1. In a study of health behavior, a random sample of 300 subjects from a major city was surveyed. In this random sample, 170 responded that they had dinner mostly after 8 PM.

   a) Use this data to construct a 95% confidence interval estimate to estimate the percentage of people in the sampled population who had dinner mostly after 8 PM.

   b) If one wishes to estimate the percentage of people in the sampled population who had dinner mostly after 8 PM with margin of error no more than 5%, how large a sample is required?

   c) If one wishes to estimate the percentage of people in the sampled population who had dinner mostly after 8 PM with margin of error no more than 5%, how large a sample is required? (It is believed this percentage is around 60% and will be used for the sample size estimation.)

2. A researcher hypothesized that the average heart performance score (HPS) for a certain population is less than 7. A sample of 9 subjects randomly chosen from this population was taken and data is the following:

   Data: 6.5, 5.5, 7.1, 4.5, 5.6, 5.1, 6.8, 6.6,

   Mean = 6.0; S.D. = 0.87

   a) What is the proper test procedure for this analysis?

   b) Check the normality assumption using SPSS output of normality test below and comment on the normality assumption using p-value.

<table>
<thead>
<tr>
<th>Tests of Normality</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Kolmogorov-Smirnov</td>
</tr>
<tr>
<td>Statistic   df  Sig. Statistic  df  Sig.</td>
</tr>
<tr>
<td>Heart Performance Score</td>
</tr>
<tr>
<td>a. This is a lower bound of the true significance.</td>
</tr>
<tr>
<td>a. Lilliefors Significance Correction</td>
</tr>
</tbody>
</table>

   b) State the hypothesis.

   Null hypothesis:

   Alternative hypothesis:
c) What is the value of the test statistic?

d) What is the decision rule? (Use either p-value approach.)

e) Draw a conclusion for this test using p-value approach.

f) Find the 95% confidence interval estimate for the average heart performance score for the sampled population.

g) If one wishes to estimate the average HPS for this population with a margin of error within 2, how large a sample would be needed? (The standard deviation is believed to be around 1.2 and is to be used for this sample size estimation.)

3. A researcher wishes to perform a one sample test for the average weight reduction to see if the new treatment can reduce the weight using a 5% level of significance.

a) Find the sample size so that one can have a 90% power to reject the null hypothesis if the new treatment can actually help reducing weight by 20 lbs on average. (The standard deviation of weight reduction measures is approximately equal 30.)

b) Find the sample size so that one can have a 90% power to reject the null hypothesis if the new treatment can actually help reducing weight by 20 lbs on average with a two-sided test. (The standard deviation of weight reduction measures is approximately equal 30.)