Math 2250
Problems 1.4 Redo Notes
September 2003

Problem 1.4-1.

Find the general solution for $y' + 2xy = 0$. Find the equilibrium, implicit and explicit solutions.

The equilibrium solution is $y = 0$.
In one detail, $e^{\ln|y|}$ reduces to $|y|$, which is written as $\pm y$.
The non-equilibrium solution is $y = y_0 e^{-x^2}$.
Explain why the two solutions collapse into the book's answer.

Problem 1.4-5.

Find the general solution for $2\sqrt{x}y' = \sqrt{1-y^2}$. Find the equilibrium, implicit and explicit solutions.

The equilibrium solutions are $y = 1$ and $y = -1$.
The implicit solution is $\sin^{-1} y = \sqrt{x} + c$.
An explicit solution $y = \sin(\sqrt{x} + c)$ is valid for domain $D = \{x \geq 0 \ : \ \cos(\sqrt{x} + c) \geq 0\}$.
Reports should contain four (4) solution checks. The book's answer is incorrect.

Problem 1.4-11.

Find the general solution for $y' = xy^3$. Find the equilibrium, implicit and explicit solutions.

The equilibrium solution is $y = 0$.
The implicit solution is $y^{-2} = c - x^2$.
Explicit solutions are $y = \pm\frac{1}{\sqrt{c-x^2}}$, valid for domain $D = \{x \ : \ c - x^2 > 0\}$.
Reports should contain two (2) solution checks. The book's answer is correct for the non-equilibrium solution, provided you supply the missing $\pm$.