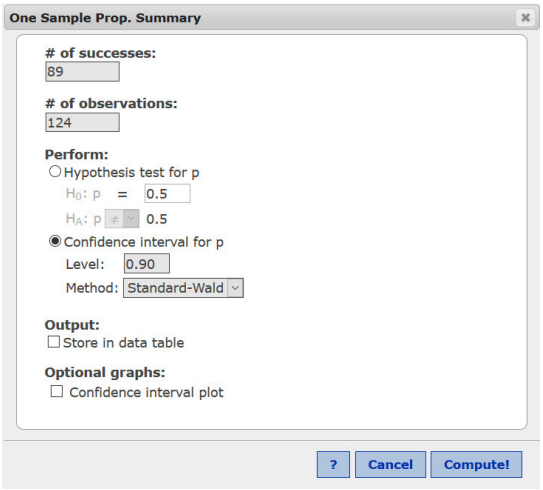
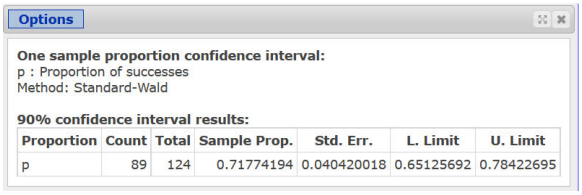
Math 21 – Summer – Written Project 3 (Chapters 9-10)

1) What percentage of young drivers run red lights? A survey of 124 drivers aged 18 to 25 showed that 89 of them run red lights. Construct a 90% confidence interval for the proportion of all drivers aged 18 to 25 that run red lights.

Confidence Interval, Proportion

$\hat{p} = 89/124$



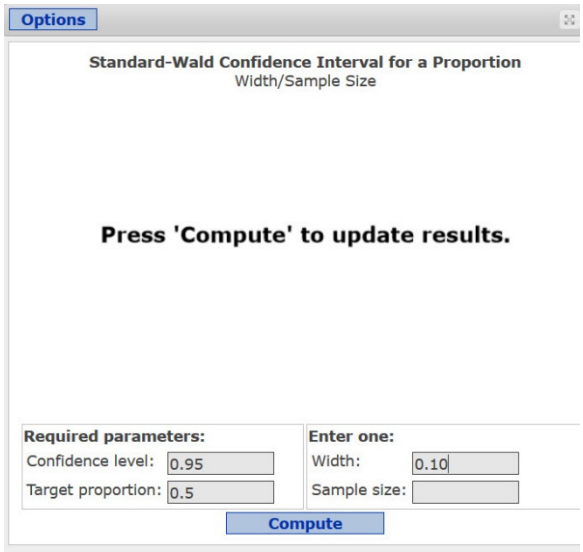


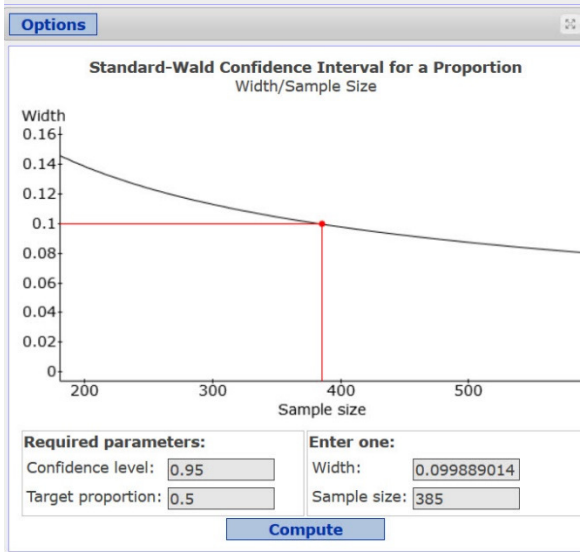
Proportion	Count	Total	Sample Prop.	Std. Err.	L. Limit	U. Limit
p	89	124	0.71774194	0.040420018	0.65125692	0.78422695

We are 95% confident that the proportion of all drivers aged 18 to 25 that run red lights is between 0.6513 and 0.7842.

