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Introductory Statistics Lectures  
Quizzes

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## 1 Quizzes

### 1.1 Intro material

#### BASIC DEFS

#### Quiz

#### Questions

1. A researcher discovered a data entry error that caused her estimate of the mean amount of carbon dioxide in the atmosphere to be too low. Would this error be classified as a sampling error or a non-sampling error?
2. Which type of sampling would be likely to introduce less bias: a random sample or a simple random sample?
3. What would you type to store the data set  $\{3, 4, 2, 8\}$  in the variable  $x$  using R?
4. To estimate the mean height of students at Pima CC, we randomly select 5 classrooms and measure the height of all of the students in the 5 selected rooms. What type of sampling was used: simple random sample, convenience sampling, systematic sampling, stratified sampling, or cluster sampling?
5. What level of measurement does time in years represent? (nominal, ordinal, interval, or ratio)

## DESCRIPTIVE STATISTICS

## Quiz

## Questions

1. In a histogram, what do the heights of the bars represent?
2. Is a Parato chart used for qualitative or quantitative data?
3. Let  $x = \{1, 2, 3, 4\}$ . Fully simplify the following expression:

$$\sum x_i - 2$$

4. Let  $z = \{4, 0, 3\}$ . Fully simplify the following expression:

$$\sqrt{\sum z_i^2}$$

5. **BONUS:** Using only the variable  $i$ , write the following expression in summation notation:

$$2 + 4 + 6 + 8 + 10$$

## Quiz

## Questions

1. What does the standard deviation represent in words (be specific)?
2. What percentage of data would fall within  $\mu \pm 3\sigma$  as stated by the Empirical Rule?
3. If we classify a data point as **unusual**, what must its  $z$ -score's magnitude (absolute value) be greater than?
4. Which measure of center is least resistant (most affected) by outliers: the mean, median, or mode?
5. On a statistics exam  $Q_1 = 72\%$  and  $Q_3 = 94\%$ . What percent of students had a score that fell within the IQR?

## 1.2 Probability

## Quiz

## Questions

1. On a statistics exam  $Q_1 = 72\%$  and  $Q_3 = 94\%$ . What percent of students had a score that fell within the IQR?
2. An event A is defined as unusual if  $P(A) \leq x$ . What is the value of  $x$ .

Use the table below for the following questions. The table lists the color

|                               | red | blue |
|-------------------------------|-----|------|
| and size of marbles in a bag. |     |      |
| <b>small</b>                  | 8   | 2    |
| <b>large</b>                  | 4   | 6    |

3. What is the probability of randomly selecting a red marble?
4. What is the probability of randomly selecting a red marble or a small marble?
5. Find the probability of the compliment for the previous question.

**Quiz****Questions**

1. If a couple plans to have 3 children, what is the probability that they will have at least one girl?
2. What is the probability that two randomly selected people were born on the same day of the year?
3. What is the probability twins have the same birthday? (Think simple.)
4. If a class has 10 males and 10 females, what is the probability of randomly selecting 2 females without replacement?

**1.3 Random Variables**

## BINOMIAL DISTRIBUTION

**Quiz****Questions**

A statistics class consists of 100 students and 85 are right handed. Answer the following questions if 4 students are randomly selected without replacement.

1. Can the binomial distribution be used for this question? (Yes/No)
2. If we are interested in finding the probability that 3 in 4 students are left handed, what are  $x$ ,  $n$ , and  $p$  for this problem?
3. Find the probability that 3 in 4 students are left handed.
4. Find the probability that 2 or fewer students in 4 are left handed.

## NORMAL DISTRIBUTION

**Quiz****Questions**

Assume that heights of women are normally distributed with  $\mu = 63.6$  in and  $\sigma = 2.5$  in.

1. A women's club for tall people has a membership requirement that women must be at least 70 in tall. What percentage of women meet this requirement? (Make a sketch and do the calculation.)
2. The club's membership is too low, they want to reduce the requirement so that the tallest 25% of women will be able to enter the club. What should the new height requirement be? (Make a sketch and do the calculation.)

## CENTRAL LIMIT THEOREM

**Quiz****Questions**

The following questions regard  $\bar{x}$  and the Central Limit Theorem.

1. What is the difference between a population distribution and a sampling distribution?

2. To satisfy the Central Limit Theorem, one of two requirements must be met. What are the two requirements?
3. If we satisfy the CLT requirements, what type of distribution will  $\bar{x}$ 's have?
4. BONUS: What is the equation for  $\sigma_{\bar{x}}$ ?

## 1.4 Hypothesis Testing

### BASICS

#### Quiz

#### Questions

Answer the following basic questions on hypothesis testing:

1. A global warming researcher believes that the mean ( $\mu$ ) daily maximum temperature has increased from 82.2 degrees. What is the null hypothesis  $H_0$ ? (Hint:  $H_0 : \mu \dots$ )
2. What is the alternative hypothesis  $H_a$ ?
3. In hypothesis testing, we calculate the probability of observing the sample data ( $p$ -value) assuming one of the hypotheses is true. Do we assume the null hypothesis  $H_0$  is true or the alternative hypothesis  $H_a$  is true?
4. What is the decision rule we use to reject the null hypothesis  $H_0$ ?
5. When does a Type I error occur?

