Name (Last, First): _____

Student ID: _____

1. Determine if the columns of the matrix form a linearly independent set.

$$\begin{bmatrix} 1 & -2 & 2 \\ -2 & 5 & 1 \\ 3 & -7 & 2 \end{bmatrix}$$

2. Let a map $T : \mathbb{R}^2 \to \mathbb{R}^3$ be defined as

$$T(x, y) = (x - y, y, 0) \text{ or equivalently } T\left(\begin{bmatrix} x \\ y \end{bmatrix}\right) = \begin{bmatrix} x - y \\ y \\ 0 \end{bmatrix}$$

Show that T is a **one-to-one** linear transformation. Does T map $\mathbb{R}^2$ **onto** $\mathbb{R}^3$?