Homework 8

S520, Spring 2019

Due at the beginning of class, Tuesday March 19th. Please upload your file to Canvas no later than 1pm on the due date. Late submission will be accepted (but penalized) before the solutions are posted.

Trosset question numbers refer to the hardcover textbook. Show all work.

1. (3 points) Trosset exercise 9.6.8.

2. (3 points) Trosset exercise 9.6.9.

3. A person wishes to show beyond reasonable doubt that he has psychic powers. He takes the test described in Trosset exercise 4.5.14, except he tries to identify 100 symbols, with a 20% chance of being right for each symbol if he does not have psychic powers. The result is that he correctly identifies 25 out of 100 symbols.

   (a) (2 points) Write down appropriate null and alternative hypotheses for this test.

   (b) (3 points) Suppose a person does not have psychic powers. Using the binomial or otherwise, find the probability they correctly identify 25 or more symbols out of 100.

   (c) (3 points) Has the psychic demonstrated his powers beyond reasonable doubt?

4. (3 points) In a 2015 Gallup poll, [1] 58% of a sample of 1009 U.S. adults supported same-sex marriage. Treating the data as a simple random sample, find a 95% confidence interval for the percentage of all U.S. adults who support same-sex marriage.

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[1] `http://www.gallup.com/poll/184217/support-gay-marriage-stable-high-court-ruling.aspx`. Note: The margin of error Gallup states is dfferent from what we would calculate, because they weight their data to reduce nonresponse bias.