Math 325
Spring, 2000

Assignment 1, due January 28

Unless otherwise indicated, all problems are to be done by hand. All page numbers refer to Boyce and DiPrima. All Problem Sets are in *Differential Equations with Maple*.

Read Sections 1-3 of Chapter 4 in Boyce and DiPrima and Chapters 1-3 in *Differential Equations with Maple*.

Warning: One difference between Maple V Release 4 and Release 5.1 is that in Release 5.1, % refers to the last output (instead of ″).

Do:

Problem Set A

p. 206 #3,7,8,14,17,25.

p. 214 #21,29,30.

p. 219 #9,17,18.

Supplementary problem:

Here is Maple's solution to an initial value problem for a first order ODE.

```
>  eq := y(t)^2/2+2*y(t)*exp(t)+(y(t)+exp(t))*diff(y(t),t)=0;
```

$$eq := \frac{1}{2}\,y(t)^2 + 2\,y(t)\,e^t + (y(t) + e^t)\,(\tfrac{\partial}{\partial t}\,y(t)) = 0$$

```
>  dsolve({eq,y(0)=0},y(t));
```

$$y(t) = -e^t - e^{(-t)}\,\sqrt{e^{(4\,t)}},\; y(t) = \frac{1}{2}\,\frac{-2\,(e^t)^2 + 2\,\sqrt{(e^t)^4}}{e^t}$$

Here are the two solutions, simplified:

```
>  simplify(%[1]);
```

$$y(t) = -(1 + e^{(-2\,t)}\,\sqrt{e^{(4\,t)}})\,e^t$$

```
>  simplify(%%[2]);
```

$$y(t) = (-1 + e^{(-2\,t)}\,\sqrt{e^{(4\,t)}})\,e^t$$

Are both solutions correct? Explain. (Your explanation should not involve any computation with the solutions.)