

Directions: This assessment has 2 questions, for a total of 20 points. You must show all of your work to receive full credit for an answer. Remember, you may not use a calculator or any other resources during this assessment. Good luck!!

First Name: \_\_\_\_\_ Last Name: \_\_\_\_\_ # \_\_\_\_\_

1. (10 points) Let  $L$  be the line in  $\mathbb{R}^3$  that consists of all scalar multiples of the vector  $\begin{bmatrix} 2 \\ 1 \\ 2 \end{bmatrix}$ . Find the orthogonal projection of the vector  $\begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$  onto  $L$ .

2. (10 points) Let  $L$  be the line in  $\mathbb{R}^2$  that consists of all scalar multiples of the vector  $\begin{bmatrix} 1 \\ 2 \end{bmatrix}$ . Find the reflection of the vector  $\begin{bmatrix} 2 \\ 5 \end{bmatrix}$  in  $\mathbb{R}^2$  about the line  $L$ .