

University of Florida

MAP2302

EXAM I

FEBRUARY 20, 2004

Name:

ID #:

Instructor:

Directions: You have 50 minutes to answer the following questions. You must show all your work as neatly and clearly as possible and indicate the final answer clearly. You may use only a simple not graphic calculator.

Problem	Possible	Points
1	10	
2	15	
3	15	
4	15	
5	25	
6	20	
Total	100	

(1) (10 points) Find the general solution to the equation

$$r' = e^{r-\theta}$$

(2) (15 points) Find the integrating factor that will make the following equation exact

$$(x + 2) \sin y dx + x \cos y dy = 0$$

(3) (15 points) Solve the initial value problem:

$$\begin{cases} x(2+x)y' + 2(1+x)y = 1 + 3x^2 \\ y(-1) = 1 \end{cases}$$

(4) (15 points) Find a particular solution to the equation

$$y'' + 4y = 8 \sin 3t$$

(5) This problem has the following parts.

(a) (10 points) Find the roots of the characteristic equation of

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

(b) (5 points) Find the general solution of the equation

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

(c) (10 points) Determine the form of a particular solution for the differential equation. Do NOT evaluate the coefficients.

$$y'' + 2y' + 2y = 8t^3 e^{-t} \sin t$$

(6) (20 points) Find the general solution to the equation:

$$(e^x \sin y - 2y \sin x)dx + (e^x \cos y + 2 \cos x)dy = 0$$