MATHEMATICAL ANALYSIS 2

Test 3, version A.

1. Using the Laplace transform, solve the Cauchy problem

$$\begin{cases} x' = x + 2y + 1 \\ y' = -2x + y - 1 \end{cases}, \quad x(0) = 0, \quad y(0) = 0.$$

2. Find the general solution to the difference equation

$$x_{n+3} = 2x_n - x_{n+2}, \quad n \geqslant 0.$$

3. Determine the Taylor series for the function $f(x) = (x + 2)\ln x$ at the point $x = 2$. Find the radius and the interval of convergence of the series.