THE CHINESE UNIVERSITY OF HONG KONG
Department of Mathematics
MMAT5520
Differential Equation & Linear Algebra

Assignment 1

Due date: 6 Oct 2016 (Thur)

Solve the following differential equations. If an initial condition is given, solve the initial value problem. If there is no initial condition, find the general solution of the equation.

Exercise 1.1:
1(a) $y' + y = 4e^{3x}$
2(c) $(x^2 + 4)y' + 3xy = 3x;\ y(0) = 3$

Exercise 1.2:
2(a) $xy' - y = 2x^2y;\ y(1) = 1$

Exercise 1.3:
Find the value of k so that the equation is exact and solve the equation.
2(c) $(2xy^2 + 3x^2)dx + (2x^ky + 4y^3)dy = 0$

Exercise 1.4:
1(e) $x^2y' = xy + y^2$

Exercise 1.5:
1(c) $xy' = y(x^2y - 1)$

Exercise 1.6:
Solve the following differential equation by using the given substitution.
1(b) $y' = \sqrt{x + y};\ u = x + y$

Exercise 1.7:
1(a) $yy'' + (y')^2 = 0$
2(b) $y' = \dfrac{x^2 + 2y}{x}$
2(d) $xy' + 2y = 6x^2\sqrt{y}$