

Name: _____ score: _____ / 10

There are 10 points possible on this quiz. No aids (book, notes, etc.) are permitted. You may use a non-programmable calculator. **Show all work and supporting calculations for full credit. Explain how you get your answers.**

1. (2 points) **Decrypt** the message XUWNS LNXMJ WJ using an alphabetic Caesar (shift) cipher with shift 5 (A to F).

Use row 5 of attached table

X	U	W	N	S	L	N	X	M	J	W	J
S	P	R	I	N	G	I	S	H	E	R	E

Spring is here.

2. (2 points) **Encrypt** the message "2 WEEKS LEFT" using the substitution table below.

plain	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
cipher	L	K	J	I	P	O	N	M	T	S	Q	R	V	U	Y	X	W	Z

plain	S	T	U	V	W	X	Y	Z	0	1	2	3	4	5	6	7	8	9
cipher	9	8	7	6	5	4	3	2	1	0	D	C	B	A	H	G	F	E

2	W	E	E	K	S	L	E	F	T
D	5	P	P	Q	9	R	P	0	8

D5PPQ 9RPO8

3. (2 points) **Encrypt** the message I LIKE CHEESE using a tabular transposition cipher with rows of length 4.

1	2	3	4
I	L	I	K
E	C	H	E
E	S	E	X

cipher text (columns)
 I E E L C S I H E K E X

4. (2 points) **Decrypt** the message LIKED ETESS BXRIZ using a tabular transposition cipher with rows of length 5.

1	2	3	4	5
L	E	T	S	R
I	D	E	B	I
K	E	S	X	Z

grid shape: 15 letters
5 columns
 $\frac{15}{5} = 3$ rows

plain text (rows)
LETS RIDE BIKES XZ

5. (2 point) You are given a message to decrypt. You suspect that a substitution cipher may have been used to encrypt the message. Given this, you construct the following frequency table for the ciphertext message. What letter in plaintext might you guess is represented by "X" in ciphertext? Why?

letter	frequency	letter	frequency	letter	frequency
A	4	J	12	S	0
B	13	K	20	T	21
C	14	L	9	U	5
D	9	M	1	V	15
E	0	N	0	W	1
F	0	O	6	X	38
G	8	P	8	Y	2
H	12	Q	5	Z	17
I	1	R	1		

← largest number = most frequent letter

PLAINTEXT LETTER REPRESENTED BY "X": E (if not, try T)

EXPLANATION: E is the most common letter in English text.

Math F113X: Quiz 7



	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	
0	A	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
1	B	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A
2	C	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B
3	D	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C
4	E	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D
5	F	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E