Department of mathematics and statistics
Differential Equations I
Compensating Course Exam 1.11.2013

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

1. Solve the differential equation

$$y' = 3x + 3 - \frac{y}{x-1}, \quad x \neq 1.$$

2. Solve the initial value problem

$$y' = 2(x-1)(y+1)^2, \quad y(1) = 3.$$

Give also a maximal solution interval of it.

3. Solve the differential equation

$$y'' - 2y' + 2y = 3\sin x.$$

4. Solve the differential equation

$$y' = \frac{2x^2y + y^3}{x^3}, \quad x \neq 0.$$