Sample Problems – Test 1
Math 143 – Fall 2000

1. Below are 5 boxplots and 5 histograms from 5 data sets. Match them up. (Boxplots and histograms were given.)

2. Each of the distributions below has the same scale. (Histograms were given.)
   a) Which has the largest standard deviation?
   b) Which has the smallest standard deviation?
   c) Which has the largest mean?
   d) Which have a mean that is clearly larger than the median? (There may be more than one.)

3. Compute the mean and standard deviation of the following small data set: 1, 2, 4, 5, 8. Do this "by hand" showing all of your work and using a calculator only to perform arithmetic operations like addition, subtraction, multiplication, division, square roots, etc. That is, do not use any statistical functions on your calculator.

4. What is bias? Give one example (you can make it up) of a situation where poor statistical design could lead to bias and explain what could be done to eliminate or reduce the bias in that situation. [Similar types of questions could be asked about other important words. Check the vocabulary list on the calendar and boldfaced words in section summaries. I also sometimes make use of multiple choice, true/false, or matching questions.]

5. Answer the following questions as accurately as you can using Table A from your book. If you the best you can do from the table is to give a value that is a little to high and a value that is a little too low, please give both values. Be sure to show some work as you answer the following questions.

   A certain test is standardized in such a way that the mean score is 40 and the standard deviation is 5.
   a) What Z-score is associated with a test score of 48.5?
   b) Approximately what percentage of people score above 48.5 on the test?
   c) Approximately what percentage of people score between 37.0 and 48.5 on the test?
   d) Fred scored in the 65th percentile. (This means that 65% of test takers scored below Fred.) What was his test score? What percent of the test takers did better than Fred?

6. Consider the probability chart below which shows the probabilities for sex and favorite color in Mr. Ortez’s class.

<table>
<thead>
<tr>
<th></th>
<th>Red</th>
<th>Yellow</th>
<th>Blue</th>
</tr>
</thead>
<tbody>
<tr>
<td>boy</td>
<td>.15</td>
<td>.05</td>
<td>.25</td>
</tr>
<tr>
<td>girl</td>
<td>.10</td>
<td>.25</td>
<td>.20</td>
</tr>
</tbody>
</table>

Let \( M \) be the event that a student is a boy (male), \( F \) be the event that a student is a girl (female), \( R \) be the event that a student’s favorite color is red, \( Y \) be the event that a student’s favorite color is yellow, and \( B \) be the event that a student’s favorite color is blue. For each of the following, express the probability using probability notation and determine the numerical value.

If a student is selected at random from Mr. Ortez’s class:
   a) What is the probability of selecting a boy?
   b) What is the probability that the student’s favorite color is blue, given that the student is a girl?
   c) What is the probability that the student is a girl, given that the favorite color is blue?