

1. Show work on these sheets.

2. Do not submit extra sheets.

3. Box answers.

Math 254 Quiz 3

October 21, 1997

Name _____

(10 pts) 1.) Show that the functions $y_1 = 2x$, $y_2 = x^2 + x$, and $y_3 = 7x - 4x^2$ are linearly dependent.

(15 pts.) 2.) Verify that the functions 1, x , and x^3 form a fundamental set of solutions to the differential equation $xy''' - y'' = 0$ on $(0, \infty)$.

(15 pts.) 3.) Given that $y = c_1 \cos \frac{3x}{2} + c_2 \sin \frac{3x}{2}$ is a two parameter family of solutions of

$4y'' + 9y = 0$ on $(-\infty, \infty)$, find a solution such that $y(\frac{\pi}{2}) = 0$ and $y(\frac{\pi}{3}) = 4$.

Does Theorem 4.1 (Existence of a Unique Solution Theorem) guarantee that this is the only solution? Why or why not?

4.)

(12 pts.) (a.) Form the general solution of $y''' - 27y = 0$.

(16 pts.) (b.) Solve $4y'' - 12y' + 9y = 0$ subject to $y(0) = 4$ and $y'(0) = 7$.

(16 pts.) (c.) If $y_1 = e^{2x} \sin 3x$ is a solutions of $y''' - 5y'' + 17y' - 13y = 0$, what is the general solution of this differential equation?

(16 pts) 5.) Solve $y'' - y' - 2y = 3xe^x$ by undetermined coefficients.