Name: AP Stats In class Quiz 4

1. A recent study of 1,000 randomly chosen residents in each of two randomly selected states indicated that the percent of people living in those states who were born in foreign countries was 6.5% for State A and 1.7% for State B. Find a 99% confidence interval for the difference between the proportions of foreign-born residents in these two states.
2. A researcher wants to know whether there is a difference in AP Statistics exam failure rates between rural and suburban students. She randomly selects 107 rural students and 143 suburban students who took the exam. Thirty rural students failed to pass their exam, while 45 suburban students failed to pass. Is there a significant difference in failure rates for these groups?
3. Owners of a chain of ice cream shops recently examined sales figures and noticed that on a randomly selected day, 21 of 103 ice cream customers from their shop located in the eastern part of the state ordered soft-serve ice cream, while 29 of 132 ice cream customers from their shop located in the western part of the state ordered soft-serve ice cream. Construct a 95% confidence interval to find the difference in proportions of customers who favor soft-serve ice cream in the two parts of the state.
4. Use the same information as in the previous problem. Is there a significant difference in the proportions of customers who favor soft-serve ice cream in the eastern and western parts of the state?
5. With an alpha level of 5%, what is the power of a test against an alternative for which the probability of a Type II error is 3%?
6. A major university expresses 95% confidence that about 90% to 93% of its students find employment in their field within one year of graduation. What is the margin of error implied in this statement?
7. Research indicates that about 30% of all smokers were early smokers, having smoked their first cigarette by age 14. In a random sample of 400 14-year-olds, 140 reported already having smoked their first cigarette. What is the standard error for a confidence interval for p, the proportion of early smokers?
8. A manufacturer of brick pavers maintains that 80% of the pavers produced by his company meet the standard 15-inch length.
   1. A company quality control specialist randomly samples 51 pavers and finds that 27 of them meet the standard. Does the quality control specialist have evidence to show that the proportion of pavers that meet the standard is different from the manufacturers claim?
   2. Find a 95% confidence interval for the proportion of pavers that meet the standard.
   3. Use your confidence interval to justify your decision in part (a).