Department of mathematics and statistics
Differential Equations I
Course Exam 15.10.2013

Remark. Use of an abstract page of the size A4 is allowed to a candidate.

1. Solve the differential equation

$$-2y' = (4x^3 + 1)y^2.$$

2. Solve the initial value problem

$$(x + 1)y' + 2y = 5, \quad y(0) = 3/2,$$

and give also a maximal solution interval of it.

3. Determine an integrating factor to the differential equation

$$y \cos x + \left(e^{-y^2} + (1 + 2y^2) \sin x\right)y' = 0$$

and solve the equation (implicitely).

4. Solve the differential equation

$$y'' - 2y' + y = xe^x.$$