Machine Learning Quiz 1

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Prob 1:

```
Covariance Matrix for Dataset_1:
[[ 0.08060992  0.40242878 -0.0025104 ]
 [ 0.40242878  2.09900159 -0.01439466]
 [-0.0025104  -0.01439466  0.08058254]]
Eigenvalues for Dataset_1:
```

1)
Var(x) = 0.08060992
Var(y) = 2.09900159
Var(z) = 0.08058254

2)
Cov(x, y) = 0.40242878
Cov(y, z) = -0.01439466

3) Do pca (see code)
Below is the three PCs

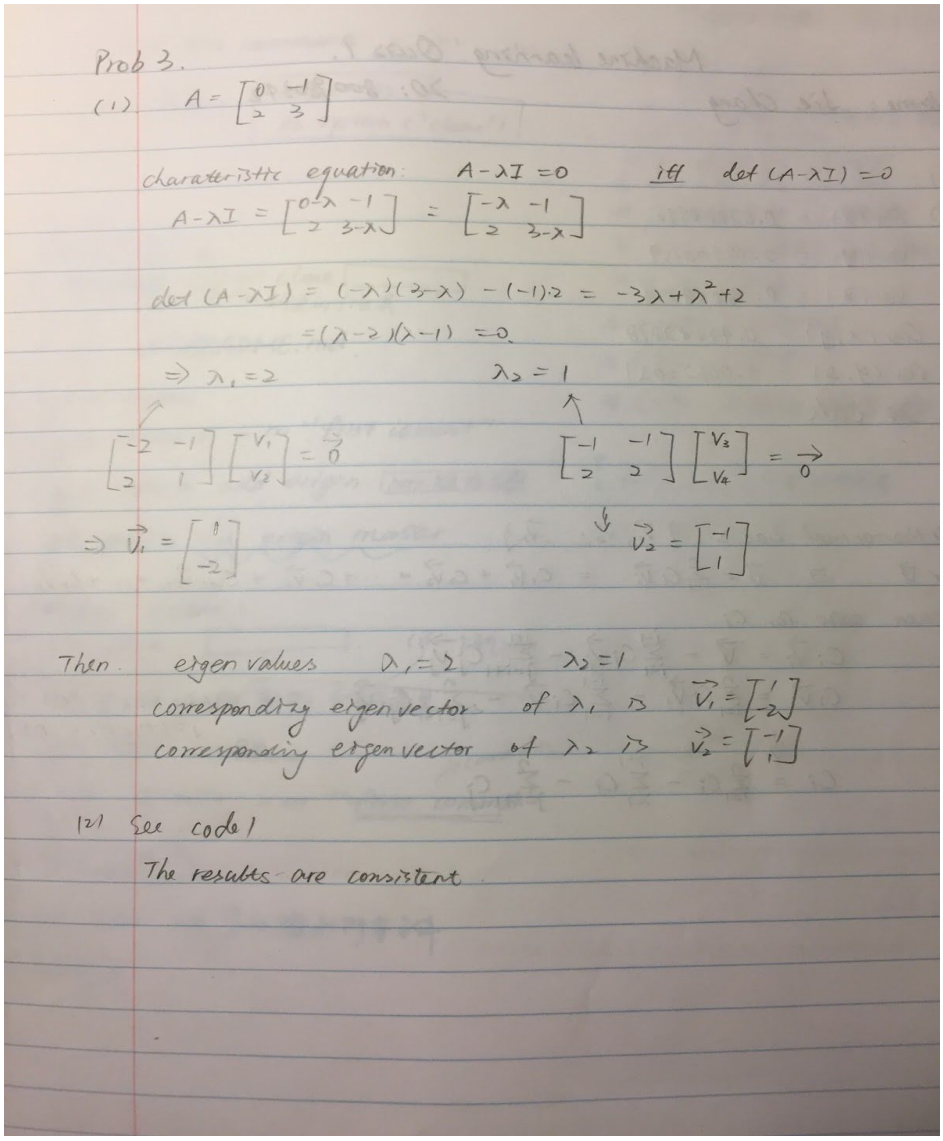
```
PCA for dataset_1:
[[ -1.75681915e+00   2.20257289e-03  -8.97784291e-02]
 [ -8.88177567e-01   1.64657996e-02  -2.54949633e-02]
 [  5.26487022e-02  -4.46783426e-01   3.83101057e-02]
 ...,
 [  3.60428154e-01   3.45422947e-01   4.99235344e-02]
 [ -2.86808081e+00  -3.85070743e-01   6.02112236e-02]
 [  1.52319700e+00  -1.45746184e-01  -3.05903854e-02]]
```

Prob2:

Ci = V ·Vi

Prob 3:

1)



2)

```
eigenvalues for a
[ 1.  2.]
eigenvectors for a
[[-0.70710678  0.4472136 ]
 [ 0.70710678 -0.89442719]]
```