Quiz 8

MATH 2280, ORDINARY DIFFERENTIAL EQUATIONS, FALL 2023

NAME: A#:

Problem 1. Chapter 15 Ex. 15.2.h An initial value problem involving a second-order homogeneous linear differential equation with a pair of functions, $y_1(x)$ and $y_2(x)$. Verify the pair of functions forms a fundamental set of solutions to the given differential equation. Then find a linear combination of the functions that satisfies the initial value problem.

$$x\ y'' - y' + 4\ x^3\ y = 0$$

with $y(\pi) = 3$ and $y'(\pi) = 4$ and $y_1(x) = \cos(x^2)$ and $y_2(x) = \sin(x^2)$.

Solution:

Problem 2. Chapter 16 Ex 16.6.c (10 points) A choice for L_1 and L_2 are given. Compute L_1L_2 and L_2L_1.

$$L_1 = x\,\frac{d}{dx} + 3, \qquad L_2 = \frac{d}{dx} + 2\,x$$

Solution: