

You will have twenty minutes to take this quiz. Read the instructions carefully. There are more questions on the back of this page.

1. (4 points) *You do not need to show your work. Only the answer will be graded.*

Let $\vec{a} = \begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix}$, $\vec{b} = \begin{pmatrix} -1 \\ 1 \\ -1 \end{pmatrix}$ and $\vec{c} = \begin{pmatrix} 1 \\ 2 \end{pmatrix}$. Which of the following expressions are nonsense?

Evaluate the sensible ones.

1. $\vec{a} + \vec{c}$

2. $\vec{a} \cdot \vec{c}$

3. $\vec{a}\vec{b}$

4. $\vec{a} - 2\vec{b}$

2. (6 points) Show your work. Partial credit may be awarded.

Let $\vec{\mathbf{a}} = \begin{pmatrix} 2 \\ 1 \\ 1 \end{pmatrix}$ and $\vec{\mathbf{b}} = \begin{pmatrix} 1 \\ 1 \\ 0 \end{pmatrix}$. Find $\vec{\mathbf{a}}^{\parallel}$ and $\vec{\mathbf{a}}^{\perp}$ so that $\vec{\mathbf{a}} = \vec{\mathbf{a}}^{\parallel} + \vec{\mathbf{a}}^{\perp}$, where $\vec{\mathbf{a}}^{\parallel}$ is parallel to $\vec{\mathbf{b}}$ and $\vec{\mathbf{a}}^{\perp}$ is perpendicular to $\vec{\mathbf{b}}$.