Differential Equations I
Exercise 2, fall 2012

1. Solve the differential equations (DE)

$$(a) \quad y' + 2y/x = 4x, \quad (b) \quad y' + (\cos x)y = -\cos x.$$

2. Solve at least in two ways the DE

$$2y + 3 + (2x - 2)y' = 0.$$

3. Solve the IVP:s, the DE

$$(x - 2)y' - y = 2(x - 2)^3$$

with the initial conditions

$$(a) \quad y(0) = 0, \quad (b) \quad y(2) = 0, \quad (c) \quad y(2) = 1.$$

How can the solutions be interpreted in relation to the existence and uniqueness Theorem 1.2?

4. Solve the DE

$$y^{-1} + (2y - xy^{-2})y' = 0.$$

An implicit solution is sufficient.

5. Solve in two ways the DE

$$2x + 3 + (2y - 2)y' = 0.$$

6. Find an integrating factor for

$$y^2 + (y^3 - xy)y' = 0$$

and solve the equation.