Congratulations! You passed!

Next Item

1/1 points

1. As we have seen in the lecture videos, the dot product of vectors has a lot of applications. Here, you will complete some exercises involving the dot product.

What is the size of the vector $\begin{bmatrix}1\\3\\4\\2\end{bmatrix}$?

- $\sqrt{10}$
- $\sqrt{30}$

Correct
The size of the vector is the square root of the sum of the squares of the components.

- 10
- 30

1/1 points

2. What is the dot product of the vectors $\begin{bmatrix}-5\\3\\2\\8\end{bmatrix}$ and $\begin{bmatrix}1\\2\\-1\\0\end{bmatrix}$?

- $\begin{bmatrix}-5\\6\\-2\\0\end{bmatrix}$
- -1

Correct
The dot product of two vectors is the total of the component-wise products.

- 1
- $\begin{bmatrix}-4\\5\\1\\9\end{bmatrix}$

1/1 points

3. Let $\mathbf{r} = \begin{bmatrix}3\\-4\\0\end{bmatrix}$ and let $\mathbf{s} = \begin{bmatrix}10\\5\\-6\end{bmatrix}$.

What is the scalar projection of $\mathbf{s}$ onto $\mathbf{r}$?

- $-\frac{1}{2}$
- $\frac{1}{2}$
- -2
- 2

Correct
The scalar projection of of $\mathbf{s}$ onto $\mathbf{r}$ can be calculated with the formula $\frac{r \cdot s}{|r|}$

1/1 points

4. Let $\mathbf{r} = \begin{bmatrix}3\\-4\\0\end{bmatrix}$ and let $\mathbf{s} = \begin{bmatrix}10\\5\\-6\end{bmatrix}$.

What is the vector projection of $\mathbf{s}$ onto $\mathbf{r}$?

- $\begin{bmatrix}30\\-20\\0\end{bmatrix}$
- $\begin{bmatrix}6/5\\-8/5\\0\end{bmatrix}$

Correct
The vector projection of $\mathbf{s}$ onto $\mathbf{r}$ can be calculated with the formula $\frac{r \cdot s}{r \cdot r} r$.

- $\begin{bmatrix}6\\-8\\0\end{bmatrix}$
- $\begin{bmatrix}6\\4\\0\end{bmatrix}$

1/1 points

5. Given Let $\mathbf{a} = \begin{bmatrix}3\\0\\4\end{bmatrix}$ and let $\mathbf{b} = \begin{bmatrix}0\\5\\12\end{bmatrix}$.

Which is larger, $|\mathbf{a}+\mathbf{b}|$ or $|\mathbf{a}| + |\mathbf{b}|$?

- $|\mathbf{a}+\mathbf{b}| \geq |\mathbf{a}| + |\mathbf{b}|$
- $|\mathbf{a}+\mathbf{b}| = |\mathbf{a}| + |\mathbf{b}|$
- $|\mathbf{a}+\mathbf{b}| \leq |\mathbf{a}| + |\mathbf{b}|$

Correct
This is in general true for any $\mathbf{a}$ or $\mathbf{b}$. This is called the "triangle inequality".