June 27

Problem 1.

Show that there is an orthonormal basis for any inner product on $\mathbb{C}^2$.

Problem 2.

What are the unitary maps from $\mathbb{C}$ to $\mathbb{C}$?

Problem 3.

Show that unitary maps from $\mathbb{C}^n$ to $\mathbb{C}^n$ form a group under composition.
What can we say about inner product-preserving maps from $\mathbb{C}^n$ to $\mathbb{C}^m$?