

Practice:

- (1) Suppose Alice is using the Affine cipher with encryption function $E(x) \equiv 23x + 19 \pmod{26}$. What is the ciphertext for the plaintext message HI?
- (2) Using the same encryption function for an affine cipher, $E(x) \equiv 23x + 19 \pmod{26}$ find the equation for the decryption function in the form $D(y) \equiv cx + d$ where c and d are numbers between 0 and 25.
- (3) Suppose you have a known plaintext situation for affine cipher. The plaintext is HAHAHA and the ciphertext is NONONO. Determine the key (i.e. the encryption function). Hint: write down some equations modulo 26 that must be true and try to solve for the key. Use the multiplication table posted on the website.
- (4) Suppose you have a known plaintext situation for an affine cipher. The plaintext is MMM and the ciphertext is QQQ. Explain why this is not enough information to determine the key.

Don't forget to do the reading in the textbook!