MTH 201
Multivariable calculus and differential equations
Homework 10
First order ordinary differential equations

1. Solve each of the following differential equations
   (a) $(x^2 - 2y^2)dx + xydy = 0.$
   (b) $x\sin(y/x)\frac{dy}{dx} = y\sin(y/x) + x.$
   (c) $(x + \frac{2}{y})dy + ydx = 0.$
   (d) $(\sin x \tan y + 1)dx + (\cos x \sec^2 y)dy = 0.$
   (e) $dx = \frac{y}{1-x^2y^2}dx + \frac{x}{1-x^2y^2}dy.$
   (f) $xdy - ydx = (1 + y^2)dy.$
   (g) $ydx - xdy = xy^3.$
   (h) $x\frac{dy}{dx} - 3y = x^4.$
   (i) $\frac{dy}{dx} + y = 2xe^{-x} + x^2.$
   (j) $x\frac{dy}{dx} + y = x^4y^3.$
   (k) $x\frac{dy}{dx} = 5y + e^{-2x}y^{-2}.$
2. Solve each of the following Initial value problems (IVPs)
   (a) $\frac{dy}{dx} = e^{y-x}\sec(y)\ (1 + x^2),\ y(0) = 0.$
   (b) $x\frac{dy}{dx} + 2y = x^2 - x + 1,\ y(1) = 1/2.$