

Statistics Checkpoint Assignment #4 (Version C)

Directions:

- Watch the Checkpoint #4 Overview Video
- Do not place any solutions on the actual checkpoint assignment paper.
- Show all work and solutions on your own notebook paper.
- Only write on the front side of the notebook paper.
- Use plenty of spacing and dark print to make sure the paper is legible, follow the directions indicated for each problem or set of problems.

You must show all work to receive full credit, unless otherwise indicated.

Confidence Intervals

1. The following data represent the age (in weeks) at which babies first crawl based on a survey of 12 mothers conducted by Essential Baby (Source: www.essentialbaby.com). The ages are normally distributed.

The Age (in weeks) When a Baby First Crawled					
52	30	44	35	39	26
28	47	37	56	26	39

- a) Using technology (calculator or *Excel*), find the sample mean and the sample standard deviation. (Round two decimal places)
 - b) Find the 95% confidence interval for the population mean by hand. Show all work by writing the formula and substituting in the appropriate values. (Round two decimal places)
 - c) Find the 95% confidence interval for the population mean using technology (calculator). (Round four decimal places)
 - d) Interpret the solution in the context of the problem.
2. The General Social Survey asked: “How many e-mails do you send in a day?” The results of 928 respondents indicate that the mean number of e-mails sent in a day is 10.4, with a standard deviation of 28.5.
 - a) Find the 90% confidence interval for the population mean by hand. Show all work by writing the formula and substituting in the appropriate values. (Round two decimal places)
 - b) Find the 90% confidence interval for the population mean using technology (calculator). (Round four decimal places)
 - c) Interpret the confidence interval in the context of the problem.
 3. **College Score Card Data**
 - a) Use the College Score Card data to find $\hat{p}$ for the percentage of the colleges in the sample that are public. (Round 4 decimal places)
 - b) Construct a 99% confidence interval for the percentage of the colleges in the sample that are public by hand. Show all work by writing the formula and substituting in the appropriate values. (Round four decimal places)
 - c) Construct a 99% confidence interval for the percentage of the colleges in the sample that are public using technology (calculator). (Round four decimal places)
 - d) Interpret the confidence interval in the context of the problem.

4. The article “*Kids Digital Day: Almost 8 Hours*” (USA Today, January 20, 2010) summarized a national survey of 2,002 Americans ages 8 to 18. The sample was selected to be representative of Americans in this age group. Of those surveyed, 1,321 reported owning a cell phone.
 - a) Construct a 98% confidence interval for the population proportion of all Americans ages 8 to 18 who own a cell phone, p , by hand. Show all work by writing the formula and substituting in the appropriate values. (Round two decimal places)
 - b) Construct a 98% confidence interval for the population proportion of all Americans ages 8 to 18 who own a cell phone, using technology (calculator). (Round four decimal places)
 - e) Interpret the confidence interval in the context of the problem.
5. The standard IQ test has a mean of 100 and a standard deviation of 15. We want to be 99% certain that we are within 1.2 IQ points of the true mean. Determine the required sample size.
6. The owner of a bowling alley wants to estimate the percent of bowlers in the senior league. How large a sample must the owner select if he desires to be 95% confident that the sample percentage has a margin of error of three percentage points?
7. A researcher at major clinic wishes to estimate the proportion of the adult population of the United States that has sleep deprivation. How large a sample is needed in order to be 98% confident that the sample proportion will not differ from the true proportion by more than 3%?
8. A doctor at a local hospital is interested in estimating the birth weight of infants. How large a sample must she select if she desires to be 90% confident that her estimate is within 2 ounces of the true mean? Assume that $s = 5$ ounces based on earlier studies.

Hypothesis Testing

9. Many consumers pay careful attention to stated nutritional contents on packaged foods when making purchases, so it is important that the information on packages is accurate. A random sample of $n = 12$ frozen dinners of a certain type was selected and the calorie content of each one was determined. The stated mean caloric content is 240. Conduct a hypothesis test to determine if the mean caloric content is different than 240. Use a 1% level of significance.

