✓ **Congratulations! You passed!**
TO PASS 80% or higher

Keep Learning

GRADE
80%

Vector operations assessment

LATEST SUBMISSION GRADE
80%

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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!   `0/1 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?

- ○ $\begin{bmatrix} 3/2 \\ 2/3 \end{bmatrix}$
- ◉ $\begin{bmatrix} 2/3 \\ 2/3 \end{bmatrix}$
- ○ $\begin{bmatrix} 2/3 \\ 3/2 \end{bmatrix}$
- ○ $\begin{bmatrix} 3/2 \\ 3/2 \end{bmatrix}$

! **Incorrect**
Revise one of the concepts that you have learnt from this module.

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2. 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?

- ○ $-\frac{2}{5}$
- ○ $\frac{5}{2}$
- ◉ $\frac{2}{5}$
- ○ $-\frac{5}{2}$

✓ **Correct**
This is the scalar projection of the velocity of the ball onto the velocity of the wind.

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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, what is $\mathbf{v}$ in the basis defined by $\mathbf{b_1}$, $\mathbf{b_2}$ and $\mathbf{b_3}$? You are given that $\mathbf{b_1}$, $\mathbf{b_2}$ and $\mathbf{b_3}$ are all pairwise orthogonal to each other.   `1/1 point`

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

✓ **Correct**
This is a change of basis in 3 dimensions.

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4. Are the following vectors linearly independent?   `1/1 point`

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

- ○ Yes
- ◉ No

✓ **Correct**
One can be written as a linear combination of the other two.

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5. 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   `1/1 point`

system. The ship is travelling with velocity $\begin{bmatrix} -1 \\ 2 \\ -3 \end{bmatrix}$ km/h What is the location of the spaceship after 2 hours have passed?

- ○ $\begin{bmatrix} 2 \end{bmatrix}$

$\begin{bmatrix} 4 \\ 1 \end{bmatrix}$

○ $\begin{bmatrix} -1 \\ -6 \\ 2 \end{bmatrix}$

○ $\begin{bmatrix} -2 \\ 4 \\ -1 \end{bmatrix}$

◉ $\begin{bmatrix} 1 \\ 6 \\ -2 \end{bmatrix}$

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