1. Use the determinant to find out for which values of the constant k the given matrix A is invertible:

$$A = \begin{bmatrix} 0 & 1 & k \\ 3 & 2k & 5 \\ 9 & 7 & 5 \end{bmatrix}$$

2. Consider an $n \times n$ matrix A such that $\det(A) = 3$. Answer the following questions. You do not need to provide reasoning to your answers.
(a) $\det(A^T) = ?$
(b) $\det(A^T A) = ?$
(c) Consider the QR-factorization $A = QR$. $\det(Q) = ?$, $\det(R) = ?$ *Hint:* Make observation to the value of $\det(Q^T Q) = \det(I)$ to conclude about $\det(Q)$.

3. **(Bonus, 2 points)** We know that similar matrices have the same value of determinant. Can you give an example such that $\det(A) = \det(B)$ for two matrices $A, B \in \mathbb{R}^{n \times n}$ but A and B are not similar? You have to justify that the matrices you give are not similar.