Tutorial Business Analytics

Tutorial 2

Exercise 2.1

The consumption per person is measured in index values, where a high index value represents a high consumption. The following table embodies index values for 10 individuals before and after a tax increase.

Individual no. i	Index value previous to the tax increase (a)	Index value after the tax increase (b)	Difference (d=a-b)
1	27	40	-13
2	31	36	-5
3	23	43	-20
4	35	34	1
5	26	25	1
6	27	41	-14
7	26	32	-6
8	18	29	-11
9	22	21	1
10	21	36	-15

a.) Determine if there is a significant difference between consumption prior to the tax increase and after, utilizing a hypothesis test (significance level $\alpha = 0.05$). The difference is assumed to be normally distributed.

b.) Check your result applying t.test() in R.

Exercise 2.2

According to the information supplied by the manufacturer of a certain type of car, its gas consumption in city traffic is approximately normally distributed with expected value $\mu = 9.5l\,/100km$. The standard deviation $\sigma = 2.5l\,/100km$ is commonly known (to the general public and the manufacturer). In order to review the manufacturers prediction, a consumer organization has performed a test on 25 cars which yielded the following result:

Average gas consumption: $\bar{x} = 10.5l\,/100\ km$

Check the manufacturers statement with a suitable test at significance level of $\alpha = 0.05$ and a second time with $\alpha = 0.01$.