2) A researcher wants to determine what proportion of all high school students have Internet access at home. He has no idea of what the sample proportion will be. How large of a sample is required in order to be 95% sure that the sample proportion is off by no more than 5%?

Sample Size, Proportion
Margin of Error = 0.05, Width = 0.10
Level of Confidence = 0.95
Target Proportion unknown (Use 0.05)





A sample of size 385 is needed.

3) A random sample of 13 accountants showed that they had a mean salary of $46,328 and a standard deviation of $17,298. Use this sample to test the claim that the mean accountant salary is higher than $40,000 at the 0.05 level of significance.

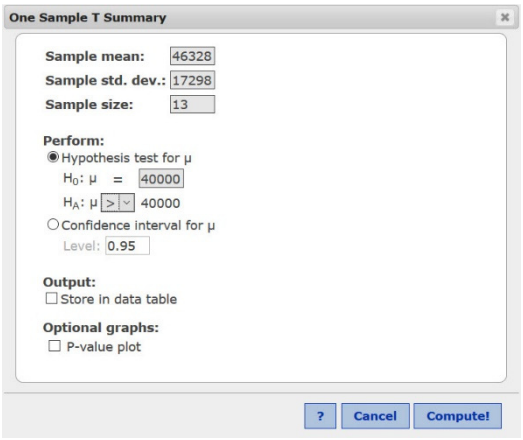
One Mean Hypothesis Test

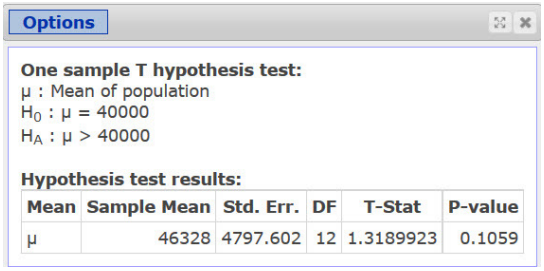
Step 1: H0: $\mu = 40000$ *H1:* $\mu > 40000$

Step 2: $\alpha = 0.05$

Step 3: One Mean Test

Step 4:





t = 1.32, P-value = 0.1059

Step 5: Fail to reject H0.

There is not sufficient evidence to conclude that the mean accountant salary is higher than $40,000.

4) It is claimed that 60% of all 18- to 25-year olds have used alcohol in the past 30 days. A survey of 125 students on campus who are between the ages of 18 and 25 showed that 83 have used alcohol in the past 30 days. Test the claim at the 0.05 level of significance.

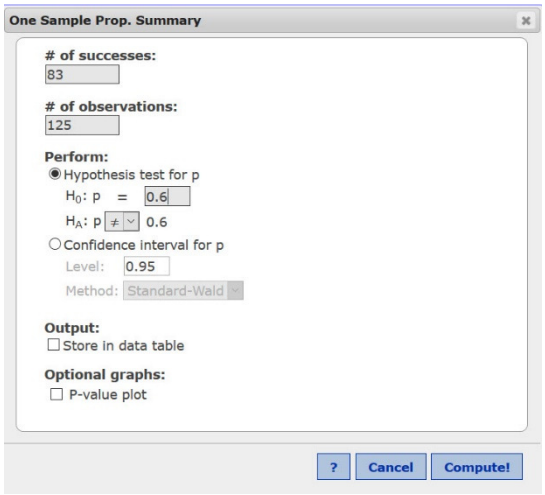
One Proportion Hypothesis Test

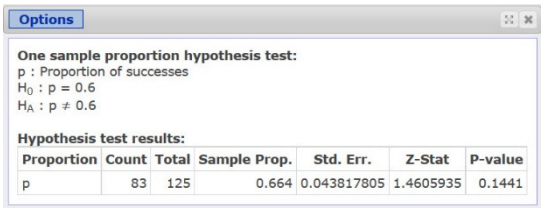
Step 1: H0: $p = 0.60$ *H1:* $p \neq 0.60$

Step 2: $\alpha = 0.05$

Step 3: One Proportion Test

Step 4:





z = 1.46, P-value = 0.1441

Step 5: Fail to reject H0.

