MEMORIAL UNIVERSITY OF NEWFOUNDLAND

DEPARTMENT OF MATHEMATICS AND STATISTICS

SECTION 1.2 **Math 2050 Worksheet** WINTER 2026

For practice only. Not to be submitted.

1. Let $\mathbf{v} = \begin{bmatrix} -1 \\ 4 \\ 3 \end{bmatrix}$.

   (a) Find a unit vector in the direction of $\mathbf{v}$.

   (b) Find a vector of length 7 in the direction of $\mathbf{v}$.

   (c) Find a vector of length 4 in the opposite direction to $\mathbf{v}$.

2. Find the angle (in radians) between $\mathbf{u} = \begin{bmatrix} -1 \\ 2 \\ 1 \end{bmatrix}$ and $\mathbf{v} = \begin{bmatrix} 0 \\ -1 \\ -1 \end{bmatrix}$.

3. Let $\mathbf{u}$, $\mathbf{v}$, and $\mathbf{w}$ be vectors of length 2, 6 and 8, respectively such that $\mathbf{u} \cdot \mathbf{v} = -3$, $\mathbf{v} \cdot \mathbf{w} = 1$ and $\mathbf{u} \cdot \mathbf{w} = 4$. Find

   (a) $(\mathbf{u} + 5\mathbf{w}) \cdot (3\mathbf{v} - 2\mathbf{u})$

   (b) $\|\mathbf{v} - \mathbf{w}\|^2$