ENGR 115
Homework No. 1

Name:

1. A random sample of 27 concrete beams was taken to be tested for flexural strength in MPa (a measure of ability to resist failure in bending). The data are summarized below.

   5.9, 7.2, 7.3, 6.3, 8.1, 6.8, 7.0, 7.6, 6.8, 6.5, 7.0, 6.3, 7.9, 9.0,
   8.2, 8.7, 7.8, 9.7, 7.4, 7.7, 9.7, 7.8, 7.7, 11.6, 11.3, 11.8, 10.7

   a) Classify the variable as discrete or continuous.
   b) Construct a stem-and-leaf display, and comment on the distribution.
   c) Construct a complete frequency distribution table (i.e. class, frequency, cumulative frequency, relative frequency, and cumulative relative frequency). Choose 5 classes with an interval of 1.5 MPA. Start the distribution at 5 MPa.
   d) Construct the graph of "category vs. cumulative relative frequency."
   e) Comment on the trend.
   f) Based on part "d," approximately what percentage of the beams showed a flexural capacity of more than 10 MPa?
   g) Approximately what percentage of the beams showed a flexural capacity of between 6.0 PMa to 8.0 MPa?
   h) Determine the 35%, 89% values.
   i) Determine the sample mean, variance and standard deviation? You may use Excel to do these computations. Is the distribution normal or skewed? If skewed, specify the direction.

2. A sample of 20 glass bottles of a particular type was selected, and the internal pressure strength of each bottle was determined. Consider the following partial sample information:

   Median = 202.2
   lower fourth = 196.0
   Upper fourth = 216.8

Three smallest observations	125.8	188.1	193.7
Three largest observations	221.3	230.5	250.2

   Are there any outliers in the sample? Any extreme outliers?

3. Assume the resting heart rates for a sample of individuals are normally distributed with a mean of 70 and standard deviation of 15. Use the Empirical Rule to find the following quantities.
   A) Percentage of rates less than 55.
   B) Percentage of rates less than 100.
   C) Percentage of rates greater than 85
   D) Percentages of rates between 55 and 100