

Problem I. In a discussion of the education level of the American workforce, a pessimist says, “The average young person can’t even balance a checkbook.” The National Assessment of Adult Literacy (NAAL) survey indicates that a score of 289 or higher on its quantitative test reflects skills that include those needed to balance a checkbook. The NAAL administered the test to a random sample of 1001 young American men (aged 19 to 24). Their mean score was 279, a bit below the checkbook-balancing level. The standard deviation of the scores was 103. Please answer the following questions. (20 points total)

- (a) Please describe the population of interest. (2 points)

- (b) What is the variable being measured on the population? Is it quantitative or categorical? (2 points)

- (c) What is the population parameter of interest? Clearly describe this parameter in the context of this problem. (2 points)

- (d) State the hypotheses that would test the pessimist’s conjecture. (3 points)

- (e) What statistical test will you run to test the above hypotheses and what assumptions must you make in order to conduct the test? Please state the assumptions in the context of this problem. (3 points)

- (f) Find the test statistic and p-value of your test. Please show all calculator input. Clearly indicate your answers. (4 points)

Test statistic =

p-value =

- (g) What is your conclusion in the context of this problem, i.e. is the pessimist correct? You should justify your answer based on the value of your p-value in part (f). (4 points)

Problem II. A 95% confidence interval for the proportion of college graduates in California who had engaged in binge drinking while in college is (0.1146, 0.1434). Use this interval to answer the following. (12 points total)

(a) What was the point estimate for the percent of college graduates in California who had engaged in binge drinking while in college? (2 points)

(b) What is the margin of error of the confidence interval? (2 points)

(c) Place an X by each of the following scenarios that would result in a smaller margin of error for the confidence interval (you may place more than one X): (4 points)

_____ Use a smaller sample size because it will be easier to manage and control all of the binge drinkers.

_____ Use a smaller sample size because a smaller sample size will result in a smaller margin of error.

_____ Use a larger sample size because a larger sample size will result in a smaller margin of error.

_____ Compute a 90% confidence interval rather than a 95% confidence interval, because a smaller confidence level will result in a smaller margin of error.

(d) Consider the hypothesis $H_0 : p = 0.13$ against $H_a : p \neq 0.13$ where p is the proportion of college graduates in California who had engaged in binge drinking while in college. Use the confidence interval above to determine if you would reject or fail to reject the null hypothesis (i.e. justify your answer) and state your conclusion in the context of this problem. (4 points)

Problem III. In an October 2004 Gallup Poll 425 adults in a random sample of 1012 adults said having a gun in the house makes it a safer place to be. Please answer the following questions. (8 points total)

(a) Find a 95% confidence interval for the proportion of all adults who believe having a gun in the house makes it a safer place to be. Please show all calculator input. (4 points)

(b) Suppose you are a newspaper reporter. Describe the results of your confidence interval in language that would be understood by an educated newspaper reader. Your description should include information about the point estimate and margin of error, both in percent, as well information on the sample size and confidence level. (4 points)