GRA 6035 Mathematics

Problems for Lecture 10

Key problems

Problem 1.
Solve the differential equations:
a) $y' = 3t^2 + 2$ b) $ty' = 1$ c) $y' = t\sqrt{t^2 + 1}$

Problem 2.
Solve the differential equations:
a) $y' = 5y$ b) $y' = y^2 t$ c) $y' = 5y(1 - y/10)$

Problem 3.
Solve the differential equations:
a) $y' + 3y = 6$ b) $y' - 2ty = 4t$ c) $y' + 2y = e^t$

Problems from Differential Equations

Exercise problems   1.1 - 1.16 (full solutions on the web page)

Problems from the Digital Workbook

Exercise problems   10.1 - 10.12 (full solutions in the workbook)
Excel problems   10.17 - 10.18 (full solutions in the workbook)
                     As a minimum, you should understand what happens when you change the parameters in the Excel
                     models that are available in the workbook.

Answers to key problems

Problem 1.
a) $y = t^3 + 2t + C$ b) $y = \ln|t| + C$ c) $y = \frac{1}{3}(t^2 + 1)\sqrt{t^2 + 1} + C$

Problem 2.
a) $y = Ke^{5t}$ b) $y = -2/(t^2 + 2C)$ c) $y = 10 \cdot Ke^{5t}/(1 + Ke^{5t})$

Problem 3.
a) $y = 2 + Ce^{-3t}$ b) $y = -2 + Ce^{t^2}$ c) $y = \frac{1}{3}e^t + Ce^{-2t}$