

Math 266B A01**Guide for the Final Exam**

The final exam is on Monday, June 6, at 8 am in our regular classroom. This is also the deadline for any late good problems. The exam is cumulative, with greater emphasis on the material in Chapter 11, which has not been tested yet. Here are some sample questions from Chapter 11. Some topics that we covered are not represented by these questions, but are still fair game.

1. Consider the system of differential equations

$$\begin{aligned}\frac{dx_1}{dt} &= 4x_1 + 7x_2 \\ \frac{dx_2}{dt} &= x_1 - 2x_2.\end{aligned}$$

- (a) Find the general solution.
 - (b) Find the actual solution when $x_1(0) = 2$ and $x_2(0) = -1$.
 - (c) Find and classify the equilibria.
2. Consider the system of differential equations

$$\begin{aligned}\frac{dx_1}{dt} &= -x_1 + 3x_1(1 - x_1 - x_2) \\ \frac{dx_2}{dt} &= -x_2 + 5x_2(1 - x_1 - x_2).\end{aligned}$$

- (a) Graph the zero isoclines.
- (b) Find the equilibria.
- (c) Classify the equilibria.