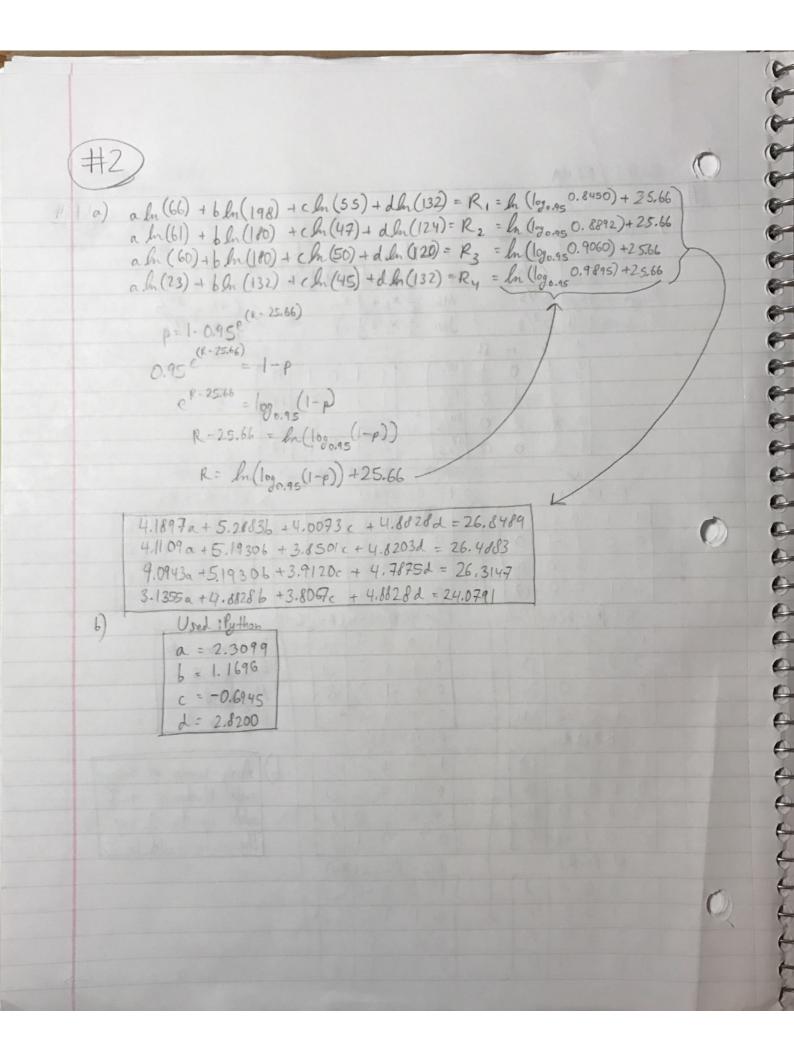
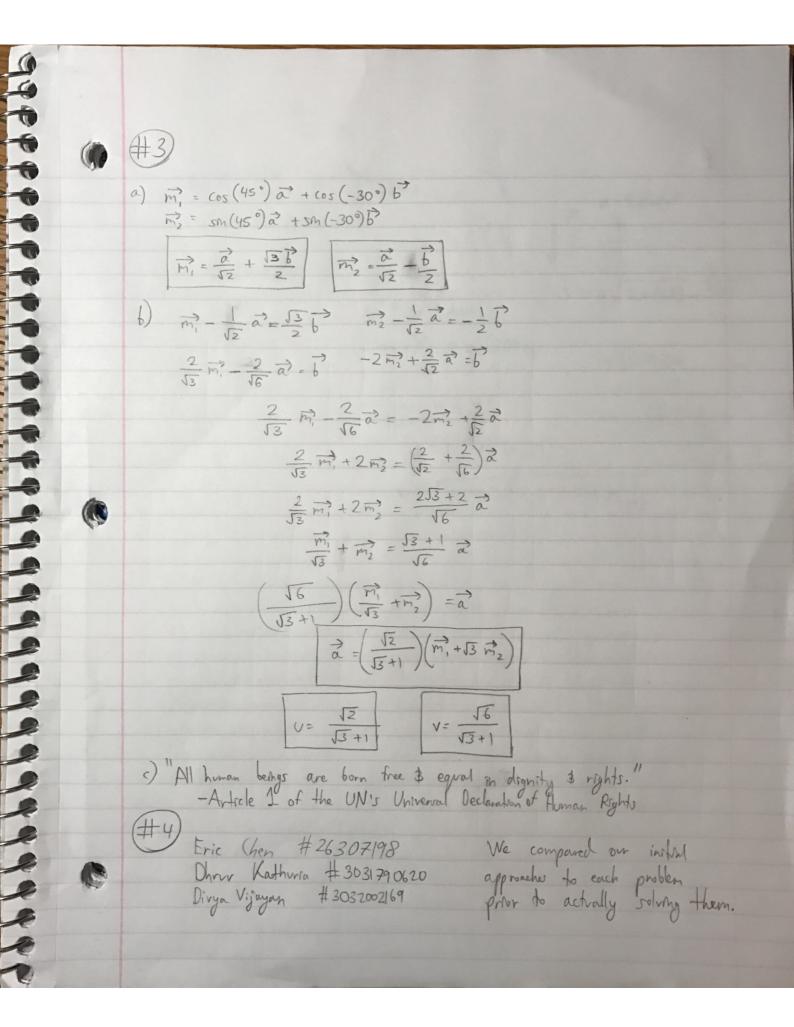


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EE16A: Homework 1

Problem 2: The Framingham Risk Score

```
In [15]: # Tip: np.log works element-wise on an np.array
    import numpy as np

main = np.log(np.array([[66,198,55,132], [61,180,47,124],
    [60,180,50,120], [23,132,45,132]]))
    Rs = np.log(np.log(np.array([0.8450, 0.8892, 0.9060, 0.9895]))/np.log(0.95)) + 25.66
    coefficients = np.around(np.linalg.solve(main, Rs), 4)

print('a is', coefficients[0])
    print('b is', coefficients[1])
    print('c is', coefficients[2])
    print('d is', coefficients[3])

a is 2.3099
    b is 1.1696
    c is -0.6945
    d is 2.82
```

Problem 3: Filtering out the troll

```
In [17]: import numpy as np
    import matplotlib.pyplot as plt
    import wave as wv
    import scipy
    from scipy import io
    import scipy.io.wavfile
    from scipy.io.wavfile import read
    from IPython.display import Audio
    import warnings
    warnings.filterwarnings('ignore')
    sound_file_1 = 'm1.wav'
    sound_file_2 = 'm2.wav'
```

Let's listen to the recording by the first microphone (it can take some time to load the sound file).

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And this is the recording by the second microphone (it can take some time to load the sound file).

We read the first recording to corrupt1 and second recording to corrupt2 variables.

```
In [24]: rate1,corrupt1 = scipy.io.wavfile.read('m1.wav')
rate2,corrupt2 = scipy.io.wavfile.read('m2.wav')
```

Enter the gains to combine the two recordings to get the clean speech.

Note: The square root of a number a can be obtained as np.sqrt(a) in IPython.

```
In [25]: # enter the gains u to weight recording 1 and v to weight recording 2
u = np.sqrt(2)/(np.sqrt(3)+1)
v = np.sqrt(6)/(np.sqrt(3)+1)
```

Weighted combination of the two recordings

```
In [26]: s1 = u*corrupt1 + v*corrupt2
```

Let's listen to the resulting sound file (make sure your speaker's volume is not very high, the sound may be loud if things go wrong).

(Practice) Problem 5: Finding Charges from Potential Measurements

```
In [ ]:
```