## /

## **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  $\begin{bmatrix} 1\\3\\4\\2 \end{bmatrix}$ ?

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

### Correct

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

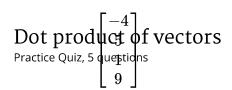


1 / 1 point

2.

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







1



-1

#### Correct

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





3.

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

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



 $\frac{1}{2}$ 



-2



 $-\frac{1}{2}$ 



 $\mathbf{2}$ 

#### Correct

The scalar projection of of  ${f s}$  onto  ${f r}$  can be calculated with the formula  ${r\cdot s\over |r|}$ 



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

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

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

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

#### Correct

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

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

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

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

#### Correct

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

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

# Dot product of vectors Practice Quiz, 5 questions

Practice Quiz 5 questions 5/5 points (100%)



