6. Consider the system with parameter \( h \)

\[
x' = \begin{pmatrix} -3 & 1 \\ -1 & h \end{pmatrix} x
\]

for a vector function \( x = x(t) \).

(a) (4 points) For which value(s) of \( h \) is there a solution of this system of the form

\[
x(t) = \begin{pmatrix} (at + b)e^{-4t} \\ (t + c)e^{-4t} \end{pmatrix}
\]

for some constants \( a, b, c \)? (No need to find \( a, b, c \), just \( h \).)

(b) (4 points) Suppose that \( h = -3 \). Solve the initial-value problem for the system with initial condition

\[
x(0) = \begin{pmatrix} 1 \\ 1 \end{pmatrix}.
\]