Linear algebra and differential equations - 2243
Midterm I
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Teaching Assistant:

Recitation section:

Name:

#	Points
1	/25
2	/25
3	/25
4	/25
Sum	/100
Grade	

Problem 1 (25 points): Separable differential equations
Determine the general solution of the following differential equation.

$$\frac{dy}{dx} + 12xy = 2xy^2 + 18x$$

Problem 2 (25 points): First order differential equations – Integrating factor

Determine the general solution of the following differential equation.

$$y' + \frac{2}{x}y = \ln x$$

Problem 3 (25 points): Homogeneous second order linear differential equations with constant coefficients
Solve the following initial value problem.

$$y'' - 8y' + 16y = 0, y(0) = 2, y'(0) = -3$$

Problem 4 (25 points): Non-homogeneous second order linear differential equations with constant coefficients

Determine the general solution of the following differential equation. (Do not forget to determine all constants that arise in the derivation of a particular solution.)

$$y'' - 2y' + 2y = xe^{2x}$$