

Matrices and Linear Transformations

1. The reflections are linear transformations. Write the standard matrix associated to the reflection in the line $y = x$.
2. Write the standard matrix associated to the rotation counterclockwise of 30 degrees.
3. Write the matrix associated to the composition of the reflection as in 1 followed by the rotation as in 2.
4. (Extra Credit) Shows that if $\mathbf{v}_1, \dots, \mathbf{v}_k$ are a basis for R^k and if \mathbf{v} is a vector in R^k such that $\mathbf{v} = a_1\mathbf{v}_1 + \dots + a_k\mathbf{v}_k$ then the coefficients a_1, \dots, a_k are unique.