

**Linear Algebra**

1. If  $\mathbf{x} = \begin{pmatrix} 2 \\ -5 \\ 4 \end{pmatrix}$  and  $\mathbf{y} = \begin{pmatrix} 1 \\ 2 \\ -1 \end{pmatrix}$ , find the vector projection of  $\mathbf{x}$  onto  $\mathbf{y}$ .

[This is exercise 3(d) on page 224 of the textbook.]

2. Let  $L$  be the linear transformation from  $R^2$  to  $R^2$  given with respect to the standard basis by  $L \begin{pmatrix} x_1 \\ x_2 \end{pmatrix} = \begin{pmatrix} 0 \\ x_2 \end{pmatrix}$ , let  $\mathbf{u}_1 = \begin{pmatrix} 1 \\ 1 \end{pmatrix}$ , and let  $\mathbf{u}_2 = \begin{pmatrix} -1 \\ 1 \end{pmatrix}$ . Find the matrix that represents the transformation  $L$  with respect to the basis  $[\mathbf{u}_1, \mathbf{u}_2]$ .

[This is exercise 1(e) on page 204 of the textbook.]