Homework 2

Math 3D

04/15/05
Due date: 04/22/05

Explain carefully all your answers. Unsupported answers will not receive any credit.

1. (2 points) (from ch. 1.9, ex 4) Solve the equation
\[ 1 + (1 + ty)e^{ty} + (1 + t^2 e^{ty})y' = 0. \]

2. (2 points) (from ch. 1.9, ex 8) Solve the equation
\[ 2t \cos(y) + 3t^2 y + (t^3 - t^2 \sin(y) - y)y' = 0, \]
with the condition \( y(0) = 2. \)

3. (4 points) (from ch. 1.9, ex 12) find the constant \( a \) so that the following equation is exact. Then solve the equation
\[ t + ye^{2ty} + ate^{2ty}y' = 0. \]

4. (4 points) (from ch. 1.9, ex 16) Find all the functions \( f(t) \) such that the differential equation
\[ y^2 \sin(t) + yf(t)y' = 0, \]
is exact. Solve the equation for these \( f(t) \).

5. (2 points) (from ch. 2.2, ex 2) Solve the equation
\[ 6y'' - 7y' + y = 0. \]

6. (2 points) (from ch. 2.2, ex 8) Solve the equation
\[ y'' - 6y' + y = 0, \]
with the conditions \( y(2) = 1 \) and \( y'(2) = 1. \)

7. (2 points) (from ch. 2.2.1, ex 2) Solve the equation
\[ 2y'' + 3y' + 4y = 0. \]

8. (2 points) (from ch. 2.2.1, ex 8) Solve the equation
\[ 2y'' - y' + 3y = 0, \]
with the conditions \( y(1) = 1 \) and \( y'(1) = 1. \)