Calorie Content					
255	244	239	242	265	245
248	225	226	251	233	259

- a) Using technology (calculator or *Excel*), find the sample mean and sample standard deviation. (Round two decimal places).
- b) Complete the following areas. Label the critical value and test statistic on the curve and shade the rejection region(s).

H_0 : _____

H_1 : _____

Type of Test: _____

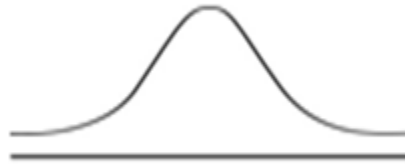
Test Statistic: _____ (2 decimal places)

Critical Value(s): _____ (2 decimal places)

P-Value: _____ (4 decimal places)

Reject or Fail to Reject: _____

Conclusion (express in a sentence in the context of the problem)



10. SAT Verbal Scores...Do students who learn English and another language simultaneously score worse on the SAT Critical Reading exam than the general population of test takers? The mean score among all test takers on the SAT Critical Reading exam is 501. A random sample of 100 test takers who learned English and another language simultaneously had a mean SAT Critical Reading score of 485 with a standard deviation of 116. Do these results suggest that students who learn English as well as another language simultaneously score worse on the SAT Critical Reading exam? Use a 1% level of significance.

a) Complete the following areas. Label the critical value and test statistic on the curve and shade the rejection region(s).

H_0 : _____

H_1 : _____

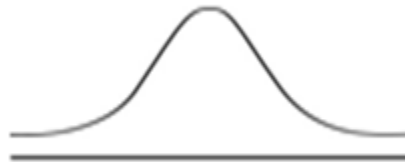
Type of Test: _____

Test Statistic: _____ (2 decimal places)

Critical Value(s): _____ (2 decimal places)

P-Value: _____ (4 decimal places)

Reject or Fail to Reject: _____



Conclusion (express in a sentence in the context of the problem)

10. College Score Card Data

A reporter has claimed that the majority of Colleges in the United States are Private For-Profit colleges. Using the College Score Card data as a sample and a 0.05 level of significance, test the claim that the majority of Colleges in the USA are private for-profit.

- a) Use the College Score Card data to find $\hat{p}$ for the proportion of colleges in the sample which are private for-profit. $\hat{p}$: _____ (Round 4 decimal places)
- b) Complete the following areas. Label the critical value and test statistic on the curve and shade the rejection region(s).

H_0 : _____

H_1 : _____

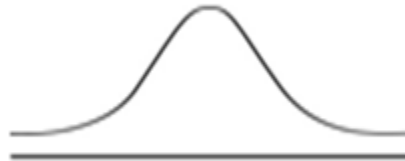
Type of Test: _____

Test Statistic: _____ (2 decimal places)

Critical Value(s): _____ (2 decimal places)

P-Value: _____ (4 decimal places)

Reject or Fail to Reject: _____



Conclusion (express in a sentence in the context of the problem)

12. *USA Today* (Feb. 17, 2011) described a survey of 1,008 American adults. One question on the survey asked people if they had ever sent a love letter using e-mail. Suppose that this survey used a random sample of adults and 205 stated that they had written a love letter using e-mail. Is this evidence that more than 20% of American adults have written a love letter using e-mail? Use a level of significance of 5%.

a) $\hat{p}$: _____ (3 decimal places)

b) Complete the following areas. Label the critical value and test statistic on the curve and shade the rejection region(s).

H_0 : _____

H_1 : _____

Type of Test: _____

Test Statistic: _____ (2 decimal places)

Critical Value(s): _____ (2 decimal places)

P-Value: _____ (4 decimal places)

Reject or Fail to Reject: _____

Conclusion (express in a sentence in the context of the problem)

