

17 January 2008  
Math 242

## Homework 2 (Due on Thursday, January 24)

*Directions:* Please work the following problems. This will be due in class one week from today (1/24).

1. Consider the piecewise defined function

$$y(x) := \begin{cases} 0 & x < 0 \\ x & x \geq 0 \end{cases}$$

Does  $y(x)$  solve the following IVP for every real  $x$ ? If not, can you find an open interval where it does solve the IVP?

$$\begin{cases} xy' = y \\ y(0) = 0 \end{cases}$$

2. Page 43 Problems 1-12, 19-25, 33. Note: We will concentrate on applications at a different time. For 33, use the population model discussed in class.

3. Consider the IVP

$$\begin{cases} (1 + x^2)y' = y \\ y(0) = 0 \end{cases}$$

Firstly, use the theorem we discussed in class to determine if there is a local unique solution to this problem. Then, actually find the solution.