Congratulations! You passed!

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1. In this assessment, you will be tested on all of the different topics you have in covered this module. Good luck!

1 / 1 point

A ship travels with velocity given by $\begin{bmatrix} 1 \\ 2 \end{bmatrix}$, with current flowing in the direction given by $\begin{bmatrix} 1 \\ 1 \end{bmatrix}$ with respect to some co-ordinate axes.

What is the velocity of the ship in the direction of the current?

- $\bigcirc \quad \begin{bmatrix} 2/3 \\ 3/2 \end{bmatrix}$
- $\bigcirc \begin{bmatrix} 2/3 \\ 2/3 \end{bmatrix}$
- A ball travels with velocity given by $\begin{bmatrix} 2 \\ 1 \end{bmatrix}$, with wind blowing in the direction given by $\begin{bmatrix} 3 \\ -4 \end{bmatrix}$ with respect to some co-ordinate axes.

1 / 1 point

What is the size of the velocity of the ball in the direction of the wind?

- $O^{\frac{5}{2}}$
- $O -\frac{5}{2}$
- $O_{-\frac{2}{5}}$
 - ✓ Correct

This is the scalar projection of the velocity of the ball onto the velocity of the wind.

3. Given vectors $\mathbf{v} = \begin{bmatrix} -4 \\ -3 \\ 8 \end{bmatrix}$, $\mathbf{b_1} = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$, $\mathbf{b_2} = \begin{bmatrix} -2 \\ 1 \\ 0 \end{bmatrix}$ and $\mathbf{b_3} = \begin{bmatrix} -3 \\ -6 \\ 5 \end{bmatrix}$ all written in the standard basis,

1 / 1 point

what is v in the basis defined by b_1 , b_2 and b_3 ? You are given that b_1 , b_2 and b_3 are all pairwise orthogonal to each other.

- $\begin{bmatrix} 0 \\ 1 \\ 1 \end{bmatrix}$
- O $\begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix}$
- $\bigcap_{\substack{1\\1\\0}}$
- **⊘** Correct

This is a change of basis in 3 dimensions.

4. Are the following vectors linearly independent?

$$\mathbf{a} = \begin{bmatrix} 1 \\ 2 \\ -1 \end{bmatrix}, \mathbf{b} = \begin{bmatrix} 3 \\ -4 \\ 5 \end{bmatrix} \text{ and } \mathbf{c} = \begin{bmatrix} 1 \\ -8 \\ 7 \end{bmatrix}.$$

- O Yes
- No
- At 12:00 pm, a spaceship is at position $\begin{bmatrix} 3 \\ 2 \\ 4 \end{bmatrix} km$ away from the origin with respect to some 3 dimensional co

ordinate system. The ship is travelling with velocity $egin{bmatrix} -1 \\ 2 \\ -3 \end{bmatrix} km/h$ What is the location of the spaceship after 2

hours have passed?

- $\bigcirc \begin{bmatrix} 1 \\ 6 \\ -2 \end{bmatrix}$
- $\begin{array}{c|c}
 & \begin{bmatrix}
 -2 \\
 4 \\
 -1
 \end{array}$
- $\begin{array}{ccc}
 & \begin{bmatrix}
 -1 \\
 -6 \\
 2
 \end{bmatrix}$
- $\begin{bmatrix}
 2 \\
 4 \\
 1
 \end{bmatrix}$

This takes the idea of vectors in the context of a moving body.

1 / 1 point

1 / 1 point