### CONTINGENCY TABLES: INDEPENDENCE, HOMOGENEITY

#### Quiz

#### Question

Each respondent in the Current Population Survey of March 1993 was classified as employed, unemployed, or outside the labor force. The results for men in California age 35-44 can be cross-tabulated by marital status, as follows:

|                    | Married | Divorced | Never Married |
|--------------------|---------|----------|---------------|
| Employed           | 679     | 103      | 114           |
| Unemployed         | 63      | 10       | 20            |
| Not in labor force | 42      | 18       | 25            |

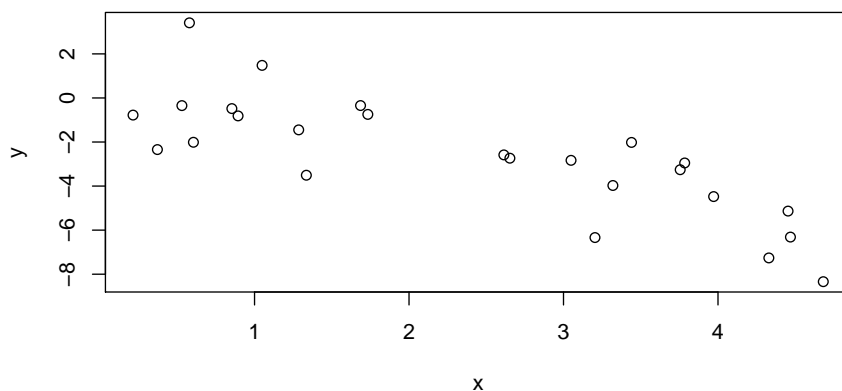
1. What are the two variables in this contingency table?
2. What is  $H_0$  and  $H_a$ ?
3. If the  $p$ -value  $\approx 0$  and  $\alpha = 0.05$ , what would your formal decision be?
4. What is your conclusion?

## 1.5 Regression ANOVA

### LINEAR CORRELATION

#### Quiz

#### Questions



Use the above plot to answer the following questions. Assume the relationship is significant.

1. Classify the relationship as either: perfect positive linear correlation, positive, perfect negative, negative, or non-linear correlation.
2. Which linear correlation coefficient best matches the data:  
5, 1, 0.8, 0.08, 0, -0.08, -0.8, -1, -5
3. Based on your above answer, what percent of variation in  $y$  is explained by  $x$ ?

## 1.6 Admin

### STUDENT EVALUATIONS

#### Student Evaluations

##### Information

Instructor: Tanbakuchi; Course: MAT167; Section: 22684; Campus: West;  
Class Time: TR 9:10-10:25 am

##### Additional Faculty Questions

- 15 I have found R to be a useful tool in this class. (As compared to doing the calculations by hand.)
- 16 If I need to do statistics outside of this class, I would consider using R.
- 17 I found the lecture notes to be a useful resource for learning the course material.

Your comments are the **most important** part! Please write any comments you have (use the back if needed). In particular, comment on the following:

- What were the strong aspects of the course or what did you like? (So I don't quit doing it.)
- What would change to make the class better?

Thanks!

### EXAM SEATING

#### MAT167 Exam I

| Seat | Name       | Seat.1 | Name.1    |
|------|------------|--------|-----------|
| 14   | Anjali     | 23     | Kristina  |
| 24   | Anyangatia | 6      | Lexi      |
| 21   | Ashlee     | 3      | Maria     |
| 28   | Brian      | 13     | Nathaniel |
| 12   | Brittney   | 4      | Rachel    |
| 15   | Casey      | 9      | Scott     |
| 11   | Emily      | 20     | Seung     |
| 18   | Ian        | 5      | Tasnia    |
| 8    | Jaclyn     | 27     | Trevor B. |
| 19   | Jennifer   | 25     | Trevor P. |

- (1) Sit in assigned seat (randomly assigned by R).
- (2) Keep R minimized when not using it.

#### Exam II Seating

| Seat | Name       | Seat.1 | Name.1    |
|------|------------|--------|-----------|
| 23   | Anjali     | 22     | Kristina  |
| 13   | Anyangatia | 4      | Lexi      |
| 21   | Ashlee     | 18     | Maria     |
| 20   | Brian      | 8      | Nathaniel |
| 12   | Brittney   | 16     | Rachel    |
| 9    | Casey      | 19     | Scott     |
| 17   | Emily      | 6      | Seung     |
| 27   | Ian        | 7      | Tasnia    |
| 11   | Jaclyn     | 28     | Trevor B. |
| 25   | Jennifer   | 3      | Trevor P. |

Randomly assigned by R.

#### Final Exam Seating

Randomly assigned by R.

| Seat | Name       | Seat.1 | Name.1    |
|------|------------|--------|-----------|
| 21   | Anjali     | 27     | Kristina  |
| 18   | Anyangatia | 16     | Lexi      |
| 6    | Ashlee     | 3      | Maria     |
| 15   | Brian      | 12     | Nathaniel |
| 20   | Brittney   | 17     | Rachel    |
| 8    | Casey      | 10     | Scott     |
| 25   | Emily      | 2      | Seung     |
| 24   | Ian        | 19     | Tasnia    |
| 26   | Jaclyn     | 11     | Trevor B. |
| 9    | Jennifer   | 5      | Trevor P. |