Changing basis

TOTAL POINTS 5

1.Question 1
In this quiz, you will practice changing from the standard basis to a basis consisting of orthogonal vectors.

Given vectors v=[5 −1], b1=[1 1] b2=[1 −1] all written in the standard basis, what is $\mathbf{v}$v in the basis defined by $\mathbf{b_1}$b1 and $\mathbf{b_2}$b2? You are given that $\mathbf{b_1}$b1 and $\mathbf{b_2}$b2 are orthogonal to each other.

- ○ **vb**=[−3 2]
- ● **vb**=[2 3]
- ○ **vb**=[3 −2]
- ○ **vb**=[3 2]

1 / 1 point

2.Question 2
Given vectors v=[10 −5], b1=[3 4] and b2=[4 −3] all written in the standard basis, what is v in the basis defined by b1 and b2? You are given that b1 and b2 are orthogonal to each other.

- ○ **vb** = [−2/5 11/5]
- ○ **vb** = [2 11]
- ○ **vb** = [11/5 2/5]
- ● **vb**=[2/5 11/5]

1 / 1 point

3.Question 3
Given vectors v=[2 2], b1=[−3 1] and b2=[1 3] all written in the standard basis, what is v in the basis defined by b1 and b2? You are given that b1 and b2 are orthogonal to each other.

- ● **vb**=[−2/5 4/5]
- ○ **vb**=[5/4 −5/2]

○ **vb**=[2/5 −4/5]

○ **vb**=[−2/5 5/4]

4.Question 4
Given vectors $v=\begin{bmatrix}1&1&1\end{bmatrix}$, **b1**=$\begin{bmatrix}2&1&0\end{bmatrix}$, **b2**=$\begin{bmatrix}1&-2&-1\end{bmatrix}$ and **b3**=$\begin{bmatrix}-1&2&-5\end{bmatrix}$ all written in the standard basis, what is v in the basis defined by b1, b2 and b3? You are given that b1, b2 and b3 are all pairwise orthogonal to each other.

◉ **vb**=$\begin{bmatrix}3/5&-1/3&-2/15\end{bmatrix}$

○ **vb**=$\begin{bmatrix}-3/5&-1/3&-2/15\end{bmatrix}$

○ **vb**=$\begin{bmatrix}3&-1&-2\end{bmatrix}$

○ **vb**=$\begin{bmatrix}-3/5&-1/3&2/15\end{bmatrix}$

5.Question 5
Given vectors v=$\begin{bmatrix}1&1&2&3\end{bmatrix}$, **b1**=$\begin{bmatrix}1&0&0&0\end{bmatrix}$, **b2**=$\begin{bmatrix}0&2&-1&0\end{bmatrix}$, **b3**=$\begin{bmatrix}0&1&2&0\end{bmatrix}$ and **b4**=$\begin{bmatrix}0&0&0&3\end{bmatrix}$ all written in the standard basis, what is v in the basis defined by b1, b2, b3 and b4? You are given that b1, b2, b3 and b4 are all pairwise orthogonal to each other.

○ **vb**=$\begin{bmatrix}0&1&1&1\end{bmatrix}$

◉ **vb**=$\begin{bmatrix}1&0&1&1\end{bmatrix}$

○ **vb**=$\begin{bmatrix}1&1&0&1\end{bmatrix}$

○ **vb**=$\begin{bmatrix}1&1&1&0\end{bmatrix}$