

# Homework 8

Math 469, Spring 2024

This homework is due on Friday, March 8<sup>1</sup> at 11:30 am. (Turn in your answers – via Gradescope – to questions 1–3.)

0. (*This problem is not to be turned in.*)
  - (a) Read Section 3.1
  - (b) Skim Sections 3.2–3.6 (see problem #1 below).
  - (c) Read Section 3.7
1. Is anything in Sections 3.2–3.6 related to the paper you are reading for the final project? Explain briefly.
2. Assume the hypotheses of the Hardy-Weinberg Law (Theorem 3.2) for a gene with alleles  $A$  and  $a$ . Assume that after one generation, 16% of the population has genotype  $aa$ .
  - (a) What percentage of the population (after one generation) has genotype  $AA$ ? What percentage has  $Aa$ ?
  - (b) If originally 10% of the population had genotype  $aa$ , what percentage originally had  $AA$ ? What percentage had  $Aa$ ?
3. Read the first three pages of Michael Reed’s article, “Why Is Mathematical Biology So Hard?”, available at <https://www.ams.org/notices/200403/comm-reed.pdf>. Which issues that he brings up (for instance, no fundamental laws of biology or the problems of levels) are relevant for the paper you are reading for your project? *You may complete this problem together with your project partner – if so, only one of you needs to turn in this part, but state clearly on both homeworks that you are doing this, and include your partner’s full name (first and last name).*

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<sup>1</sup>The day of the midterm exam.