
Exercise 1 Vectors $\mathbf{q}_1 = \frac{1}{7} \begin{bmatrix} 2 \\ -3 \\ 6 \end{bmatrix}$ and $\mathbf{q}_2 = \frac{1}{\sqrt{10}} \begin{bmatrix} 3 \\ 0 \\ -1 \end{bmatrix}$ form an orthonormal basis for the plane $3x + 20y + 9z = 0$.

(You should know how to verify that $\mathbf{q}_1, \mathbf{q}_2$ are orthonormal.) Express the orthogonal projection of $\mathbf{x} = \begin{bmatrix} 14 \\ 7 \\ 21 \end{bmatrix}$ onto the plane as a linear combination of $\mathbf{q}_1$ and $\mathbf{q}_2$.

Enter exact coefficients below. Do not round.

$$\mathbf{x} = \dots \mathbf{q}_1 + \dots \mathbf{q}_2$$