

A	B	C	D	E	F	G	H	I	J	K	L	M
1	2	3	4	5	6	7	8	9	10	11	12	13
N	O	P	Q	R	S	T	U	V	W	X	Y	Z
14	15	16	17	18	19	20	21	22	23	24	25	26

Practice: Simplify the Modular Arithmetic.

(1) $42 \pmod{5} = 2 \pmod{5}$

(2) $92 \pmod{7} = 1 \pmod{7}$

(3) If $11^6 \pmod{4} = 1$, what is $11^{12} \pmod{4}$?

$11^{12} \pmod{4} = 11^6 \pmod{4} \cdot 11^6 \pmod{4} = 1 \cdot 1 \pmod{4} = 1 \pmod{4}$

Practice: Practice the Caesar Cipher. Dr. Paullin has to secretly shop for groceries that her husband won't eat. Can you encrypt her grocery list so that he doesn't know what she's buying?

(1) PEAS SHDV

(2) SHRIMP VKULPS

(3) QUINOA TXLQRD

(1) Using $\Delta = 6$, Encrypt the message "CODES ARE FUN".

C	O	D	E	S	A	R	E	F	U	N
3	15	4	5	19	1	18	5	6	21	14
I	U	J	K	Y	G	X	K	L	A	T

(2) Using $\nabla = 11$, Decrypt the message "RXEWTGH JHT BDSJAPG PGXIWB TIXR".

R	X	E	W	T	G	H	J	H	T	B	D	S	J	A	P	G	P	G	X	I	W	B	T	I	X	R
18	24	5	23	20	7	8	10	8	20	2	4	19	10	1	16	7	16	7	24	9	23	2	20	9	24	18
C	I	P	H	E	R	S	U	S	E	M	O	D	U	L	A	R	A	R	I	T	H	M	E	T	I	C

(3) Using the English Alphabet and the numbering system above, find the missing Encryption or Decryption Key.

(a) If $\Delta = 22$, find ∇ .

$22 + \nabla = 26$

$\nabla = 4$

(b) If $\nabla = 8$, find Δ .

$\Delta + 8 = 26$

$\Delta = 18$