CRYPTOGRAPHY — PART 1 PRACTICE

HASHDUMP SECURITY CLUB

1. **MODULAR ARITHMETIC**

   a. $14 + 17$ in $\mathbb{Z}/7\mathbb{Z}$

   b. $8 - 12$ in $\mathbb{Z}/3\mathbb{Z}$

   c. 6×3 in $\mathbb{Z}/4\mathbb{Z}$

   d. Find the multiplicative inverse of 7 in $\mathbb{Z}/5\mathbb{Z}$

2. **SHIFT & AFFINE CIPHERS**

   Use the following table to help you solve the following questions:

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	26
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	_

   a. Encode the following using ROT $+13$: "`WELCOME_TO_HASHDUMP`"

   b. The following was encoded with ROT $+5$. Decode it: "`AJERJJYENSEHXGEYMWJJDJWTKN_J`"

   c. Encode the following using the affine cipher $2x - 3$: "`HELLO`"

   d. The following was encoded with the affine cipher $5x + 1$. Find the decoded text: "`ERRQGNV`"