Department of mathematics and statistics
Differential Equations I
Compensating Course Exam 5.11.2012

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

1. Solve (an implicit solution is sufficient)

$$3x^2y^2 + 4x + (2x^3y + 1)y' = 0.$$

2. Solve the initial value problem

$$y' + 2(x - 1)y = 3\,e^{-(x-1)^2}, \quad y(1) = 0.$$

What is a maximal solution interval of it?

3. Solve

$$2y' = \frac{x^2 + 2xy - y^2}{x^2}.$$

4. Solve

$$y'' - y' - 2y = 2e^{-x}.$$