

First Exam
Friday, June 23, 2017

This exam is closed book, but you may use calculators. Make sure your name is on all pages. Show all work, and show it in a logical and organized manner. Each entire problem is worth 25 points.

1. Consider $2y' + y = 1$.

- (a) Does this equation have an equilibrium solution? If so, what is it?
- (b) If there is an equilibrium solution, is it stable, unstable, or neither? State why.
- (c) Sketch a direction field for this equation, showing any equilibrium solutions.

2. Write down the solution to the initial value problem

$$y' + \frac{2}{t}y = t, \quad y(1) = 1.$$

3. Write down the solution to the initial value problem

$$y'' + 2y' + 5y = 0, \quad y(0) = 1, \quad y'(0) = 0.$$

4. Write down the solution to the initial value problem

$$y'' + 6y' + 9 = 0, \quad y(0) = 0, \quad y'(0) = 1.$$