PCA computation

Suppose the random variables X_1, X_2, and X_3 have the covariance matrix:

$$C = \begin{pmatrix} 1 & -2 & 0 \\ -2 & 5 & 0 \\ 0 & 0 & 2 \end{pmatrix}$$

Calculate (by hand, show detail work) the eigenvalue-eigenvector pairs and the principal components Y_1, Y_2 and Y_3.