> Answer the questions below. You may answer in the space provided. You may use a separate sheet of paper if you need more space. You are to work in groups of no more than four people. Make sure to enter the names of your groupmates below.

Name: _____

Section: _____

Group Members: _____

1. (3 points) Let S be a finite orthogonal set of non-zero vectors of an inner product space V. Show that S is linearly independent.

2. (3 points) Let $S = \{\mathbf{u}_1 \ldots \mathbf{u}_n\}$ be an orthogonal basis of inner product space V. Let $\mathbf{v} \in V$ where $\mathbf{v} = \sum_{i=1}^{n} c_i \mathbf{u}_i$. Find a formula for c_i

3. (a) (2 points) Show that if $\|\cdot\|$ is an operator norm on $n \times n$ matrices, then $\|I_n\| = 1$.

(b) (2 points) Show that there is no norm on $\mathbb{R}^n$ for $n > 1$ inducing the Frobenius norm as an operator norm on the set of $n \times n$ matrices.