1. Verify that $z(t) = \binom{4}{2} e^{2t}$ solves $z' = \begin{pmatrix} 3 & -2 \\ 2 & -2 \end{pmatrix} z$.
2. Find all eigenvalues and eigenvectors of $\begin{pmatrix} 5 & -1 \\ 3 & 1 \end{pmatrix}$.