Practice, confidence intervals

1. Confidence interval for the population mean (μ), if population standard deviation (σ) is known.
1.1.The mean height of first year pharmaceutical students is 175 cm with SD= 10. Let' s suppose the height follow normal distribution with these parameters.
a) What percentage of the height is above 175 cm…….
b) What percentage of the height is below 175 cm? P(height<175)=…………
c) What percentage of the height are between 155 and 195?
d) What percentage of the height is below 155 cm?
1.2. Calculate the mean and standard error of mean of a sample of 36 cases derived from this population
Mean…….. S.E.…….
1.3 The mean of another random sample with 36 number of cases is 172and SD=10. Calculate the 95% confidence interval…………………..

What is the meaning of the 95% CI? ……………………………………………
Compare the population mean (175) with the 95%CI calculated. It is included in the 95%CI?..................

2. Confidence interval for the population mean (μ), if population standard deviation (σ) i unknown.
2.1. (Example from Altman). In a trial we actually observed a mean serum albumin of 34.46 g/l with a standard error of 1.273 g/l from a sample of 21 patients with primary biliary cirrhosis. Find the 95% confidence interval.
α=
N=
Mean=
SE=
Degrees of freedom=
t_α=
Mean- t_α SE= Mean+ t_α SE=
Confidence interval:
Meaning:
P(………………<true population mean< ……………)=0.95
We can be 95% confident from this study that the true mean serum albumin among all such patients lies somewhere in the range 31.8 to 37.1 g/l, with 34.46 as our best estimate. This interpretation depends on the assumption that the sample of 21 patients is representative of all patients with the disease.

2.2. Find the 99% confidence interval
α=
N=
Mean=
SE=
Degrees of freedom=
t_α=
Mean- t_α SE= Mean+ t_α SE=
Confidence interval:
Meaning:
P(………………<true population mean< ……………)=0.99

2.3. Suppose that the above data were observed from a sample of 216 patients. Find the 95% confidence interval.
α=
N=
Mean=
SE=
Degrees of freedom=
t_α=
Mean- t_α SE= Mean+ t_α SE=
Confidence interval:
Meaning:
P(………………<true population mean< ……………)=0.95

2.4. In a study, systolic blood pressure of 10 healthy women was measured. The mean was 119, the standard error 0.664. Calculate the 95% confidence interval for the population mean!
(α=0.05, t_{tabla}=2.26).

2.5. In a study, systolic blood pressure of 10 healthy women was measured. The mean was 119, the standard error 2.1. Calculate the 95% confidence interval for the population mean!
(α=0.01, t_{tabla}=2.26).
Compare the lenght of this last confidence interval to the earlier one (in Problem 2.4.).
.... Explain ………………………………..

Questions
1. Which is wider, a 95% or a 99% confidence interval?
2. When you construct a 95% confidence interval, what are you 95% confident about?
3. When computing a confidence interval, when do you use *t*-table and when do you use *u*?

Practice with SPSS:
Open the data file of the questionnaire filled out by the students in SPSS! (Data:E/Data/Biostat=kerd??.sav) or QUEST2010.sav.
1. Examine the distribution of "age"!
Find the 95% CI…………………….
Find the 99% CI……………………..
With 95% probability, can we state that the mean age in the population of students is 20?...........
Explain……………
With 99% probability, can we state that the mean age in the population of students is 20?...........
Explain……………2. Examine the distribution of "body height" for boys and girls!
Find the 95% CI for boys ……………………. girls ………………….
Find the 99% CI for boys ……………………. girls ………………….

With 95% probability, can we state that the mean body height in the population of girls is 160 cm? ....
Explain……………
With 95% probability, can we state that the mean body height in the population of boys is 160 cm? ....
Explain……………
With 99% probability, can we state that the mean body height in the population of girls is 160 cm? ....
Explain……………
With 99% probability, can we state that the mean body height in the population of boys is 160 cm? ....
Explain……………