SAMPLE QUESTIONS: Confidence Interval for difference between two proportions

Information

STT 231 students a few years ago had a theory that the proportion of American made cars parked in the north campus parking lots is different to the proportion of American made cars parked in the south campus parking lots. They randomly surveyed the cars parked on MSU campus by carefully dividing the parking lots into the two parts, north campus parking lots and south campus parking lots. Of the 200 north campus lots surveyed 105 had American made cars while out of the 200 south campus lots surveyed 110 had American made cars.

Hint: For 3 and 4 below, use the multiplier $z^*=1.96$.

1. What is the sample proportion of American made cars parked in the north campus parking lots and south campus parking lots?

2. Find the standard error for the difference between the sample proportions of American made cars parked in the north and south campus?

3. Find the 95% confidence interval for the difference between the true population proportions of American made cars parked in the north and south campus parking lots, that is, $p_{north} - p_{south}$?

4. Interpret the 90% confidence interval (-0.107 , 0.057) for the difference between the true population proportions of American made cars parked in the north and south campus parking lots, that is, $p_{north} - p_{south}$?

5. A 90% confidence interval for the difference between the true population proportions of American made cars parked in the north and south campus parking lots, that is, $p_{north} - p_{south}$ is given by (-0.107 , 0.057). Is there evidence to reject the null hypothesis that the proportions are the same and accept the STT231 students’ claim at 10 % level of significance that the proportion of American made cars parked in the north campus parking lots is different to the proportion of American made cars parked in the south campus parking lots?
   A. True, because 0 is inside the interval.
   B. False, because 0 is inside the interval.

6. The hypothesis test in question 5 is a:
   A. Two-tailed test
   B. One-tailed test