

Instructions: You must show all work to receive full credit for the problems below. You may check your work with a calculator, but answers without work will receive minimal credit. Use exact answers unless the problem starts with decimals or you are specifically asked to round.

1. For the matrix $A = \begin{bmatrix} 1 & 0 & 0 & 4 \\ 0 & 1 & 0 & 5 \\ 1 & 1 & 1 & 9 \end{bmatrix}$, find an explicit description of Nul A and Col A.

2. Determine if the following sets represent vector spaces.

a. The set of even functions (i.e. all functions such that $f(x) = f(-x)$).

b. $W = \left\{ \begin{bmatrix} a \\ b^2 \end{bmatrix}, a, b \text{ real} \right\}$