Instructions: Show all work. Answers without work can only be graded all or nothing. Partial credit is available only when work is shown. Answer all parts of each problem. Provide explanations as indicated. You may use Minitab or any other statistical software (such as a calculator or Excel) to complete any required statistical calculations or graphs.

1. A population has a mean $\mu = 81$ and a standard deviation $\sigma = 5$. Use this information and the Empirical Rule to estimate the following.
   a. The probability a randomly selected observation will be between 76 and 86.

   68%

   b. The probability randomly selected observation will between 76 and 91.

   81.5%

   c. Between which two values will fall 99.7% of the population?

   66 and 96

2. A dataset has 157 observations and the value 46 corresponds to the 112 observation. Estimate the percentile represented by the value 46.

   Approximately 71st percentile

3. For the same dataset in #2, at what position (rank) would one find the value corresponding to the 90th percentile?

   Approximately 141st position

4. A coin is flipped 15 times. In how many different ways can one obtain 6 heads? What is the probability of such a result?

   $\binom{15}{6} = 5005, \frac{5005}{2^{15}} = \frac{5005}{32,768} = 0.1527$

5. Suppose that 25 names written on pieces of paper are placed in a jar and thoroughly mixed. Seven names are chosen from the jar in order. How many different ways are there to select those 7 names?

   $25P7 = 2,422,728,000$