Exercise 1 *Select all of the following statements that must be true:*

Select All Correct Answers:

(a) *Given any nonzero vector* $\vec{\mathbf{u}}$, *the vector* $\dfrac{\vec{\mathbf{u}}}{|\vec{\mathbf{u}}|}$ *has magnitude* 1. ✓

(b) *Given any nonzero vectors* $\vec{\mathbf{u}}$ *and* $\vec{\mathbf{v}}$ *with the same dimension,* $|\vec{\mathbf{u}} + \vec{\mathbf{v}}| = |\vec{\mathbf{u}}| + |\vec{\mathbf{v}}|$.

(c) *If* $\vec{\mathbf{u}} = 3\vec{\mathbf{v}}$, *then* $|\vec{\mathbf{u}} + \vec{\mathbf{v}}| = |\vec{\mathbf{u}}| + |\vec{\mathbf{v}}|$ ✓

(d) *If* $|\vec{\mathbf{u}}| = 5$, *then* $|6\vec{\mathbf{u}}| = 30$. ✓

(e) *If* $\vec{\mathbf{u}} = \langle u_1, u_2, u_3 \rangle$ *and* $\vec{\mathbf{v}} = \langle v_1, v_2, v_3 \rangle$, *then* $\vec{\mathbf{u}} = \vec{\mathbf{v}}$ *if and only if:*

$$u_1 = v_1 \qquad u_2 = v_2 \qquad u_3 = v_3$$

✓

(f) *If* $|\vec{\mathbf{u}}| = |\vec{\mathbf{v}}|$, *then* $\vec{\mathbf{u}} = \vec{\mathbf{v}}$.

(g) *If* $\vec{\mathbf{u}} = \vec{\mathbf{v}}$, *then* $|\vec{\mathbf{u}}| = |\vec{\mathbf{v}}|$. ✓