(a) $\begin{pmatrix} 2 & -1 \\ 0 & 3 \end{pmatrix}$ $\lambda_1 = 2$ $\begin{pmatrix} 0 \\ 0 \end{pmatrix}$

$\lambda_2 = 3$ $\begin{pmatrix} 1 \\ -1 \end{pmatrix}$

Q1. $x(t) = a_1 \begin{pmatrix} 0 \\ 0 \end{pmatrix} e^{2t} + a_2 \begin{pmatrix} 1 \\ -1 \end{pmatrix} e^{3t}$

Q2. $x(0) = \begin{pmatrix} 1 \\ -1 \end{pmatrix}$ $a_2 \begin{pmatrix} 1 \\ -1 \end{pmatrix} = \begin{pmatrix} 1 \\ -1 \end{pmatrix}$ $a_2 = 1$

$x(t) = \begin{pmatrix} 1 \\ -1 \end{pmatrix} e^{3t}$

(b) $\begin{pmatrix} 7 & -2 \\ 1 & 4 \end{pmatrix}$

refer to (c) in Turtorial 1.

(c) $\begin{pmatrix} 1 & -1 & 2 \\ -3 & -2 & 3 \\ 2 & -1 & 1 \end{pmatrix}$

refer to (d) in Turtorial 1.