

Examination No. 4

Point Park University

Summer 2014

Name (please print)

MATH 310 Differential Equations

Examination No 4 7-19-2014

Instructions

- Solve all four problems. Return Solutions 7/26/2014.
- Use only one side of 8 1/2 x 11 in sheets
- Place solutions in order and staple this sheet to the front of your work
- Show all work in detail

You may use your class notes and a text-book.

Problem 1

Solve the system

$$\frac{dx}{dt} = 2x + 4y$$

$$\frac{dy}{dt} = -x - 2y$$

initial conditions

$$x(0) = 1$$

$$y(0) = 0$$

Use Laplace transforms

Problem 2

Solve the system

$$\frac{d^2x}{dt^2} = -2x + y$$

$$\frac{d^2y}{dt^2} = x - 2y$$

initial conditions

$$x(0) = 1$$

$$y(0) = 0$$

$$\dot{x}(0) = 0$$

$$\dot{y}(0) = 0$$

Use Laplace transforms.

Problem 3

Solve the differential equation

$$x \frac{d^2y}{dx^2} + \frac{1}{x} \frac{dy}{dx} + y = 0$$

Use the Frobenius method

Problem 4

Solve the differential equation

$$4x \frac{d^2y}{dx^2} + 2 \frac{dy}{dx} - y = 0$$

Use the Frobenius method

$$\frac{1}{6} + \frac{2}{6} + \frac{3}{6} + \frac{4}{7} = \frac{25}{25}$$