Homework Assignment 1

(Due Thursday January 24, 2008 in class)

Find the general solution of the following differential equations:

(1) $xy' = (1+x)y$

(2) $x(2y+3)y' = y(3+y)$

(3) $2xy(1+x)y' = 1+y^2$

(4) $2y' = e^{x+2y}$

(5) $y' = y/x + x/y$

(6) $y' = (x/y)e^{-y/x} + y/x$

(7) $x^2y' = xy - y^2$

(8) $(2x+2y+5)y' = 2y - 2x + 1$

(9) $(x+y)^2y' = (x+y+1)^2$

(10) $(1-x^2)y' - \frac{1}{2}(1+x)y = \sqrt{1-x^2}$

(11) $y' = (x-4)e^{4x} + xy$

(12) $xy' + \frac{2x+1}{x+1}y = x - 1$

(13) $y' + y = xy^3$

(14) $(x+1)(yy' - 1) = y^2$

(15) $y' - y/x = -y^2/x$

(16) $y' = 2(2x-y)^2$

(17) $y' = (1-x)y^2 + (2x-1)y - x$, if one of the solution is $y_1(x) = 1$

(18) Find a such that $y_1 = a/x$ is a solution to $x^2y' + xy + x^2y^2 = 4$ (why it is natural to look for a solution of this form?) and use it to find the general solution of the equation.