

1) Let A be the matrix

$$\begin{pmatrix} -2 & 1 & 2 \\ 1 & -2 & -3 \\ 1 & 0 & 0 \end{pmatrix}$$

a) Determine A^{-1}

b) Show that $A^3 + 4A^2 + A = I_3$

c) By considering the equality in b), find another expression for A^{-1} , in terms of powers A^n of A for non-negative integers n ($A^0 := I_3$)

2) Let $a, b, c, d \in \mathbb{R}$ and let

$$A = \begin{pmatrix} a & b \\ c & d \end{pmatrix}$$

a) find values of a, b, c, d such that $A^T = -A$ and $\det(A) \neq 0$

b) find values of a, b, c, d , all non-zero, such that $A^2 = I_2$

Note: there are infinitely many correct solutions to both 2 a) and b)