QMB: Estimation and Testing

Task 1. A service company claims that their repair time is less than 24 hours in 90% of cases. The repair times of the company over a month have been recorded. There have been 8 cases during a month with repair times: 2.6, 12.2, 8.3, 28.6, 0.5, 19.0, 16.3, 5.7.

a) Calculate the sample mean and the standard error of the mean.

b) Draw a normal plot and comment the distribution.

c) Give a 95% confidence interval for the expected repair time.

d) The service company claims that their average repair time is less than 4 hours. Carry out a t-test.

e) Use the repair time data. Assume that the normal distribution actually had the parameters as we estimated. Calculate the probability that the repair time is larger than 24 hours. Comment!

Task 2. Use the data on housing rents.

a) Check the normal distribution of the new variable `rps` (rent per square meter) for the nre and non-nre appartments separately.

b) Carry out a two-sided t-tests with equal variances assumed and not assumed of the null hypothesis that there is no difference in rps between non-nre and nre appartments.

c) Carry out a one-sided t-test with equal variances not assumed. Formulate the null-hypothesis and alternative hypothesis first.

Task 3. Use the data on housing rents:

a) Carry out a χ^2 test for independence for the two variables number of `rooms` and `nre`. Modify the test (or the categories), if needed. Give your interpretation!

b) Check the standardized residuals (Use `resid()` on the chisquare object).