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1. Given the vectors: 1 / 1 point

$\vec{v}$= (1, 0, 7)

$\vec{w}$= (0, -1, 2)

find the distance between them, $d(\vec{v}, \vec{w})$.

- ○ 5
- ○ -2
- ◉ $\sqrt{(27)}$
- ○ $\sqrt{(23)}$

Correct

Correct! $d(\vec{v}, \vec{w}) = \sqrt{(0-1)^2 + (-1-0)^2 + (2-7)^2}$

2. You are given the points *P*: (1, 0, -3) and *Q*: (−1,0,-3). The magnitude of the vector from *P* to *Q* is: 1 / 1 point

- ○ 3
- ◉ 2
- ○ -2

Correct

Correct! The magnitude of the vector is the distance between points P and Q, which you find by using the following:
$\sqrt{((-1)-1)^2 + 0^2 + ((-3)-(-3))} = \sqrt{4} = 2$

3. Select the correct statements pertaining to the dot product. 1 / 1 point

- ☑ The dot product of two vectors is always a scalar.

Correct

Correct! The dot product gives us a real number, therfore a scalar.

- ☑ The dot product of orthogonal vectors is always 0.

Correct

Correct! Since both vectors are perpendicular to each other, the dot product is always 0.

- ☐ The dot product of orthogonal vectors is always 1.
- ☐ The dot product vector is the diagonal in a parallelogram formed by the two vectors $\vec{u}$ and $\vec{v}$.

4. Calculate the norm $\|v\|$ of the vector $\vec{v}$ = (1, -5, 2, 0,-3) and select the correct answer. 1 / 1 point

- ○ $\|v\| = 5$
- ○ $\|v\| = \sqrt{35}$
- ○ $\|v\| = 39$
- ◉ $\|v\| = \sqrt{39}$

Correct
Correct! $\|v\| = \sqrt{((1^2) + (-5)^2 + 2^2 + 0^2 + (-3)^2)} = \sqrt{39}$

5. Which of the vectors has the greatest norm? 0 / 1 point

- ○ $\begin{bmatrix} 1 \\ 2 \\ -3 \end{bmatrix}$
- ○ $\begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \end{bmatrix}$
- ◉ $\begin{bmatrix} 2 \\ 2 \\ 2 \\ 2 \end{bmatrix}$
- ○ $\begin{bmatrix} 1 \\ 0 \\ -2 \\ 0 \\ -1 \end{bmatrix}$
- ○ $\begin{bmatrix} 2 \\ 5 \end{bmatrix}$

Incorrect
Not quite. Review the video on finding the norm of a vector (The dot product).

For a vector $\vec{v} = (x, y, z)$, the norm $\|v\| = \sqrt{(x^2) + (y^2) + (z^2)}$

6. Calculate the dot product $\vec{a} \cdot \vec{b}$ and select the correct answer. 1 / 1 point

$$\vec{a} = \begin{bmatrix} -1 \\ 5 \\ 2 \end{bmatrix}, \vec{b} = \begin{bmatrix} -3 \\ 6 \\ -4 \end{bmatrix}$$

- ○ 30
- ○ $\begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix}$
- ○ $\begin{bmatrix} -3 \\ 30 \\ -8 \end{bmatrix}$
- ◉ 25

Correct

Correct! By applying the formula you saw in the video The dot product as follows: $\vec{a}\cdot\vec{b} = ax\cdot bx + ay\cdot by + az\cdot bz$, you have:

$$\vec{a}\cdot\vec{b} = (-1)\cdot(-3) + 5\cdot 6 + 2\cdot(-4) = 3 + 30 - 8 = 25.$$

7. **Which of the following is the result of performing the multiplication $M_1 \cdot M_2$? Where M_1 and M_2 are given by:** **1 / 1 point**

$$M_1 = \begin{bmatrix} 2 & -1 \\ 3 & -3 \end{bmatrix}, M_2 = \begin{bmatrix} 5 & -2 \\ 0 & 1 \end{bmatrix}.$$

- $\begin{bmatrix} 10 & 3 \\ 15 & 4 \end{bmatrix}$
- $\begin{bmatrix} 10 & 15 \\ -3 & -4 \end{bmatrix}$
- $\begin{bmatrix} 10 & -3 & 1 \\ 15 & -4 & 0 \\ 1 & 0 & 1 \end{bmatrix}$
- (selected) $\begin{bmatrix} 10 & -5 \\ 15 & -9 \end{bmatrix}$

Correct

Correct! Remember from the video Matrix Multiplication, to multiply matrices, you have: $\begin{bmatrix} c_1 & c_2 \\ c_3 & c_4 \end{bmatrix}$ where in the matrices given:

$$c_1 = 2\cdot 5 + (-1)\cdot 0 = 10,$$

$$c_2 = 2\cdot(-2) + (-1)\cdot 1 = -5,$$

$$c_3 = 3\cdot 5 + (-3)\cdot 0 = 15,$$

$$c_4 = 3\cdot(-2) + (-3)\cdot 1 = -9.$$

When you replace these values back onto the matrix, you obtain: $\begin{bmatrix} 10 & -5 \\ 15 & -9 \end{bmatrix}$.

8. **Calculate the dot product $\vec{w}\cdot\vec{z}$ and select the correct answer.** **1 / 1 point**

$$\vec{w} = \begin{bmatrix} -9 \\ -1 \end{bmatrix}, \vec{z} = \begin{bmatrix} -3 \\ -5 \end{bmatrix}$$

- 35
- $\begin{bmatrix} 27 \\ 5 \end{bmatrix}$
- $\begin{bmatrix} -27 \\ -5 \end{bmatrix}$
- (selected) 32

Correct

Correct! $\vec{w}\cdot\vec{z} = \begin{bmatrix} -9 \\ -1 \end{bmatrix}\cdot\begin{bmatrix} -3 \\ -5 \end{bmatrix} = (-9)(-3) + (-1)(-5) = 32$