

CIS 3362 Quiz #2: Playfair, Hill, ADFGVX, Transposition, Enigma, Navajo Code

Date: 9/20/2024

Name : _____

1) (10 pts) The following ciphertext: "PGRXCTRGKCMRFUBSVOCU" was encrypted via the Playfair cipher with the following key: "SECONDHARVEST". What is the plaintext? (Note: it's weird, but still recognizable, so to speak.)

2) (5 pts) Answer these questions about the Navajo Code used during World War II.

(a) (1 pt) In what continent were the Navajo Code talkers used during combat during WWII?

(b) (2 pts) Of the 32 men in the first group of Navajo who developed the code, only 30 were subsequently sent to battle. What did the other 2 men do?

(c) (2 pts) What was the primary weakness of the code the US used for secure communications during WWII that the Navajo Code addressed?

3) (15 pts) In attempting to find a Hill cipher key, you've arrived at the two following equations for 2 unknown variables, a and b:

$$17a + 9b \equiv 19 \pmod{26}$$

$$7a + 23b \equiv 15 \pmod{26}$$

Find both ordered pairs (a, b) with $0 \leq a, b \leq 25$ that satisfy these two equations simultaneously. (Note: To speed up computation, reduce values under mod appropriately, so use negatives!)

(_____ , _____) and (_____ , _____)

5) (5 pts) When two scramblers were added to the Engima for potential use, it multiplied the number of configurations of the machine by 10. Imagine, if a similar augmentation was made and another two scramblers were added after the first modification. Let X equal the number of configurations after the first modification. Let Y equal the number of configurations after the second (fictitious) modification. $Y = aX$ where a can be represented as a decimal number with exactly one digit after the decimal point. With proof, find the value of a .

6) (1 pt) What three-dimensional shape is The Great Pyramid of Giza? _____

Scratch Page – Please clearly mark any work on this page you would like graded.