Questionnaire Responses – April 18, 2014

1. **How much drawing will there be on the midterm?** None. **Are there proofs on the midterm?** No. **What is the format of the exam/midterm structure?** There are 5 multi-part problems covering Chapters 1-4, and 7. **Practice exam?** I'll post some practice problems and hand out more practice problems in class on Monday for review.

2. **Reduce the number of homework problems assigned before a midterm. Homework will cut into studying time.** This past homework covers material that will be on the exam, including Chapters 4 and 7.

3. **I still need to review the last couple of chapters intensely.** If you have questions, please email me questions, make an appointment for office hours, or go to tutorial. Also, the book is a good resource with worked-out examples (different from those in class) in each chapter. Work through these examples and see the step-by-step solutions in the book.

4. **I appreciate the examples.** Great. If people request it, I'm happy to post extra worked-out examples and practice problems on the website as the term progresses.

5. **Give students time to do exercises in class.** We will do a problem session/review (by popular demand) on Monday and see how it goes. Perhaps I'll incorporate some extra in-class exercises during normal class time as well.

6. **Chapter 7 totally lost me... class is over my head and I am just copying hoping I'll understand later.** This class moves fast. Especially Chapter 7, which we did in a week and involves some new concepts and tools from linear algebra. If you'd like to talk more, come to office hours, or make an appointment if you are unavailable during those times. See the next answer for more.

7. **I'm not sure I would understand the linear algebra concepts if I hadn't taken Math 24.** In Math 23, we use a few ideas from Linear Algebra (eigenvalues and eigenvectors) as tools for solving systems of differential equations. We only introduce as much linear algebra as we need to solve these systems. Therefore, it seems like these ideas are coming from nowhere, when in fact, as you learn in Math 22 or 24, they're actually very important in their own right and have very interesting properties of their own. For this class, all you need to know about eigenvalues and eigenvectors is how to use them to solve systems of linear differential equations. (1) Find eigenvalues (by setting the determinant of $\boldsymbol{A} - \lambda \boldsymbol{I}$ equal to 0), (2) check whether they are real distinct, complex, or repeated, (3) find eigenvectors (or just one in the case of complex or repeated), (4) find the solution of the system. In the case of real distinct eigenvalues, you can just write the solution down. In the other two cases, it's a little more complicated, but should be straightforward.

8. **I feel like I understand how to solve these systems, but I'm not sure why I'm doing it.** In real life, most applications of differential equations involve modeling real world phenomena or behavior with a system of differential equations. Systems can be used to model much more complicated behavior than just a single differential equation. This includes much of physics, population models, models of tumor growth, models of the spread of disease, climate models, etc. We can model behavior by seeing how things are changing over time.

Finding the solution is answering the question of how things will continue to change, that is, predicting the future. Next week, we'll be studying nonlinear systems of equations and see its applications to biological modeling.

9. **Good job/straightforward so far/good.** Great!