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The functions

$$y_1 = e^{3t} \begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}, \quad y_2 = e^{2t} \begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}, \quad y_3 = e^{-t} \begin{bmatrix} 1 \\ 1 \\ 0 \end{bmatrix}$$

solve the differential equation

$$y' = \begin{bmatrix} 2 & -3 & 4 \\ 0 & -1 & 4 \\ 0 & 0 & 3 \end{bmatrix} y.$$

(You do not need to check this.)

1. Show that they form a fundamental solution set.
2. Find the solution which satisfies

$$y(0) = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}.$$