1. (12 points) Suppose that there are three populations with gene frequencies for allele $A$ of 0.1, 0.2, and 0.5. In each generation a fraction 0.9 of each population comes from the population and the rest come equally from the other two. (This is true for all three populations). What is the ultimate gene frequency in the populations? How quickly is this attained (i.e. how long does it take to get halfway to the equilibrium gene frequencies?). *Hint: this looks hard but all that is necessary is that you look through the various models in chapter IV until you find one that handles this case – then figure out how to use the equations that are given for that model.*

2. (13 points) Two populations exchange migrants. They are of equal size and have migration rate $m$ between them. There is a locus which has fitnesses of $AA$, $Aa$, and $aa$ which are $1 : 1 - s : 1$. Suppose that allele $A$ is at initial frequency 0.1 in population 1 and 0.9 in population 2. If $m$ is considerably smaller than $s$, what will be the approximate gene frequencies in each population when everything settles down to equilibrium? *Hint: there is an analogy here of migration to mutation. This one can be done exactly by equations using the symmetry of the situation, or approximately using the analogy – I’ll take whichever you feel you can handle.*