← **Vector operations assessment**
Graded Quiz • 15 min   **Due** May 11, 2:59 AM EDT

✔ **Congratulations! You passed!**

QUIZ • 15 MIN   **TO PASS** 80% or higher   [Keep Learning]   **GRADE**
                                                                                                 100%

Vector operations assessment

Vector operations assessment

LATEST SUBMISSION GRADE
100%

✔ **Submit your assignment**   Try again

DUE May 11, 2:59 AM EDT   **ATTEMPTS** 3 every 8 hours

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

✔ **Receive grade**   **Grade**   [View Feedback]

TO PASS 80% or higher   100%

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

     What is the velocity of the ship in the direction of the current?   👍   💬   🚩

     ◯ $\begin{bmatrix}2/3\\3/2\end{bmatrix}$

     ◯ $\begin{bmatrix}2/3\\2/3\end{bmatrix}$

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

     ◯ $\begin{bmatrix}3/2\\2/3\end{bmatrix}$

          ✔ **Correct**
          This is the vector projection of the velocity of the ship onto the velocity of the current.

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   1 / 1 point
     some co-ordinate axes.

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

     ◉ $\frac{2}{5}$

     ◯ $-\frac{5}{2}$

     ◯ $\frac{5}{2}$

     ◯ $-\frac{2}{5}$

          ✔ **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, what is   1 / 1 point
     $\mathbf{v}$ 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.

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

     ◯ $\begin{bmatrix}0\\1\\1\end{bmatrix}$

     ◯ $\begin{bmatrix}1\\0\\1\end{bmatrix}$

     ◯ $\begin{bmatrix}1\\1\\0\end{bmatrix}$

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

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.

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   1 / 1 point
     ordinate 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?

     ◯ $\begin{bmatrix}2\\4\\1\end{bmatrix}$

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

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

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

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