1. You’ve taken over the maintenance of a garden plot from an Austrian monk. The garden contains 867 purple pea plants (P) and 133 white pea plants (p). The purple phenotype is dominant. Assume for simplicity that each plant produces 10 gametes and that there is random mating. Each of the genotypes have the following fitness: \( W_{PP} = 1.0, W_{Pp} = 0.6, W_{pp} = 0.4. \)

a. What is the frequency of each allele (P & p) in the gamete pool of generation 0?
b. What is the expected genotypic frequency under a HWE assumption (no selection)?
c. What is the expected genotypic frequency under selection?
d. What is the allelic frequency after selection?
2. For 15 years, beginning in the early 1970’s, Norway rat populations were controlled throughout the United States and England using the rodenticide warfarin. However, resistance quickly developed and was linked to the dominant allele designated R. Unexposed populations carried predominately the susceptible allele (S). In rural England the genotypic frequencies (RR, RS and SS) in unexposed rat populations were 0.18, 0.49 and 0.33, respectively. In one sample of a 60 km² area of rural England where the rodenticide had been applied the genotypes RR, RS and SS were found at frequencies of 0.085, 0.627 and 0.287 respectively. What is the fitness of each of these genotypes? What equilibrium allelic frequencies would you expect if warfarin use had been continued?