

Quiz #11

IMPORTANT: In the problems below, you must state clearly (1) the hypothesis you are testing (2) the probability model of the test statistic you use and (3) the conclusion of the hypothesis testing problem. When you use R, you must report the command you use with all the relevant parameters.

(1) In comparing the times until failure (in hours) of two different types of light bulbs, we obtain the sample characteristics $n_1 = 38$, $\bar{x} = 964$, $s_x^2 = 6,942$ and $n_2 = 45$, $\bar{y} = 995$, $s_x^2 = 8,330$. Test the hypothesis that the average duration of the second type of light bulbs is higher than the first type at significance level $\alpha = 0.01$.

(2) A study is conducted to evaluate the analgesic effectiveness of a daily dose of oral methadone to reduce pain and each subject is given either methadone or placebo without knowing which treatment they were taking. The table below gives the mean maximum pain intensity scores for each subject, where higher number indicate higher pain. Do these data provide sufficient evidence that the maximum pain intensity is lower on days when methadone is taken? Let $\alpha = 0.005$.

Subject	Methadone	Placebo
1	29.8	57.2
2	73.0	69.8
3	98.6	98.2
4	58.8	62.4
5	60.6	67.2
6	57.2	70.6
7	57.9	67.8
8	89.2	95.6