AP Statistics   One-Sample Proportion Test Homework

1) A test of H_o: $p = 0.65$ against H_a: $p < 0.65$ has a test statistic of $z = -1.78$.

a) What conclusion would you draw at the 5% significance level? At the 1% significance level?

b) If the alternative hypothesis were H_a: $p \neq 0.65$, what conclusion would you draw at the 5% significance level? At the 1% level?

2) A drug manufacturer claims that less than 10% of patients who take its new drug for treating Alzheimer's disease will experience nausea. To test this claim, researchers conduct an experiment. They give the new drug to a random sample of 300 out of 5000 Alzheimer's patients whose families have given informed consent for the patients to participate in the study. In all, 25 of the subjects experience nausea.

a) Do these data give evidence of the manufacturer's claim that less than 10% will experience nausea? Justify your answer with statistical evidence.

b) Describe a Type I error and a Type II error in this setting, and explain the consequence of each.

c) The test has a power of 0.54 to detect that $p = 0.07$. Explain what that means.

d) Identify two ways to increase power in part (c).

3) People of taste are supposed to prefer fresh-brewed coffee to the instant variety. On the other hand, perhaps more coffee drinkers just want their caffeine fix. A skeptic claims that only half of all coffee drinkers prefer fresh-brewed coffee. To test this claim, a random sample of 50 coffee drinkers in a small city was asked to take part in the study. Each person tastes two unmarked cups---one containing instant coffee and one containing fresh-brewed coffee---and says which he or she prefers. Thirty-sic of the 50 choose the fresh coffee.

a) The two cups were presented to each coffee drinker in a random order, so that some people taested the fresh coffee first while others drank the instant coffee first. Why do you think that was done? What type of experiment is this called?

b) Do these results give convincing evidence that coffee drinkers favor fresh-brewed over instant coffee? Carry out a significance test at the 1% level.

4) In a recent study, 73% of first-year college students responding to a national survey identified "being very well-off financially" as an important personal goal. A state university finds that 132 of an SRS of 200 of its first-year students say that goal is important.

(a)Is there good evidence that the proportion of all first-year students at this university who think being very well-off is important differs from the national value, 73%? Use a 5% significance level.

(b) Construct and interpret a 95% confidence interval for the true proportion p of all first-year students at the university would identify being well off as an important goal.

(c) Using just the interval, does the national value apply to this university? Explain. Does this confirm your answer in part (a)?