Chapter 4.6
Linear Algebra with applications to differential equations
College of the Atlantic. Winter 2019

1. (Re)introduce yourself to your partners and briefly talk about your least favorite foods.

2. Let $\vec{u} = (1, 2, 3)$ and $\vec{v} = (3, -1, 3)$. Calculate $\vec{u} \cdot \vec{v}$.

3. Let $\vec{u} = (1, 2)$ and $\vec{v} = (-2, 1)$. Calculate $\vec{u} \cdot \vec{v}$. What's going on?

4. Let $\vec{u} = (1, 2, 3, 2, 1)$ and $\vec{v} = (1, -1, 3, 2, 2)$. Calculate the angle between $\vec{u}$ and $\vec{v}$.

5. Let $\vec{u} = (3, 4)$. Calculate $\vec{u} \cdot \vec{v}$.

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6. Consider the matrix A:
$$A = \begin{bmatrix} 5 & -6 \\ 2 & -2 \end{bmatrix}. \tag{1}$$

   (a) Let $\vec{u} = (3, 3)$. Calculate $A\vec{u}$.
   (b) Let $\vec{u} = (2, -2)$. Calculate $A\vec{u}$.
   (c) Let $\vec{u} = (3, 2)$. Calculate $A\vec{u}$.
   (d) Let $\vec{u} = (6, 4)$. Calculate $A\vec{u}$.
   (e) Let $\vec{u} = (4, 2)$. Calculate $A\vec{u}$.

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7. Find the eigenvalues and eigenvectors for the matrix A:
$$A = \begin{bmatrix} 5 & -2 \\ 3 & -2 \end{bmatrix}, \tag{2}$$