MATH 267 (Sections A3, C-1) Homework No. 6

Reading
Section 11.1 up to pg. 646 (included)
Section 11.2 up to Theorem 2.27 (included)
Section 5.1
Section 5.2

Suggested Problems
Section 11.2, Exercises 3,9,13,17.
Section 5.1, Exercises 3,7,9,13,25,29.
Section 5.2, Exercises 3,7,19,23,25.

Problems to be handed in class (due Tuesday March 8-th)

Problem 1 (10 points)
Write in terms of power series the solution of the following initial value problem

\[ y'' - 3xy = 0, \]
\[ y(0) = 1, \quad y'(0) = 0, \]

i.e.

1. For

\[ y(x) = \sum_{n=0}^{\infty} a_n x^n, \]

write the recurrence formula for the \( a_n \)'s.

2. From the recurrence formula express the \( a_n \)'s in terms of \( n \).

Problem 2 (10 points)
Compute the Laplace transform of the following function

\[ f(t) = 0, \quad t < 1, \]
\[ f(t) = t^2 - 2t + 2, \quad t \geq 1. \]

Problem 3 (10 points)
Find the Laplace transforms of the solutions of the following initial value problems:

1. \[ y'' - y' - 6y = 0, \quad y(0) = 1, y'(0) = -1, \]

2. \[ y'' - 2y' + 2y = 0, \quad y(0) = 0, y'(0) = 1. \]