Remember that your work is graded on the quality of your writing and explanation as well as the validity of the mathematics.

(1) (10 Points) Determine the unknow values a, b, c such that the three vectors are orthogonal

$$\begin{bmatrix} 3 \\ 2 \\ -5 \\ 0 \end{bmatrix}, \begin{bmatrix} -4 \\ a \\ -2 \\ 6 \end{bmatrix}, \begin{bmatrix} 1 \\ 1 \\ b \\ c \end{bmatrix}$$

(2) (10 Points) Let $\mathbf{y} = \begin{bmatrix} 2 \\ 6 \end{bmatrix}$ and $\mathbf{u} = \begin{bmatrix} 7 \\ 1 \end{bmatrix}$. Write $\mathbf{y}$ as the sum of a vector in Span$\{\mathbf{u}\}$ and a vector orthogonal to $\mathbf{u}$.