

STAT 2290 Homework 7

Hand in on April 29 or 30 with or before your quiz.

Read these instructions:

- Show your work. Answers without proper justifications receive no credit.

Exercise 1. (Hypothesis testing for mean with known population standard deviation)

An LED lamp manufacturer guarantees that the mean life of a certain type of LED lamp is at least 25,000 hours. A random sample of 49 LED lamps has a mean life of 24,800 hours. Assume the population is normally distributed and the population standard deviation is 500 hours. At $\alpha = 0.05$, do you have enough evidence to reject the manufacturer's claim?

Exercise 2. (Hypothesis testing for mean with known population standard deviation)

A cookie manufacturer claims that the mean sugar content in each of the cookies produced is no more than 18%. A random sample of 56 cookies has a mean sugar content of 19%. Assume the population standard deviation is 4%. At $\alpha = 0.02$, do you have enough evidence to reject the manufacturer's claim?

Exercise 3. (Hypothesis testing for mean with unknown population standard deviation)

It is generally accepted that the mean body temperature of an adult human is 98.6°F. However a recent study finds that in a random sample of 130 adult humans, the average temperature of the subjects is 98.25 with a standard deviation of 0.73. Does this recent study provide convincing evidence against the conventional wisdom that $\mu = 98.6^\circ F$?

Exercise 4. (Test for proportions)

People of taste are supposed to prefer fresh-brewed coffee to the instant variety. On the other hand, perhaps many 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, we ask a random sample of 50 coffee drinkers in a small city to take part in a study. Each person tastes two unmarked cups— one containing instant coffee and one containing fresh-brewed coffee—and says which he or she prefers. We find that 36 of the 50 choose the fresh coffee. Do these results give convincing evidence that coffee drinkers favor fresh-brewed over instant coffee?