Score:

Name: Solutions
Period (circle one): 1 2 3 4 5 6
Team (circle one): a b c d e f

SM 261 – Matrix Algebra – Quiz 24
Section 6.1 – Inner Product, Length, and Orthogonality

Let $\vec{u} = \begin{bmatrix} -1 \\ 2 \end{bmatrix}$, $\vec{v} = \begin{bmatrix} 4 \\ 6 \end{bmatrix}$, $\vec{w} = \begin{bmatrix} 3 \\ -1 \\ -5 \end{bmatrix}$, $\vec{x} = \begin{bmatrix} 6 \\ -2 \\ 3 \end{bmatrix}$

1. $\vec{u} \cdot \vec{u}$

$(-1)(-1) + (2)(2) = 5$

2. $\frac{1}{\vec{w} \cdot \vec{w}} \vec{w}$ $\quad \frac{1}{9+1+25} \begin{bmatrix} 3 \\ -1 \\ -5 \end{bmatrix} = \frac{1}{35} \begin{bmatrix} 3 \\ -1 \\ -5 \end{bmatrix}$

3. $\frac{\vec{u} \cdot \vec{v}}{\vec{u} \cdot \vec{u}} \vec{u}$ $\quad \frac{-4+12}{5} \begin{bmatrix} -1 \\ 2 \end{bmatrix} = \frac{8}{5} \begin{bmatrix} -1 \\ 2 \end{bmatrix}$

4. $\|\vec{x}\| = (36+4+9)^{1/2} = 7$