Math 121 **Test #1 Solutions** **Spring 2005**

1. A Type I error is to believe that North Korea does not have nuclear weapons when in fact it does. A Type II error is to believe that North Korea does have nuclear weapons when in fact it does not.

2. (a) The direction of extreme is two-sided.
   (b) $\alpha = \frac{2}{15}$. (The x's over 10 and 50 in Bag A.)
   (c) $\beta = \frac{5}{15}$. (The x's over 20, 30, and 40 in Bag B.)
   (d) p-value $= \frac{10}{15}$. (The x's over 10, 20, 40, and 50 in Bag A.)
   (e) Rejection of H_0 because the p-value is smaller than α.

3. (a) The sample is the set of high school students who were in the survey.
   (b) 100000.
   (c) All high school students in the U.S.
   (d) It was an observational study.
   (e) The 3/4 figure is a statistic because it comes from a sample, not the population.
   (f) The explanatory variable is whether the student has taken a course dealing with either the media or the First Amendment. The response variable is whether the student believes people should be allowed to express unpopular opinions.

4. (a) Type `123` → `rand`, then `randInt(1, 100)` and hit `Enter` twice. You get 71 and 28.
   (b) Type `456` → `rand`, then `randInt(1, 200)` and hit `Enter` four times. You get 196, 59, 153, and 194.
   (c) Stratified sampling.
   (d) Yes. Each person has a $\frac{1}{50}$ chance of being selected.
   (e) Selection bias. Women would be systematically eliminated from the sample.

5. (a) It was an experiment.
   (b) There were 6 treatments.
   (c) Replication was used.
   (d) Response bias.
   (e) Confounding factor.

6. (a) Qualitative.

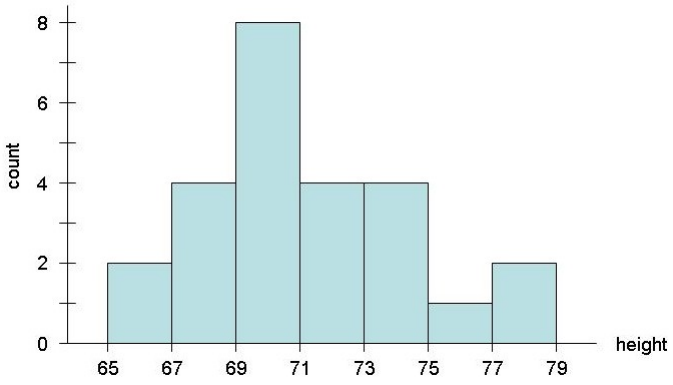
   (b) Qualitative.

   (c) Quantitative continuous.

   (d) Quantitative discrete.

7. (a) A histogram would be more appropriate because the variable (height) is continuous. Bar graphs are for qualitative (nonnumerical) data.

   (b) Many choices are possible. Here is a histogram using class width 2 and starting point 65:



   (c) Your answer depends on your drawing. The best answers for most drawings are (ii) unimodal and (v) skewed right.