Name: _____ Homework 1 | Math 256 | Cruz Godar

Due Wednesday of Week 2 at the start of class

Complete the following problems and submit them as a pdf to Canvas. 8 points are awarded for thoroughly attempting every problem, and I'll select three problems to grade on correctness for 4 points each. Enough work should be shown that there is no question about the mathematical process used to obtain your answers.

Section 1

In problems 1–3, find the order of the DE, state whether it's linear, and verify that the given function solves it.

1. $y'' + y' + y = 0$, $y(t) = e^{-t/2} \sin\left(\frac{\sqrt{3}}{2} t\right)$.

2. $y''' = t$, $y(t) = \frac{t^4}{24}$.

3. $(y'')^2 = e^t$, $y(t) = t - 4e^{t/2}$.

In problems 4–6, solve the initial value problem.

4. $\frac{y'}{\tan(t)} = \sec(t)$, $y(0) = 1$.

5. $y' = y$, $y(1) = 1$.

6. $r' = t^2 \sin(t)$, $r(0) = 0$.

In problems 7–10, draw the direction field for the given DE and sketch a solution curve. Find all the equilibria and classify them as stable, unstable, or neither.

7. $y' = \sin(t)$.

8. $y' = (y^2 - 1)(t^2 - 1)$.

9. $y' = y$.

10. $(y')^2 = |yt|$.