CS 130 Exercises

First Order ODE - Part 1

January 18, 2013

NOTE: All of the items below were taken or derived from the book "Elementary Differential Equations (8th edition)" by Rainville, Bedient, and Bedient. The ODEs can be answered using one or more of the first three techniques discussed last Tuesday.

1. $\cos x \cos y - \cot x = \sin x \sin y \frac{dy}{dx}$
2. $(x^2 - y^2)\,\frac{dy}{dx} = 2xy$
3. Find a particular solution for $y\,(3x + 2y) = x^2 \frac{dy}{dx}$ with boundary conditions $x = 1, y = 2$
4. Find a particular solution for $\frac{dy}{dx} = xe^{y-x^2}$ with initial condition $y = 0$
5. $(x - y)\,dy = (x + y)\,dx$
6. $(x^2 - 2xy + 2)\,\frac{dy}{dx} = y^2 - 2xy + 6x$
7. $ydx = \left(x + \sqrt{y^2 - x^2}\right) dy$
8. Find a particular solution for $x \cos^2\left(\frac{y}{x}\right) - y = x\frac{dy}{dx}$ with boundary conditions $x = 1, y = \frac{\pi}{4}$
9. $y \ln y \ln x = -\frac{dy}{dx}$
10. $\sin x \sin y dx + \cos x \cos y dy = 0$