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Assignment Hill Cipher

A math equations on a white background

Description automatically generatedA close-up of a number

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A notebook with writing on it

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Solved by hand below also with different cipher text and plain text. I realized that my letter for D should be 9 not B=9. Was going a little fast and mismatched the letters.

A notebook with writing on it

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Below is the conversion of cipher text back to the plain text proving the key possible and correct.

A white paper with writing on it

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Solved: I was able to solve this cipher by two different methods. The first one was simple by just looking for cipher text and plain text that were close to one another to limit the math we had to do. So, I found that D (plain text) and E (cipher text) were close enough to each other to start to formulate our matrix with possibly as little math as possible. Once we set up our matrix, we were able to find out equations in which we then plugged into Mathematica and was able to get the answers of 13,3,16,9 in our matrix above. In order to check our matrix to make sure it was correct we had determine the determinate and make sure that the number given was mod 26, which it was. Then we simply used our matrix and went form cipher text to plain text which worked giving us the correct key. The other method I used to solve this problem was just by hand. So same steps have occurred instead of using Mathematica I had to simplify and modulus by hand with a different set of letters to ensure that I knew how to do both ways just in case.