Statistical Analysis of Genetic Data
Math 155, Spring 2008
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HW #5

Due Friday, March 7

1. There are three sources of variability present in almost every data set. Which source is for the variability that
   (a) you can nearly always expect to be chance-like?
   (b) will be chance-like if you assign conditions using a chance device?
   (c) will nearly always not be chance-like?
2. True or False?
   (a) An important reason why large samples are better than small ones is that the bigger the sample, the smaller the bias.
   (b) If you have a sample of several measurements, all made under the same conditions, you can usually tell, just from looking at the numbers, whether the sampling process is biased and whether the measurement process was biased.
   (c) If you have a sample of several measurements, all made under the same conditions, you can usually get some idea, just from looking at the numbers, about how big the measurement errors are.
   (d) An important reason why large samples are better than small ones is that chance-like errors tend to cancel each other when you compute averages.
3. List three fundamental principles of experimental design. For each, give one example of how it is applied in microarray experiments.
4. Give two fixed and two random effects in your particular experiment.
5. Give one advantage and one disadvantage for each of the reference design, the balanced block design, and loop design in microarrays.