

## Week 3 Wednesday

## Historical Figure

Turn to someone sitting near you. Introduce yourselves to each other, and then take about 3 minutes to discuss:

If you could meet any historical figure, who would you choose and why?

# Polygraphic Ciphers

1. Which of the following matrices is invertible mod 26?

(A)  $\begin{bmatrix} 7 & 5 \\ 3 & 3 \end{bmatrix}$

(B)  $\begin{bmatrix} 8 & 1 \\ 3 & 2 \end{bmatrix}$

(C)  $\begin{bmatrix} 4 & 2 \\ 1 & 2 \end{bmatrix}$

(D)  $\begin{bmatrix} 4 & 3 \\ 1 & 2 \end{bmatrix}$

**Follow-up.** Find an inverse of the invertible one!

2. Use a Hill cipher with key

$$A = \begin{bmatrix} 4 & 3 \\ 1 & 2 \end{bmatrix}$$

to encrypt the word AREA.

3. The matrix

$$A = \begin{bmatrix} 4 & 3 \\ 1 & 2 \end{bmatrix}$$

was used to encrypt CRZX. What is the plaintext?

4. You are constructing a  $5 \times 5$  grid for a Playfair cipher starting with the key word FAJITAS. What letter falls in the *very center* of the grid (ie, in the 3rd row and the 3rd column)?

- (A) K
- (B) L
- (C) M
- (D) None of the above

5. Encode the message "Little Fluffy" for encryption using a Playfair cipher. How many *pairs* of letters are in the encoded message?

(A) 6

(B) 7

(C) 8

(D) None of the above



6. Use a Playfair cipher with the  $5 \times 5$  grid constructed using the key word FAJITAS to encrypt "Little Fluffy."