**Lab 3 Write-up:**

*\*\*Please see accompanying files for code and generated charts/images\*\**

1. 1. **Vector in S:**

**Vector not in S:**

You can check if a new vector is in S by… FINISH THIS

2. dim(S) = 2

3. **Orthonormal basis for S:**

[[-0.24011927 -0.05990306 -0.35992538 -0.89955994]

[ 0.8581727 -0.29094143 0.27628983 -0.32024463]]

4. FINISH THIS

1. 2. The points look like FINISH THIS

4. Yes, performing PCA made the two labels more distinguishable in two dimensions. In the resulting plot (problem2d.png), the two labels form two distinct curves with opposing “concavities.”

1. 1. See attached images, named mona\_lisa\_k.png, where k is the corresponding value of k.

2. FINISH THIS

1. 1. Usernames -

**Shamma:** ShammaKabir

**Tony:** adepalatis

2. **RMSE:** 0.13029

3. **Best RMSE:** 0.12242. We got this by raising the value of alpha to increasingly higher values, with the best results being at alpha = 7.5. We ran out of submissions before we could go any higher, but we suspect we could have further improved if we tried different solvers and (probably to a lesser degree) if we fiddled with the tolerance.