

MATH 220
2nd Hour Exam
October 31, 2008

Name:

Section time:

1. Solve the initial value problem:

$$y''' - 2y'' + y' = 0 \quad y(0) = 0 \quad y'(0) = 1 \quad y''(0) = 2$$

2. Compute the Laplace transform of the function:

$$f(t) = \begin{cases} t^2 & \text{if } 0 < t < 2 \\ 1 & \text{if } t > 2 \end{cases}$$

3. Find the inverse Laplace transform of the function:

$$F(s) = \frac{2s^2 + 9}{s^3 + 9s}$$

4. Find *one* concrete solution of the non-homogeneous differential equation:

$$y'' + 3y' = 6x + 5$$

5. Find the general solution of the differential equation:

$$y^{(4)} - 5y'' + 4y = 0$$

6. Consider the initial value problem:

$$y'' + xy = 1 \quad y(1) = 0 \quad y'(1) = 1$$

Find the 3rd degree Taylor polynomial of its solution.

7. Find the Laplace transform of the function:

$$f(t) = e^{3t} \cos(2t) + te^t$$

(Each problem is worth 15 points)