Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_ Exam III Instructor: Peter Sallay Math 1332

1. Consider the following statement.

*A recent survey by the alumni of a major university indicated that the average salary of 5,000 of its 150,000 graduates was $105,000.*

Name the population. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Name the sample. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Identify the sampling method (simple random sampling, systematic sampling, convenience sampling, and stratified sampling) in the following studies.

*An advertiser wants to study an insurance ad’s effectiveness. He randomly selects 15 male and 15 female participants in each age*

*group to study. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

*You determine that your neighborhood needs to change pool hours based on home owner’s association discussion board posts. ­­­­­­­­­­*

*\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

1. For the following question identify which type of statistical study (observational, observational with case control, experiment, and experiment with single or double blinding) is most likely to lead to an answer. Explain.

*Do guests at Walt Disney World weigh more than the average population?*

1. A survey finds that 55% of Americans spend less than 2 hours a day watching television, with a margin of error of 5 percentage points. Make a confidence interval from these results.
2. Explain what is meant by *participation bias*. **Cite an example**.
3. In what way might the following study be flawed?

*A group of high school students are asked if they would oppose the repeal of a school policy that*

*currently does not allow students to wear shorts to school.*

1. Why do you think it is sometimes difficult to define the *variables of interest* of a study? Give an example of a *variable of interest* that is difficult to define.

Use the following grades from a test from a math class to answer questions 8-10.

F C C B A A D F B C D C A A F F D A B B C

1. Is the above data qualitative data or quantitative data? Why?
2. Make a frequency distribution of the data. [you will need to complete the table]

|  |  |  |
| --- | --- | --- |
| Category | Frequency | Relative frequency |
| A |  |  |
| B |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

1. Create a bar graph with labels.

Use the following quiz grades for answering questions 11-13.

88 56 98 72 55 78 64 87 92 73 47 32 76 78 94 96 89 90 33 67 92 87

1. Is the above data qualitative data or quantitative data? Why?
2. Make a frequency distribution using 10-point bins [ you will need to complete the table]

|  |  |
| --- | --- |
| 10-19 |  |
| 20-29 |  |
| 30-39 |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

1. Draw a histogram of this data.
2. Would you expect a positive correlation, a negative correlation, or no correlation between the following variables?

*Years spent in jail* and *years of education?*  Explain.

*number of hours worked at an hourly wage and the size of a paycheck?* Explain.

An analysis of the Acme Trucking Corporation’s bills of lading for the freight charge for a standard-sized crate reveals the following:

Destination Distance (hundreds of miles) 8 11 13 16 18 19

Charge (to nearest dollar) 50 62 65 70 75 80

[#15-17]

1. Draw a scatter diagram for the data. Use the horizontal axis for distance and the vertical axis for charges. [rough sketch]
2. Does a correlation exist between distance and charges? If so, is it positive or negative? Does it appear to be weak or strong?
3. Is the relationship between distance and charge prices a coincidence, the result of some common underlying cause, or the result of one of the variables actually being the cause of the other? Explain.

#18-28, For full credit, set up the problem and circle the final answer

1. Suppose you flip five coins. How many possible outcomes are there?
2. A restaurant offers a dinner special where you have a choice of three salads, five entrees, and four desserts for one low price. How many different dinner combinations are there?
3. Suppose that you roll two six-sided dice. Find the probability rolling a sum of 4.
4. What is the probability that a family with three children has all three boys?
5. The probability of one stapler jamming on a given try is 0.04. The probability of another stapler jamming on a given try is 0.07. What is the probability that when each is used once, both will jam?
6. A pair of dice is rolled. What is the probability of rolling a sum of 5 or 8?
7. What is the probability of rolling four fair dice and getting an odd number on all four dice?
8. A five-character license plate can be any three letters of the alphabet, followed by any three numerical digits. How many different license plates are possible? [set up the problem, you do not need to multiply]
9. A brand of ballpoint pen comes in six colors, with fine or regular point, and with standard, deluxe, or executive styling. How many different versions does the pen come in?
10. Thirty people are choosing a president, a vice-president, and a secretary from among their ranks. How many ways are there to do this?
11. How many different ways are there to order a medium four-topping pizza, given that there are ten toppings from which to choose?

Exam III Formula chart

Excel skills:

|  |  |
| --- | --- |
| Creating scatterplot | 1. Highlight x-values and y-values 2. go to insert>charts>scatterplot |
| Factorial: n! | =FACT(n) |
| Combination of N objects J at a time: | =COMBIN(N,J) |
| Permutation of N objects J at a time: | =PERMUT(N,J) |
| Expected value | Use excel to make  column  Use the sum feature on  column  =sum() |

Probability rules:

|  |  |
| --- | --- |
| Event A not occurring | P(not A) = 1 – P(A) |
| And | Independent events    Dependent events |
| Either/Or | Non-overlapping events    Overlapping events |
| At least one |  |
| Odds | Odds for: Number of success: Number of failures  Odds against: Number of failures: Number of success |
| Expected Value | (Event 1 value) \* (event 1 probability) +  (Event 2 value) \* (event 2 probability) +  (Event 3 value) \* (event 3 probability) +  … |
| Arrangements with Repetition | r selections from a group of n choices = |
| Factorial |  |
| Permutations |  |
| Combinations |  |