Mat3501 Exam III Fall 05 Name

Show your work for full credit

1)(25pts) Solve the differential equations with initial conditions $y(0) = 1, y'(0) = 1, y''(0) = 1$ using Laplace transforms.

$$y''' = x - H_1(x)x$$

2))(25pts) Solve the differential equations with initial conditions $y(0) = 1, y'(0) = 0, y''(0) = 0, y'''(0) = 1$ using Laplace transforms.

$$y'''' = x - \sum_{n=1}^{\infty} H_n(x)$$

3) (25pts) Use the convolution method to compute:

$$\mathcal{L}^{-1}\Big[\frac{e^{-3s}}{(s-1)(s-2)}\Big]$$

4) (25pts) Compute the Laplace transform for:

$$\mathcal{L}[\sum_{n=1}^{\infty} H_n(x)x^2]$$