Examples of Hypothesis Tests involving one sample proportions

1. Many people have misconceptions about how profitable small, consistent investments can be. In an Associated Press survey of 1010 randomly selected U.S. adults, only 374 responded that they thought that an investment of $25 per week over 40 years with a 7% annual return would result in a sum of over $100,000 (the correct amount is $286,640). Is there sufficient evidence to conclude that fewer than half of U.S. adults are aware that such an investment would result in a sum of over $100,000? Test the relevant hypotheses using $\alpha = 0.05$.

2. Drug testing of job applicants is becoming increasingly common. The Associated Press reported that 12.2% of those tested in a California sample tested positive. Suppose that this figure had been based on a random sample of size 600. Does this sample support a claim that more than 10% of job applicants in California test positive for drug use? Test with a significance level of 1%.

3. White remains the most popular car color in the United States, but its popularity appears to be slipping relative to other colors. According to an annual survey by DuPont, white was the color of 20% of the vehicles purchased last year, a decline of 4% from the previous year. (According to a DuPont spokesperson, white represents “innocence, purity, honesty, and cleanliness.”) A random sample of 400 cars purchased last year in a certain metropolitan area resulted in 100 that were white. Does the proportion of all cars purchased in this area that were white appear to differ from the national percentage? Test the relevant hypotheses using $\alpha = 0.05$. 