Quiz navigation

1 2 3 4 5 6

Finish attempt ...

Time left **1:19:46**

Question **1**

Not yet answered

Points out of 3.00

Find the unit vector $\mathbf{u} = [u_1 \;\; u_2 \;\; u_3]^T$ in the same direction as $\mathbf{v} = [3 \;\; 4 \;\; 0]^T$.

$u_1 =$ ☐ $u_2 =$ ☐ $u_3 =$ ☐

Question **2**

Not yet answered

Points out of 4.00

Determine which pairs of vectors are orthogonal.

Select one or more:

- ☐ a. $\left\{ \begin{bmatrix} 3 \\ 2 \\ -5 \\ 0 \end{bmatrix}, \begin{bmatrix} -4 \\ 1 \\ -2 \\ 6 \end{bmatrix} \right\}$
- ☐ b. $\left\{ \begin{bmatrix} 8 \\ -5 \end{bmatrix}, \begin{bmatrix} -2 \\ -2 \end{bmatrix} \right\}$
- ☐ c. $\left\{ \begin{bmatrix} -3 \\ 7 \\ 4 \\ 0 \end{bmatrix}, \begin{bmatrix} 1 \\ -8 \\ 15 \\ -7 \end{bmatrix} \right\}$
- ☐ d. $\left\{ \begin{bmatrix} 12 \\ 3 \\ -5 \end{bmatrix}, \begin{bmatrix} 2 \\ -3 \\ 3 \end{bmatrix} \right\}$

Question **3**

Not yet answered

Points out of 4.00

Let $\mathbf{y} = \begin{bmatrix} 2 \\ 3 \end{bmatrix}$ and $\mathbf{u} = \begin{bmatrix} 4 \\ -7 \end{bmatrix}$. Write $\mathbf{y}$ as the sum of two orthogonal vectors, such that $\mathbf{y} = \hat{\mathbf{y}} + \mathbf{z}$, where $\hat{\mathbf{y}} = \begin{bmatrix} \hat{y}_1 \\ \hat{y}_2 \end{bmatrix}$ is in Span$\{\mathbf{u}\}$ and $\mathbf{z} = \begin{bmatrix} z_1 \\ z_2 \end{bmatrix}$ is orthogonal to $\mathbf{u}$.

$\hat{y}_1 =$ ___ $\hat{y}_2 =$ ___

$z_1 =$ ___ $z_2 =$ ___

Question **4**

Not yet answered

Points out of 3.00

Let $\mathbf{y} = \begin{bmatrix} 6 \\ 3 \\ -2 \end{bmatrix}$, $\mathbf{u}_1 = \begin{bmatrix} 3 \\ 4 \\ 0 \end{bmatrix}$, $\mathbf{u}_2 = \begin{bmatrix} -4 \\ 3 \\ 0 \end{bmatrix}$. Find the orthogonal projection of $\mathbf{y}$ onto Span $\{\mathbf{u}_1,\ \mathbf{u}_2\}$, i.e. find $\hat{\mathbf{y}} = \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix}$.

$x_1 =$ ___ $x_2 =$ ___ $x_3 =$ ___

Question **5**

Not yet answered

Points out of 4.00

Compute the orthogonal projection, $\begin{bmatrix} x \\ y \end{bmatrix}$, of $\begin{bmatrix} 1 \\ 7 \end{bmatrix}$ onto the line through $\begin{bmatrix} -4 \\ 2 \end{bmatrix}$.

$x =$ ___

$y =$ ___

Question **6**

Not yet answered

Points out of 7.00

Let $\mathbf{y} = \begin{bmatrix} 3 \\ -1 \\ 1 \\ 13 \end{bmatrix}$, $\mathbf{v}_1 = \begin{bmatrix} 1 \\ -2 \\ -1 \\ 2 \end{bmatrix}$, $\mathbf{v}_2 = \begin{bmatrix} -4 \\ 1 \\ 0 \\ 3 \end{bmatrix}$.

a. Find the closest point $(x_1,\ x_2,\ x_3,\ x_4)$ to $\mathbf{y}$ in the subspace W spanned by $\mathbf{v}_1$ and $\mathbf{v}_2$.

$x_1 =$ ___ $x_2 =$ ___ $x_3 =$ ___ $x_4 =$ ___

b. Find the shortest distance from $\mathbf{y}$ to the subspace of $\mathbb{R}^4$ spanned by $\mathbf{v}_1$ and $\mathbf{v}_2$: ___