

Name: _____

Date: _____

AP Statistics

Use a separate sheet of paper. You must show all work and all steps must be clearly labeled. Submitting just answers will result in a grade of 0! All unexplained numbers will be ignored and final answers must be written in complete sentences.

Inference for Proportions Mixed Practice

1. A recent report stated that only 20% of all college graduates find work in the field of their undergraduate major. A sample of 400 graduates from across the country found 100 working in the field of their undergraduate major. Does the sample provide evidence at the 5% significance level to indicate the percentage given in the report was too low?
2. Crohn's disease is a chronic inflammatory disease. A double-blind completely randomized experiment of 71 persons who were resistant to or intolerant to the standard therapy was conducted where 37 received cyclosporine and 34 a placebo.

<i>Population</i>	<i>Better</i>	<i>Not</i>	<i>Total</i>
<i>Cyclosporine</i>	22	15	37
<i>Placebo</i>	11	23	34

- a. Find a 95 percent confidence interval for the difference between the proportions of those who got better with cyclosporine compared to the placebo.
 - b. Interpret the confidence level.
3. In 1975, a random sample of 1484 adult U.S. citizens was surveyed, and 193 strongly agreed with the statement, "People should take care of themselves." Then, in 1991, a survey of 1013 adult U.S. citizens showed that only 61 strongly agreed with the statement. Does this indicate that the proportion of U.S. adult citizens who strongly agree with the given statement has dropped?
 4. According to the American Academy of Orthopedic Surgeons, 26.6% of all orthopedic treatments are to the knee. Let's assume that this report is based on sample data.
 - a. Compute a 99.5% confidence interval for the actual proportion of orthopedic treatments to the knee under the assumption that the sample estimate is based on a random sample of 1000 general orthopedic case treatments.
 - b. Suppose a random sample of 10,000 was used to compute the 99.5% confidence interval, how would the interval change?
 - c. Interpret the level of confidence.
 5. *Time Magazine* reported that in a 1994 survey of 507 randomly selected adult American Catholics, 59% answer yes to the question "Do you favor allowing women to be priests?"
 - a. Can we conclude whether more than half of American Catholics favor allowing women to be priests?
 - b. Could you run a different statistical process than you used on part "a" to achieve the same results?

6. The Reserve Mining Company of Minnesota commissioned a team of physicians to study the breathing patterns of its miners who were exposed to taconite dust. The physicians compared the breathing of 307 miners who had been employed in Reserve's Babbit, Minnesota, mine for more than 20 years with thirty-five Duluth area men with no history of exposure to taconite dust. Suppose the physicians determined that sixty-one of the 307 miners had breathing irregularities, and that five of the Duluth men had breathing irregularities. Give a 96% confidence interval for the difference between the proportion of miners with breathing irregularities and the proportion of Duluth residence with breathing irregularities.
7. You wish to estimate, with 80% confidence the true proportion of adults age 18 to 29 that have high blood pressure. Four and a half percent of a random sample of 155 adults in the specified age group was found to have high blood pressure. Compute the interval.
8. A Gallup Poll on energy use asked 512 randomly selected adults if they favored "increasing the use of nuclear power as a major source of energy." Gallup reported that 225 said "Yes." Does this poll give good evidence that fewer than half of all adults favor increased use of nuclear power? Give appropriate statistical evidence to support your conclusion.
9. The book *Secrets of Sleep* describes research on dreams. During normal sleep, there is a phase known as REM (rapid eye movement). For most people, REM sleep occurs about every 90 minutes or so, and it is thought that dreams occur just before or during the REM phase. If a person is wakened immediately after the REM phase, he or she usually can describe a dream that has just taken place. Suppose that two groups of subjects are randomly chosen for a sleep study. In group I, before going to sleep, the subjects spend 1 hour watching a comedy movie. In this group, there were a total of 175 dreams recorded of which 49 were dreams with feelings of anxiety, fear or aggression. In group II, the subjects went directly to sleep. In this group, there were a total of 180 dreams of which 63 were dreams with feelings of anxiety, fear or aggression. Does the data indicate that a comedy reduces the proportion of "bad" dreams at a 1% significance level? (*See Chp 12 PowerPoint online for answer.*)
10. Two polish math professors and their students spun a Belgian euro coin 250 times. It landed "heads" 140 times. One of the professors concluded that the coin was minted asymmetrically. A representative from the Belgian mint said the result was just chance. Do your own analysis. Write a few sentences explaining your conclusion. (*Hint: Run a one proportion z-test.*)