Name:
Collaborator(s)¹:

Math 441, Prof. Hildebrand, Summer 2018

HW 11, DUE WEDNESDAY, 8/1

- **Use this sheet as cover sheet and staple it to the assignment.** Do the problems in order, and clearly label each problem.
- **Show all work.** Provide full justifications. Answers alone (such as those found in the back of the book) will not earn credit.
- **Questions/help.** I’d be happy to answer questions, look over drafts of your work, and provide feedback. I’m available after class each day in the regular classroom.

**NOTE:** For the first four problems (1,2,5,6 in Section 9.1), you can either do part (c) (hand-drawn sketch of trajectories, as in class) or part (d) (which asks for a computer-drawn plot). For the remaining problems no graphing is required.

1. 9.1:#1.
2. 9.1:#2.
3. 9.1:#5.
4. 9.1:#6.
5. 9.1:#16. (Hint: first determine $x_0$ such that $x' = 0$, i.e., find the critical point, then make the change of variables $u = x - x_0$, so that in terms of $u$ the critical point falls at the origin.)
6. 9.1:#20.
7. 9.3:#5. Do parts (a) (find critical points), (b) (linearize at each critical point), (c) (for each critical point find eigenvalues/eigenvectors and classify the point). Skip part (d).
8. 9.5:#1. Do parts (b) (find critical points) and (c) (linearize at each critical point, find eigenvalues/eigenvectors, and classify the point). Skip the other parts.

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**Presentation/effort (5 points):**

**Graded problems (5 points):**

**Total score (10 points):**

¹If you worked with another student or in a small group on this assignment, list the names of all students involved.