Attendance Quiz #25

Solution.

$$\lambda \mathbf{v}^T \mathbf{u} = \mathbf{v}^T (\lambda \mathbf{u}) = \mathbf{v}^T A \mathbf{u} = (A^T \mathbf{v})^T \mathbf{u} = \mu \mathbf{v}^T \mathbf{u}$$

so that $(\lambda - \mu)\mathbf{v}^T \mathbf{u} = 0$. Since $\lambda \neq \mu$, we have $\mathbf{v}^T \mathbf{u} = 0$, i.e., $\mathbf{u} \perp \mathbf{v}$. □