Math 308 E, Spring 2018 quiz 5

You have 3 minutes to complete the quiz. This quiz is out of 10 points.

Name: _____

Consider the matrix

$$A = \begin{bmatrix} 1 & 1 & 3 \\ 2 & 8 & 0 \\ 0 & 1 & -1 \end{bmatrix}$$

1. (7 points) Find a basis for the null space of A.

2. (3 points) What are the rank and nullity of A?

3. (+3 extra credit) Let $P : \mathbb{R}^3 \to \mathbb{R}^3$ denote the linear transformation given by projecting on the line

$$\{(4t, -t, -t) : t \in \mathbb{R}\} \subset \mathbb{R}^3,$$

and let B be the matrix of P, i.e. $P(v) = Bv$ for all $v \in \mathbb{R}^3$. What is AB?