.

1. Write down a single survey question for this study whose response variable is qualitative.
2. Write down a single survey question for this study whose response variable is quantitative.

1. Write a paragraph on how you might collect a cluster sample of 150 students from LTCC. Be specific.

**Problem 3** (10 Points)The box plot below shows the distribution of the amount of time it takes in hours for Steller’s Jays to build their nests.



1. Order the following intervals from containing the least amount of data to containing the most amount of data.
	1. 3-5 b. 5-7 c. 7-9
2. How long might it take for a Steller’s Jay that is in the 58th percentile to build a nest?
3. If 20 Steller’s Jays are observed, find the probability that exactly 5 of them will take between 9 and 10 hours to build their nests.

1. If 15 Steller’s Jays are observed, find the probability that at most 5 of them will take between 3 and 6 hours to build their nests.

**Problem 4** (10 Points)

A hotel books rooms for $120, $150 and $180 for preferred guests, AAA members, and regular guests respectively. 15% of the guests are the preferred guests, 20% are AAA members and the rest are regular guests.

1. Write down a probability distribution table for this situation.
2. Find the expected value and standard deviation for this situation.
3. Use a complete sentence to interpret this expected value in the context of the question.

**Problem 5** (10 Points)Consider the histogram below:



1. Describe the distribution of the data using the language of statistics.
2. If one additional value were added at the “X”, would the standard deviation go up, down, or stay the same? Explain your reasoning.

**Problem 6**  (10 Points)

The table below shows the voter preference and the education level of 700 voters.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | < High School | HS Grad Only | Some College | College Grad |
| Trump | 54 | 91 | 76 | 55 |
| Clinton | 13 | 103 | 78 | 149 |
| Other | 8 | 41 | 30 | 2 |

1. Find the probability that a randomly selected college grad plans on voting for Clinton.
2. Find the probability that a randomly selected voter is a Trump supporter with less than a high school education.
3. Find the probability that a randomly selected voter is a Clinton supporter or has only some college.
4. Let T be the event that a voter is a Trump supporter and H be the event that voter has a high school diploma but no college. Are T and H independent? Back up your answer with the appropriate calculations.

**Problem 7** **(10 Points)**

Suppose that the weight of a healthy adult cat is uniformly distributed between 8 and 12 pounds. Be sure to show your work (including the diagrams for parts A and B).

1. If a healthy adult cat is randomly selected, what is the probability that the cat will be heavier than 8.3 pounds?

1. What is the 44th percentile for the weight of healthy adult cats?
2. Find the z-score corresponding to a cat that weighs 10.3 pounds.

**Problem 8 (10 Points)** Teenagers account for 10% of the US driving population, but 12% of all drivers in car accidents are teens.  Each year 3% of all drivers are involved in a car accident.

1. Find the probability that a randomly selected driver in an accident is not a teen.
2. Find the probability that a randomly selected driver will be a teen who gets into an accident this year.
3. Find the probability that a randomly selected driver will get into an accident given that that person is a teen.
4. Find the probability that a randomly selected driver will be a teen or will get into an accident this year.

**Extra Credit:** Write down one thing that your instructor can do to make the class better and one thing that you feel that the instructor should continue doing.

(Any constructive remarks will be worth full credit.)