ML - Task2 - Hypothesis testing

Q1.Suppose a child psychologist claims that the average time working mothers spend talking to their children is at least 11 minutes per day. You conduct a random sample of 1000 working mothers and find they spend an average of 11.5 minutes per day talking with their children. Assume prior research suggests the population standard deviation is 2.3 minutes.Conduct a test with a level of significance of alpha = 0.05.
H0=11=μ0
Ha≠11
n=1000

x=11.5
s=2.3
α=0.05

Using ZScore Method
Z = (x - μ0) / (s/√n)
=(11.5-11) / (2.3/√1000)
=6.878

From ZScore table we get 1.65 corresponding to CI= 0.95
Thus it is in the rejection area and the null hypothesis is rejected

Q2. A coffee shop claims that their average wait time for customers is less than 5 minutes. To test this claim, a sample of 40 customers is taken, and their wait times are recorded. The sample mean wait time is found to be 4.6 minutes with a standard deviation of 0.8 minutes. Perform a hypothesis test at a significance level of 0.05 and determine whether there is enough evidence to support the coffee shop's claim.

$H0 < 5 = \mu 0$
$Ha >= 5$
n=40

x=4.6
s=0.8
α=0.05

Using ZScore Method
$Z = (x - \mu 0) / (s/\sqrt{n})$
$= (4.6-5) / (0.8/\sqrt{40})$
$= -3.97$

From ZScore table we get -1.645 corresponding to CI= 0.05
Thus it is in the rejection area and the null hypothesis is rejected