

Lab 14: Chapter 10

1. In a 2009 nonscientific poll on www.ESPN.com, 67% of the respondents believed that Roger Federer was going to defeat Andy Roddick in the 2009 Wimbledon Gentlemen's singles championship. Suppose that a survey of 150 tennis fans conducted in Europe at the same time resulted in 118 who believed that Federer was going to win. Perform a hypothesis test to determine if it is reasonable to conclude that the percentage of all European tennis fans who believed that Federer was going to win the 2009 championship was higher than 67%, the result in the ESPN.com poll. Use a 2% significance level.
2. Women athletes at the University of Colorado, Boulder, have a long-term graduation rate of 67% (Source: Chronicle of Higher Education). Over the past several years, a random sample of 48 women athletes at the school showed that 26 eventually graduated. Does this indicate that the population proportion of women athletes who graduate from the University of Colorado, Boulder, is now less than 67%? Use a 5% level of significance.
3. Is the national crime rate really going down? Some sociologists say yes! They say that the reason for the decline in crime rates in the 1980s and 1990s is demographics. It seems that the population is aging, and older people commit fewer crimes. According to the FBI and the Justice Department, 70% of all arrests are of males aged 15 to 34 years. Suppose you are a sociologist in Rock Springs, Wyoming, and a random sample of police files showed that of 36 arrests last month, 27 were of males aged 15 to 34 years. Use a 1% level of significance to test the claim that the population proportion of such arrests in Rock Springs is different from 70%.
4. A research center claims that at most 75% of U.S. adults think that drivers are safer using hands-free cell phones instead of using hand-held cell phones. In a random sample of 160 U.S. adults, 77% think that drivers are safer using hands-free cell phones instead of hand-held cell phones. At $\alpha = 0.01$, is there enough evidence to reject the center's claim?
5. When working properly, a machine that is used to make chips for calculators does not produce more than 4% defective chips. Whenever the machine produces more than 4% defective chips, it needs an adjustment. A factory worker who works next to the machine all day claims that the machine needs adjusting. To check if the machine is working properly, the quality control department at the company often takes samples of chips and inspects them to determine if they are good or defective. One such random sample of 300 chips taken recently from the production line contained 16 defective chips. Test the factory worker's claim that the machine is producing more than 4% defective chips. Use a level of significance equal to 1%.

6. What is your favorite color? A large survey of countries, including the United States, China, Russia, France, Turkey, Kenya, and others, indicated that most people prefer the color blue. In fact, about 24% of the population claim blue as their favorite color (Reference: Study by J. Bunge and A. Freeman-Gallant, Statistics Center, Cornell University). Suppose a random sample of $n = 56$ college students were surveyed and $x = 12$ of them said that blue is their favorite color. Does this information imply that the color preference of all college students is different (either way) from that of the general population? Use $\alpha = 0.05$.
7. A research center claims that at least 46% of U.S. adults think that the IRS is not aggressive enough in pursuing people who cheat on their taxes. In a random sample of 600 U.S. adults, 246 say that the IRS is not aggressive enough in pursuing people who cheat on their taxes. At $\alpha = 0.01$, is there enough evidence to reject the center's claim?
8. DUI The U.S. Department of Transportation, National Highway Traffic Safety Administration, reported that 77% of all fatally injured automobile drivers were intoxicated. A random sample of 27 records of automobile driver fatalities in Kit Carson County, Colorado, showed that 15 involved an intoxicated driver. Do these data indicate that the population proportion of driver fatalities related to alcohol is less than 77% in Kit Carson County? Use $\alpha = 0.01$.
9. The following is based on information from *The Wolf in the Southwest: The Making of an Endangered Species* by David E. Brown (University of Arizona Press). Before 1918, the proportion of female wolves in the general population of all southwestern wolves was about 50%. However, after 1918, southwestern cattle ranchers began a widespread effort to destroy wolves. In a recent sample of 34 wolves, there were only 10 females. One theory is that male wolves tend to return sooner than females to their old territories where their predecessors were exterminated. Do these data indicate that the population proportion of female wolves is now less than 50% in the region? Use $\alpha = 0.01$.
10. Athabasca Fishing Lodge is located on Lake Athabasca in northern Canada. In one of its recent brochures, the lodge advertises that 75% of its guests catch northern pike over 20 pounds. Suppose that last summer 64 out of a random sample of 83 guests did, in fact, catch northern pike weighing over 20 pounds. Does this indicate that the population proportion of guests who catch pike over 20 pounds is different from 75% (either higher or lower)? Use $\alpha = 0.05$.