

3. WATCH YOUR STEP
 22 0 19 2 7 24 14 20 17 18 19 4 15

a) $f(p) = p + 14 \pmod{26}$

$p + 14 \pmod{26}$

W	A	T	C	H	Y	O	U	R	S	T	E	P
22	0	19	2	7	24	14	20	17	18	19	4	15
↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
10	14	7	16	21	12	2	8	5	6	7	18	3
K	O	H	Q	V	M	C	I	F	G	H	S	D

b) $f(p) = 14p + 21 \pmod{26}$

$14p + 21 \pmod{26}$

W	A	T	C	H	Y	O	U	R	S	T	E	P
22	0	19	2	7	24	14	20	17	18	19	4	15
↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
17	21	1	23	15	19	9	15	25	13	1	25	23
R	V	B	X	P	T	J	P	Z	N	B	Z	X

c) $f(p) = -7p + 1 \pmod{26}$

$-7p + 1 \pmod{26}$

W	A	T	C	H	Y	O	U	R	S	T	E	P
22	0	19	2	7	24	14	20	17	18	19	4	15
↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
3	1	24	13	4	15	7	17	12	5	24	25	0
D	B	Y	N	E	P	H	R	M	F	Y	Z	A

5. Encrypted cipher $f(p) = p + 10 \pmod{26}$

\Rightarrow decryption function $g(p) = p - 10 \pmod{26}$

(a)

	C	E	B	B	O	X	N	O	B		X	Y	G
	2	4	1	1	14	23	13	14	1		23	24	6
$p - 10$	\downarrow	\downarrow	\downarrow	\downarrow	\downarrow	\downarrow	\downarrow	\downarrow	\downarrow		\downarrow	\downarrow	\downarrow
$\pmod{26}$	18	20	17	17	4	13	3	4	17		13	14	22
	S	U	R	R	E	N	D	E	R		N	O	W

(b)

	L	O		W	I		P	B	S	O	X	N
	11	14		22	8		15	1	18	14	23	13
$p - 10$	\downarrow	\downarrow		\downarrow	\downarrow		\downarrow	\downarrow	\downarrow	\downarrow	\downarrow	\downarrow
$\pmod{26}$	1	4		12	24		5	17	8	4	13	3
	B	E		M	Y		F	R	I	E	N	D

(c)

	D	S	W	O		P	Y	B		P	E	X
	3	18	22	14		15	24	1		15	4	23
$p - 10$	\downarrow	\downarrow	\downarrow	\downarrow		\downarrow	\downarrow	\downarrow		\downarrow	\downarrow	\downarrow
$\pmod{26}$	19	8	12	4		5	14	17		5	20	13
	T	I	M	E		F	O	R		F	U	N