MATH 246 Homework 1.1 Justin Wyss-Gallifent

Directions:

- Work should be done neatly and on separate paper.
- Enough work must be shown so that the steps you are taking is clear.
- 1. The following DE is not given as explicit but may be rewritten. Do this and then solve:

$$ty' = 1$$
 with $t > 0$

2. Find the specific solution to the following initial value problem:

$$y' - 2t = \cos(t)$$
 with $y(\pi) = 1$

3. Find the specific solution to the following initial value problem. Notice that this is really one explicit DE then another; first find y' and then find y.

$$y'' + 3 = 0$$
 with $y'(-1) = 2$ and $y(-1) = 5$.

4. The following DE is not explicit but can be factored, resulting in two explicit DEs. Do this and then solve:

$$(y')^2 - ty' - 2t^2 = 0$$

5. Find the interval of existence of the solution to the IVP:

$$f'(x) = \frac{7}{x^2 - 7x}$$
 with $y(3) = 5$

6. Consider the first-order non-explicit DE:

$$y' = \frac{e^t}{\cos y}$$

- (a) Show that the general function $y = \sin^{-1}(e^t + C)$ is a solution to this for every constant C.
- (b) Find the specific solution satisfying $y(0) = \frac{\pi}{2}$.
- (c) Find the specific solution satisfying $y(\ln 2) = \frac{\pi}{4}$.