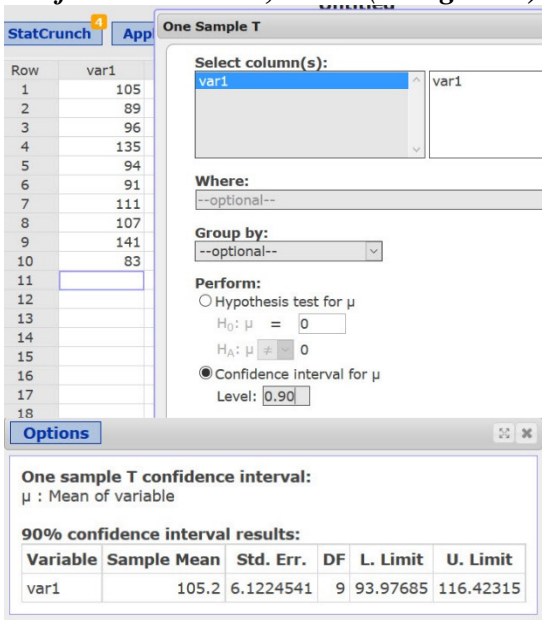
There is not sufficient evidence to conclude that the proportion of 18- to 25-year-olds who consumed alcohol in the past 30 days is different than 60%.

5) Here are 10 randomly selected blood sugar levels from a laboratory. (Levels measured after a 12-hour fast in mg/DL.)

105 89 96 135 94 91 111 107 141 83

Construct a 90% confidence interval for the mean blood sugar level of all people after a 12-hour fast.

Confidence Interval, Mean (Using Data)



We are 90% confident that the mean blood sugar level of all people after a 12-hour fast is between 93.98 and 116.42.

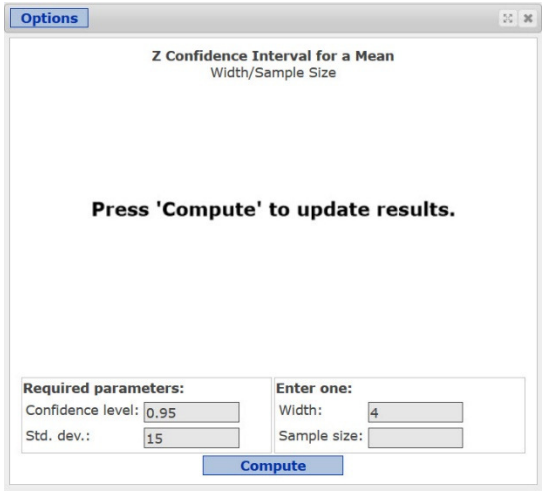
6) The public relations officer at a college wants to estimate the mean IQ of all college students. If she wants to be 95% confident that her sample mean to be off by no more than 2 points, how large of a sample is necessary? The standard deviation for IQ scores is 15 points.

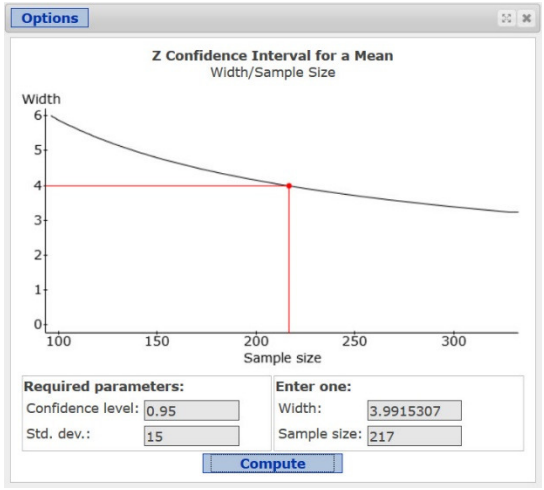
Sample Size, Mean

Margin of Error = 2, Width = 4

Level of Confidence = 0.95

Standard Deviation = 15





The sample size that is needed is 217.