✓ Congratulations! You passed!

Next Item



1/1 point 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 $\begin{bmatrix} 1\\3\\4\\2 \end{bmatrix}$



$$\sqrt{30}$$

Correct

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



$$\sqrt{10}$$

30

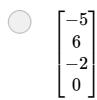
What is the dot product of the vectors

1/1 point

and
$$\begin{bmatrix} 1 \\ 2 \\ -1 \\ 0 \end{bmatrix}$$



1





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



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

1/1 point

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









2



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

1/1 point

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

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

$$\begin{bmatrix} 30 \\ -20 \\ 0 \end{bmatrix}$$

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

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

Correct

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



5.

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

1/1 point

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

$$|\mathbf{a} + \mathbf{b}| = |\mathbf{a}| + |\mathbf{b}|$$

Correct

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

