1. Which, if any, of the following matrices are positive definite? Explain your answers.

(a) $A = \begin{pmatrix} 1 & 1 \\ 1 & 1 \end{pmatrix}$

(b) $B = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$

(c) $C = \begin{pmatrix} 1 & 2 \\ 2 & 1 \end{pmatrix}$

(d) $D = \begin{pmatrix} 2 & -1 \\ -1 & 2 \end{pmatrix}$

2. Let $A = \begin{pmatrix} 2 & 4 \\ 5 & 1 \end{pmatrix}$

(a) Calculate the characteristic polynomial of A.

(b) State the conclusion of the Cayley-Hamilton Theorem for A.

(c) Use the Cayley-Hamilton Theorem to find a formula for A^{-1} in terms of A and I.

(d) [BONUS] What is the minimal polynomial of A?