

Name:

Problem 1: Consider the linear map

$$f: \mathbb{R}^2 \rightarrow \mathbb{R}^3$$
$$\begin{pmatrix} x \\ y \end{pmatrix} \mapsto \begin{pmatrix} 0 \\ x - y \\ 3y \end{pmatrix}.$$

- a) Give the matrix representation of this map. We will call this matrix A .
- b) Put A in echelon form.
- c) In your echelon form above, how many variables are leading? How many variables are free?
- d) What is the rank of f ? You do not need to justify your answer.
- e) What is the nullity of f ? You do not need to justify your answer.