EXERCISES 13.1 (submit by 08.07.2016)

In all the exercises, if the explicit solution is difficult to find, provide an implicit solution.

- 1. Solve the initial value problem: y' y = 2x 3; y(0) = 1.
- 2. Find general solutions to the following homogeneous ODEs.
 - (a) (x+2y)dx xdy = 0
 - (b) $y^2 + x^2y' = xyy'$
- 3. Find general solutions to the following ODEs by reducing them to homogeneous ones.
 - (a) $x^3(y'-x) = y^2$
 - (b) ydx + x(2xy + 1)dy = 0
 - (c) x y 1 + (y x + 2)y' = 0
 - (d) (y+2)dx = (2x+y-4)dy.
- 4. Find general solutions to the following ODEs.
 - (a) $x^2y' + xy + 1 = 0$ (b) $x(e^y - y') = 2$ (c) $y' + 2y = y^2e^x$ (d) $xy' - (2x + 1)y + y^2 = -x^2$.
- 5. Find the general solutions to the following linear ODEs.
 - (a) y'' 3y' + 2y = 0,
 - (b) y'' + 2y' + 2y = 0,
 - (c) y'' y = 1,
 - (d) $y'' + y = x^2 + \sin x$.