BIOS 600-001 (Bordonali)

Exam 1

9/30/10

CHAPTER 1 – MEASUREMENT

1. Classify the following variables as categorical, ordinal or quantitative

a) Injury severity (1=fatal, 2=severe, 3=moderate, 4=minor) ORDINAL

b) Concentration of arsenic in a sample of well water (mg/L) QUANTITATIVE

c) Religious identity (1=Buddhist, 2=Christian, 3=Hindu, 4=Jewish, 5=Muslim) CATEGORICAL

d) Number of previous miscarriages (1=None, 2=One, 3=2 or more) ORDINAL

CHAPTER 2 – STUDIES

2. Question about confounding/lurking?

4. Type of bias question?

5. Use histogram or freq table to answer questions

6. Factors/Treatments question?

|  |  |  |
| --- | --- | --- |
| 44. | A set of midterm exam scores has a median that is much larger than the mean. Which of the following statements is most consistent with this information? | |
| A) | A stemplot of the data would be symmetric. | |
| B) | A stemplot of the data would be skewed left. | |
| C) | A stemplot of the data would be skewed right. | |
| D) | The data set must be so large that it would be better to draw a histogram rather than a stemplot. | |
| Answer: | | B |
| Topic: | | 1.2 Describing Distributions with Numbers |

CHAPTER 4 – DESC. STATS

6. 4.17 a)-c) p. 87

The table below describes the percent of people without health insurance in the Southeastern U.S. by state.

a) Calculate the mean and median of these data. Compare these statistics. What does this tell you about the shape of the distribution?

b) Determine the 5 number summary for the data

c) Are there any outside values in the dataset?

CHAPTER 5 – PROBABILITY

7. Among females in the U.S. between 18 and 74 years of age, diastolic blood pressure (DBP) is normally distributed with mean \mu=77 mm Hg and standard deviation \sigma=11.6 mm Hg. What is the probability that a randomly selected woman has:

a) DBP less than 60 mm Hg?

b) DBP over 90 mm Hg?

c) DBP between 60 and 90 mm Hg?

CHAPTER 10 – CI

|  |  |  |
| --- | --- | --- |
| 1. | Determine whether each of the following statements is true or false. | |
| A) | The margin of error for a 95% confidence interval for the mean ** increases as the sample size increases. | |
| B) | The margin of error for a confidence interval for the mean **, based on a specified sample size *n*, increases as the confidence level decreases. | |
| C) | The margin of error for a 95% confidence interval for the mean ** decreases as the population standard deviation decreases. | |
| D) | The sample size required to obtain a confidence interval of specified margin of error *m* increases as the confidence level increases. | |
| Answer: | | A) False, B) False, C) True, D) True |

When 8 people in Massachusetts were hospitalized during an unexplained episode of vitamin D intoxication, it was suggested that these unusual occurrences might be the result of excessive supplementation of dairy milk. Blood levels of calcium for each individual at the time of admission are shown below.

a) Calculate the mean of these data.

b) Suppose prior research suggests that in the general population, the standard deviation of calcium is =0.15. Based on the hospital data, what is the margin of error for an ‘exact’ 95% confidence interval?

c) What is the ‘exact’ 95% confidence interval for the hospital data?

d) Suppose 4 more people were admitted to the hospital in the next week with the same condition. If we decided to include them in our data for building a 95% confidence interval, what would happen to the length of the confidence interval.

Calculate a 95% CI from some data.

|  |  |
| --- | --- |
| 11. | Suppose the heights of a simple random sample of 100 male sophomores were measured rather than 400. Which of the following statements is true? |
| A) | The margin of error for the 95% confidence interval would increase. |
| B) | The margin of error for the 95% confidence interval would decrease. |
| C) | The margin of error for the 95% confidence interval would stay the same, because the level of confidence has not changed. |
| D) | The standard deviation  would decrease. |
| Answer: |  |
| Topic: | 6.1 Estimating with Confidence |

3. Without carrying out the steps, would we reject or fail to reject 2-sided test based on the above CI?

CHAPTER 9 – HYP TEST

1. Fill in diagram for power, alpha, etc.

2. Define a p-value.

3. (9.11 p. 192)

Studies in the general population suggest that the gestational length of uncomplicated pregnancies varies according to a Normal distribution with mu=39 weeks and sigma=2 weeks. A sample of n=22 middle –class African American women demonstrates an average gestation length (xbar) of 38.5 weeks. We are interested in conducting a 2-sided hypothesis test to determine whether the mean gestation period in the African American women is significantly different from the expected value of 39 weeks. Assume alpha=0.05.

a) What are the null and alternative hypotheses for this test?

b) What is the (probability) quantity of interest for this test?

c) What is the test statistic?

d) What is the p-value?

e) In two sentences or less, state your decision and conclusion.