Attendance Quiz for Lecture 20

NAME: (print!) _____ **Section:** _____

E-MAIL ADDRESS: (print!) _____

1. Consider the vectors $\mathbf{u}$ and $\mathbf{v}$:

$$\mathbf{u} = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix} \quad , \quad \mathbf{v} = \begin{bmatrix} -11 \\ 4 \\ 1 \end{bmatrix}$$

(a) Prove that $\mathbf{u}$ and $\mathbf{v}$ are orthogonal to each other.

(b) Compute the quantities $||\mathbf{u}||^2$, $||\mathbf{v}||^2$ and $||\mathbf{u}+\mathbf{v}||^2$. Use your results to illustrate the Pythagorean theorem.

2. Suppose that $\mathbf{u}$, $\mathbf{v}$, $\mathbf{w}$ are vectors in R^n such that $\mathbf{u}\cdot\mathbf{v} = 2$, $\mathbf{u}\cdot\mathbf{w} = 3$, and $\mathbf{v}\cdot\mathbf{w} = -2$. Compute $(\mathbf{u}+\mathbf{w})\cdot\mathbf{v}$.