Data in EXCEL format: http://people.ysu.edu/~gchang/stat/ncbirth2625.xls
Data is SPSS format: http://people.ysu.edu/~gchang/stat/ncbirth2625.sav
(If you use R Commander, you can import either EXCEL or SPSS file into R Commander.)

1. Find the 95% confidence interval for the average birth weight in the population.

   116.83±1.32

2. Find the 95% confidence interval for the average birth weight from smoking mothers population.

   110.39±3.17

3. Find the 95% confidence interval for the average birth weight from nonsmoking mothers population.

   118.18±1.45

Estimation of population proportion:

4. Find the 95% confidence interval for the percentage of smoking mother in the population.

   17.3%±2.4%

5. Find the 95% confidence interval for the percentage of babies that were below normal birth weight in the population.

   8.0%±1.7%

6. Find the 95% confidence interval for the percentage of mothers having below normal birth weight babies among those mothers who were smokers.

   14.5%±5.3% (from software output)

   14.5%±5.3% (from your own computation using the formula in lecture note and the counts and percentages statistics from software)

Part 2: Hypothesis Test for Mean

Adam claimed that his average morning pulse rate is 65. A group of his friends do not think so and they took a random sample of 12 morning pulse rates from Adam on 12 randomly selected days. The data is the following: 70, 67, 67, 68, 66, 72, 75, 68, 68, 66, 68, 69.

The following link has an SPSS example for performing the one-sample t-test:
http://people.ysu.edu/~gchang/SPSSE/SPSSOneSampleTTest.pdf
The following link has an SPSS instruction video for performing the one-sample test:
http://people.ysu.edu/~gchang/SPSS/TTestOneMean.html

The objective of this research is to see if **Adam's average morning pulse rate is different from 65 per minute**. (Perform a one-sample t-test at 5% level of significance.)

Use the pulse rates data above to answer the following questions:

1) State the null and the alternative hypotheses:

   H_0 (Null): ____ Adam's average morning pulse rate is 65_____

   H_a (Alternative): ____ Adam's average morning pulse rate is different from 65__

2) Is the normality assumption valid? (Verify this using the **p-value** of the Shapiro-Wilk normality test.)

   Not valid because p-value from normality test is .032 which is less than 0.05.

3) What is the value of the t-test statistic: ___4.875_____

4) What is the value of the p-value of the test: __.000___(two-sided test p-value)_____

5) Would you reject the null hypothesis? **(Use the p-value of the t-test.)**
   Yes I would reject the null hypothesis since the p-value is less than 0.05.

6) Draw a conclusion for this test:

   There is sufficient evidence to support that Adam's average pulse rate is statistically significantly different from 65.

7) Find the 95% confidence interval estimate for Adam's average morning pulse rate.

   68.67 ±1.66

8) If one wishes to see if Adam's average morning pulse rate is higher than 65, what would you conclude the analysis using the statistics above?

   H_0: Adam's average morning pulse rate is 65; H_a: Adam's average morning pulse rate is higher than 65. Since the t-test statistic is in favor of the alternative hypothesis, so p-value for this test is half of the p-value from two sided test. There is sufficient evidence to support that Adam's average pulse rate is statistically significantly greater than 65.

Part 3: Hypothesis Test for Proportion

A group of researchers wish to see if "**more than 40% of the people living in a major city often ate dinner after 7 PM**". A random sample of 400 people from this city was surveyed and 224 of them often had dinner after 7 PM. Please perform a test at 5% level of significance to test their hypothesis, and answer the following questions.

1) State the null and the alternative hypotheses:

   H_0 (Null): $p = 0.40$

   H_a (Alternative): $p > 0.40$ (or, more than 40% of the people often ate dinner after 7pm)

2) What is the value of the z-test statistic: _6.53
   (If you want to use t-test to approximate the z-test result as in my SPSS video, you need to first enter the data using Weight Case option to create the data file and then following the SPSS video for t-test approximation for this z-test.)

3) What is the value of the p-value of the test: ____.000_____

4) Would you reject the null hypothesis? **(Use the p-value of the t-test.)**
   Yes. The p-value is less than 0.05, therefor we reject the null hypothesis and support the alternative hypothesis.

5) Draw a conclusion for this test:

   The data support the alternative hypothesis that, in this city, the proportion of people who often had dinner after 7 pm is more than 40%.

Please use the following space to show your software output that can support your answers for 2) and 3) in Part 3.

Descriptives

Binomial Test

		Category	N	Observed Prop.	Test Prop.	Exact Sig. (1-tailed)
group	Group 1	eats late	224	.6	.4	.000
	Group 2	eats on time	176	.4		
	Total		400	1.0		