Directions: Students must complete all test questions. The use of textbooks is allowed, but notes not in the textbook are NOT allowed. Students are also allowed the use of a calculator. All work, other than direct calculations done on a calculator, MUST be shown. A correct answer with no work shown will receive NO credit.
1. The following is a stem-and-leaf plot of the scores on a midterm of large statistics class of 58 students.

<table>
<thead>
<tr>
<th>Stem</th>
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</tr>
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<tbody>
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<td>01233333344577888999</td>
</tr>
<tr>
<td>10</td>
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</table>

(a) Calculate the median and the mode for the above data set.

(b) Make a boxplot for the above data set. (Be sure to show any calculations that you use.)
2. Given below are the numbers of students in ten different MAT 121 recitations.

16 12 17 18 20 18 17 15 17 17

(a) Calculate the mean of the sample.

(b) Calculate the standard deviation of the sample.

(c) Calculate the variance of the sample.

(d) Does the sample contain any outliers? Use z-scores to justify your answer.
3. In a test of the MicroSort method of gender selection, 51 babies are born to couples trying to have baby boys, and 39 of those babies are boys.

(a) If the gender-selection method has no effect and boys and girls are equally likely, find the mean and standard deviation for the number of boys born in groups of 51.

(b) Is the result of 39 boys unusual? Does it suggest that the gender-selection method appears to be effective?
4. A certain slot machine is configured so that there is a $1/2000$ probability of winning the jackpot on any individual trial. A woman claims to have won the jackpot twice in only 5 trials.

(a) Find the probability of exactly two jackpots in 5 trials.

(b) Find the probability of at least two jackpots in 5 trials.

(c) Does the woman's claim of two jackpots in only 5 trials seem valid? Explain.
5. Suppose that men's heights are normally distributed with mean 69.0 in. and standard deviation 2.8 in.

(a) If a standard doorway has a height of 80 in., find the probability that a randomly selected man will be too tall to fit through the doorway without bending.

(b) If a statistician designs a house so that all of the doorways have heights that are sufficient for all men except the tallest 4%, what doorway height would be used?
6. Assume that cans of Coke are filled so that their weights are normally distributed with a mean of 12.00 oz. and standard deviation of 0.11 oz.

(a) Find the probability that a randomly selected can will have a mean weight of at least 12.15 oz.

(b) If a person buys a six pack of cans of Coke, what is the probability that the mean weight of the six cans will be at least 12.15 oz.?
7. When Mendel conducted his famous genetics experiment with peas, one sample of offspring consisted of 426 green peas and 154 yellow peas.

(a) Find a 95% confidence interval estimate of the percentage of yellow peas.

(b) Based on his theory of genetics, Mendel expected that 25% of the offspring peas would be yellow. Given that the percentage of offspring yellow peas is not 25%, do the results contradict Mendel's theory? Why or why not?
8. A study was done to determine the mean body temperature of healthy humans. The study found the body temperature of 106 subjects of which $\bar{x} = 98.20^\circ\text{F}$ and $s = 0.62^\circ\text{F}$. Using the sample statistics, construct a 99% confidence interval estimate of the mean body temperature of all healthy humans. Does the confidence interval contain $98.6^\circ\text{F}$? What does the sample suggest about the use of $98.6^\circ\text{F}$ as the mean body temperature?