

STA 2023 REVIEW III – Chapters 6-7 (not all-inclusive)

1. True/False
 - a) The width of a confidence interval increases as the sample size decreases, everything else held constant.
 - b) It is desirable for the width of a confidence interval to be large.
 - c) A Type I Error is committed whenever the null hypothesis is incorrectly rejected.
 - d) For an upper-tailed hypothesis test, if the critical value of z is 2.33 and the calculated test statistic is 2.57, the null hypothesis should be accepted.
2. If a 97% confidence interval for p is calculated to be (.53, .55), what is meant by “97% confidence”?
3. In a random sample of 150 clerical workers at a large company, 30 exhibit an intense dislike for their jobs. Calculate a 94% confidence interval for the proportion of all clerical workers at this company who exhibit an intense dislike for their jobs.
4. A telephone answering service records the length of each call. A random sample of 12 calls yields a mean length of 3.2 minutes with a standard deviation of 0.7 minute. Calculate a 95% confidence interval for the mean length of all phone calls for this answering service.
5. A marketing research firm wishes to determine the mean number of hours families in a particular community watch television per week. A random sample of 300 families in this community results in a mean viewing time of 26.8 hours with a standard deviation of 7.3. Do you have enough evidence to conclude the mean viewing time for families in this community exceeds 25 hours? Use $\alpha = .07$.
6. Define a Type I and Type II error in terms of problem #5.
7. In a random sample of 200 college students, 45 had taken Statistics in high school. Using $\alpha = .04$, do you have enough evidence to conclude the proportion of college students who have not taken Statistics in high school differs from .75?
8. Find the p —value for problem #7.

KEY (brief answers provided; show all work on the exam)

1. T, F, T, F
2. In repeated sampling, 97% of all the intervals constructed will contain p .
3. (.139, .261)
4. 2.76, 3.64
5. $z = 4.27$, yes
6. Type I: Conclude the mean viewing time/family in this community is greater than 25 hours when in fact it is less than or equal to 25 hours.
Type II: Conclude the mean viewing time/family in this community is less than or equal to 25 hours when in fact it is greater than 25 hours.
7. $z = .82$, no
8. .4122