

Name: _____

Homework 5 | Math 256 | Cruz Godar

Due Wednesday of Week 6 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 5

In problems 1–6, solve the DE. If possible, verify that you've found the general solution with the Wronskian.

1. $y'' + 6y' + 9y = 0$.

2. $ty'' + y' = 0$.

3. $y'' + 10y' + 26y = 0$.

4. $y'' - 2y' - 8y = 0$.

5. $y'' - 100y = 0$.

6. $y'' + 100y = 0$.

In problems 7–8, solve the initial value problem and determine the behavior of the solution as $t \rightarrow \infty$.

7. $y'' - 2y' + 17y = 0$, $y(0) = 4$, $y'(0) = -4$.

8. $y'' + 8y' + 16y = 0$, $y(0) = 1$, $y'(0) = 0$.

9. One fundamental solution to $ty'' - y' + t^3y = 0$ is $y = \sin\left(\frac{t^2}{2}\right)$. Find the other.

10. One fundamental solution to $t^2y'' + ty' + y = 0$ is $y = \sin(\log(t))$. Find the other.

Section 6

In problems 11–18, find the general solution to the DE.

11. $y'' - 2y' - 3y = 8e^t$.

12. $y'' - 2y' - 3y = 8e^{3t}$.

13. $y'' + y = 3\sin(t) + e^t$.

14. $y'' + 6y' + 9y = 120t^2e^{-3t}$.

15. $4y'' + y = \sec\left(\frac{t}{2}\right)$.

16. $y'' + 2y' + y = 2t\sin(t)$.

17. $y'' + 4y' + 4y = t^{-2}e^{-2t}$.

18. $y'' + 3y' + 2y = \frac{1}{1 + e^t}$.