Prince Sultan University

Department of Mathematical Sciences

STAT 101 – First Examination

24 March 2010

Time allowed: 90 minutes
Maximum points: 45 points

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1. (12 points) The following data represent the scores for a sample of 10 students on a 20-point chemistry quiz:

   16 14 2 8 12 12 9 10 15 13

   (a) Find the median, the lower and upper quartiles, and the IQR for these data.
   (b) Calculate the sample mean and sample variance.
   (c) Calculate the z score for the smallest and largest observations. Is either of these observations unusually large or unusually small? Why?
   (d) Are the measurements symmetric, skewed to the right or skewed to the left? Why?

2. (6 points) A distribution of measurements is relatively mound-shaped with mean 55 and standard deviation 5.
   (a) What proportion of the measurements will fall between 40 and 60?
   (b) If a measurement is chosen at random from this distribution, what is the probability that it will be greater than 65?

3. (4 points) The mean and variance of a sample of $n = 25$ measurements are 80 and 100, respectively. Explain in detail how to use Tchebysheff's Theorem to describe the distribution of measurements.

4. (4 points) For Labrador Retriever dogs, the average weight at 12 months of age is 50 pounds with a standard deviation of 2.5 pounds. What can be said about the proportion of 12 month old Labrador Retrievers that will weigh between 46.25 pounds and 53.75 pounds?

5. (9 points) The weight of a can of soup is supposed to be 15 ounces. Each may vary slightly from this standard. The weights for 18 cans of soup are listed below.

14.5	15.0	15.1	16.0	15.2	13.9
14.7	14.9	15.5	15.6	15.1	14.9
16.1	14.8	14.9	15.1	14.6	13.5

   (a) Construct a stem and leaf plot to describe the data. (What is the leaf unit?)
   (b) Find the median, mean, and the mode.
   (c) What can be said about the shape of the distribution of the data? Why?

6. (10 points) A garbage carrier would like to start charging by the weight of a customer's garbage rather than the number of cans. The weights (in pounds) of 90 randomly selected cans of garbage are summarized in the chart below.

Class	Interval	Frequency
1	4.9 to < 8.9	4
2	8.9 to < 12.9	11
3	12.9 to < 16.9	16
4	16.9 to < 20.9	27
5	20.9 to < 24.9	19
6	24.9 to < 28.9	10
7	28.9 to < 32.9	3

(a) Construct the relative frequency histogram.
(b) Describe the shape of the distribution.
(c) Determine the modal class. What is the mode?
(d) What percentage of the cans weigh less than 20.9 pounds?
(e) What percentage of the cans weigh at least 24.9 pounds?
