Análisis y diseño de experimentos - Gutiérrez Pulido. **Example 2.4 Weight of sacks.**
A candy manufacturer buys sacks of sugar from a certain sugar mill. According to the sellers, the sacks have a mean weight of 50.1 Kg, with a variance of ($\sigma^2 = 0.5$). The buyer suspects that the mean weight is lower. To confirm their suspicion, they decide to test the hypotheses:

$$H_0: \mu = 50.1$$

$$H_A: \mu < 50.1$$

with a significance level of 95%. To do this, they randomly select three sacks from each of the following five orders. They weigh the 15 sacks and obtain $\overline{X} = 49.4$ and $S^2 = 1.2$.

Solution:

A One-Sample t-test for the mean will be carried out on Minitab. The null hypothesis is that the population mean is equal to the hypothesized mean of 50.1, given by the sellers. Alternatively, if the mean of the sugar sacks is less than 50.1, the sellers are not complying with the stipulated weight in the agreement.

The steps for the hypothesis test are described below:

Step 1. Inside Minitab, go to Stat -> Basic Statistics -> 1-Sample t
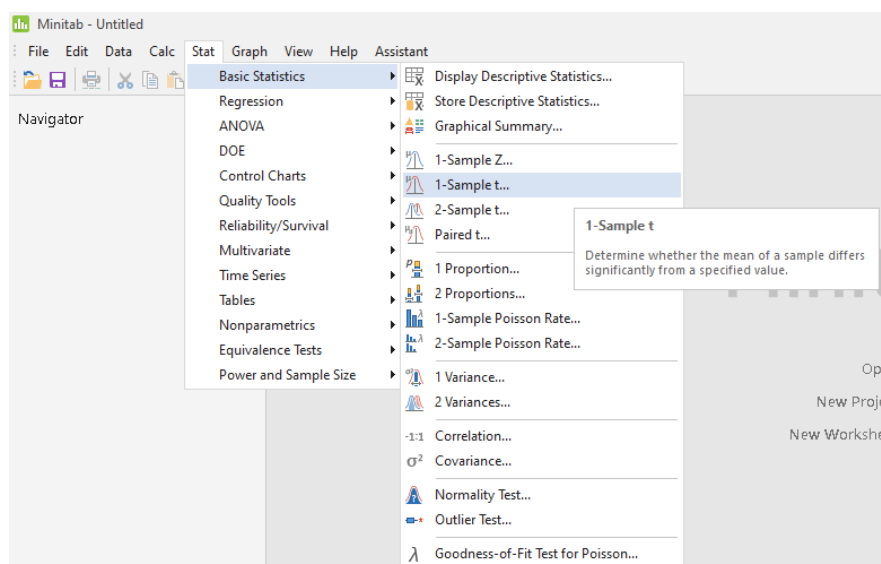
Step 2. Fill in the necessary information about the problem (Confidence level, type of Alternative hypothesis, sample size, sample mean and variance / standard deviation of the sample)
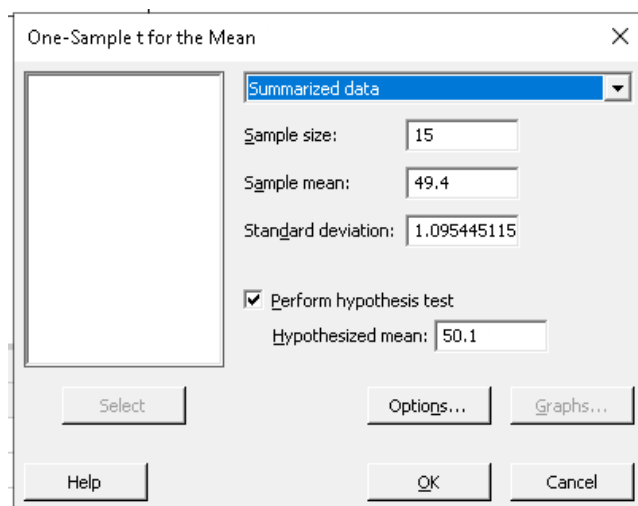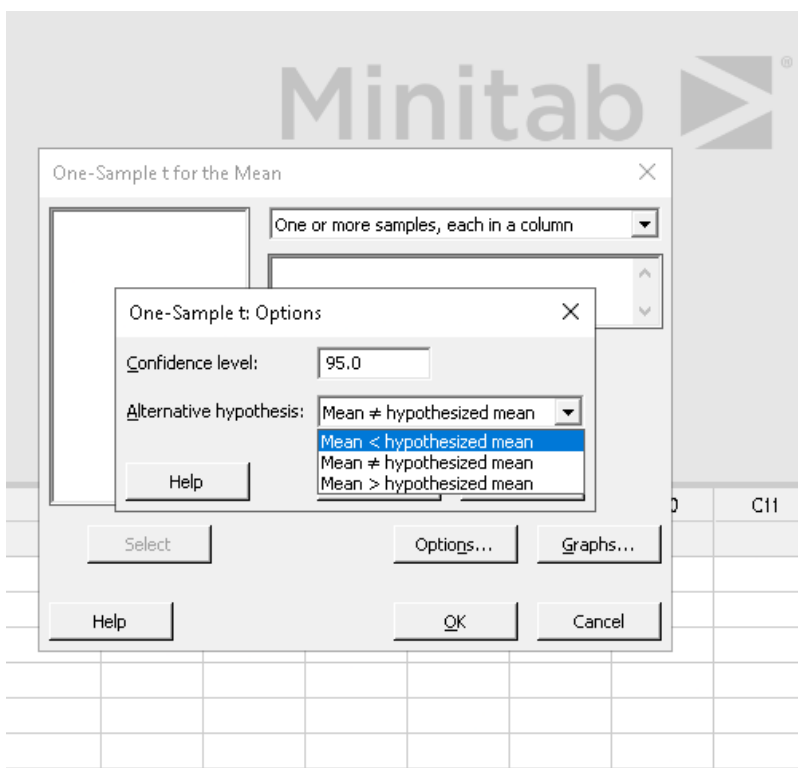
Step 3. Analyze the results of the test:

⊞ WORKSHEET 1

One-Sample T

N	Mean	StDev	SE Mean	95% Upper Bound for μ
15	49.400	1.095	0.283	49.898

μ: mean of Sample

Test

Null hypothesis H_0: $μ = 50.1$
Alternative hypothesis H_1: $μ < 50.1$

T-Value	P-Value
-2.47	0.013

Given that p < 0.05 (p = 0.013), <u>we reject the null hypothesis</u>, and thus, we conclude that **the mean of the sugar sacks is less than 50.1**, proving the incompliance of the sellers.