Written Homework

Your carefully written solutions to the following questions will be due at the beginning of class on Monday, September 28.

1. Draw a slope field for the differential equation $y' = y^2 - 2y$. On the same graph, sketch a solution curve that satisfies the initial condition $y(0) = 1$. Based on this sketch, what do you think the value is for $\lim_{t \to \infty} y(t)$? Check your answer by solving the initial value problem and calculating the limit for the solution you find.

2. Let $y(x)$ be the solution of the initial value problem

$$\begin{cases}
    y' = y^2 + 4 \\
    y(0) = 1
\end{cases}$$

What is the largest connected interval containing $x = 0$ on which $y(x)$ is defined and continuous? (This is called the domain of definition for the solution $y(x)$.)

Comments on Homework Grading

Each homework problem will be graded on a scale of 5 points. To get full credit, a problem must be solved correctly, completely, with all relevant work shown, and it must be easy to read. It must also be presented clearly, with well-written explanations. (Basically, you should pretend you are writing a solution for a textbook.) Sloppy or incomplete work will not receive full credit, even if the solution is correct.

Begin each problem on the left side of the page – do not work in columns. Submit the problems in the order they are listed on the assignment sheet.

Use plain white or lined paper, not graph paper, not engineering paper. If you need to include a graph drawn by hand, you may attach a sheet of graph paper for the figure only. (Better yet, cut the graph from the graph paper and paste it to the solution.) If you use notebook paper, make sure you remove all fringe edges from the paper where it is torn out of the notebook.

Leave space for your instructor to write comments. Do not squeeze solutions onto the page. Don’t turn in pages with work crossed out. Erase fully if using a pencil, or use white-out if using pen. If there is too much to erase or white-out, start over on a new sheet of paper.

You are strongly encouraged to make use of rough drafts before writing up your final submission.

These rules apply to all homework assignments in this course.