

## CIPHERTEXT:

CQN ARPQCB XO NENAH VJW JAN MRVRWRBQNM FQNW CQN ARPQCB XO XWN  
VJW JAN CQANJCNWNM

## DECRYPTION STEP-BY-STEP:

1. *GIVEN:* Caesar cipher, spaces remain as spaces, single-letter words in ciphertext must be either 'A' or 'I'

### *CIPHERTEXT Character Frequency*

C: 6	O: 2
Q: 7	E: 1
<b>N: 12</b>	H: 1
A: 6	V: 3
R: 4	J: 5
P: 2	W: 6
B: 3	M: 3
X: 3	F: 1

2. Within the CIPHERTEXT, the most frequent character to appear is N. In the English language, the most common letter is E. **So, let's assume all instances of N map to E.**
3. **Calculate the shift  $E \rightarrow N$**  using the following alphabet:

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

E can be found at Index 4.

N can be found at Index 13.

**Based on our  $E \rightarrow N$  assumption, the shift value would be +9.**

4. Under the assumption of shift = 9, **let's attempt to decrypt the first word of the CIPHERTEXT** to see if it makes sense when converted back to PLAINTEXT...

*1st word from CIPHERTEXT: CQN*

*Caesar Decryption Formula:  $(C_x - \text{shift}) \bmod (\text{alphabet\_length})$*

- $C \rightarrow (2 - 9) \% 26 \rightarrow (-7) \% 26 = 19 \rightarrow T$
- $Q \rightarrow (16 - 9) \% 26 \rightarrow 7 \% 26 = 7 \rightarrow H$
- $N \rightarrow (13 - 9) \% 26 \rightarrow 4 \% 26 = 4 \rightarrow E$

Here, we see that CQN can be decrypted to THE, which is a common, recognizable word from the English language. Logically, this is *most likely* the solution we were searching for.

5. Let's continue to decode the remainder of the CIPHERTEXT using the same formula.

$$A \rightarrow (0 - 9) \% 26 \rightarrow (-9) \% 26 = 17 \rightarrow R$$

$$R \rightarrow (17 - 9) \% 26 \rightarrow (8) \% 26 = 8 \rightarrow I$$

$$P \rightarrow (15 - 9) \% 26 \rightarrow (6) \% 26 = 6 \rightarrow G$$

$$B \rightarrow (1 - 9) \% 26 \rightarrow (-8) \% 26 = 18 \rightarrow S$$

$$X \rightarrow (23 - 9) \% 26 \rightarrow (14) \% 26 = 14 \rightarrow O$$

$$O \rightarrow (14 - 9) \% 26 \rightarrow (5) \% 26 = 5 \rightarrow F$$

$$E \rightarrow (4 - 9) \% 26 \rightarrow (-5) \% 26 = 21 \rightarrow V$$

$$H \rightarrow (7 - 9) \% 26 \rightarrow (-2) \% 26 = 24 \rightarrow Y$$

$$V \rightarrow (21 - 9) \% 26 \rightarrow (12) \% 26 = 12 \rightarrow M$$

$$J \rightarrow (9 - 9) \% 26 \rightarrow (0) \% 26 = 0 \rightarrow A$$

$$W \rightarrow (22 - 9) \% 26 \rightarrow (13) \% 26 = 13 \rightarrow N$$

$$M \rightarrow (12 - 9) \% 26 \rightarrow (3) \% 26 = 3 \rightarrow D$$

$$F \rightarrow (5 - 9) \% 26 \rightarrow (-4) \% 26 = 22 \rightarrow W$$

6. CIPHERTEXT:

CQN ARPQCB XO NENAH VJW JAN MRVRWRBQNM FQNW CQN ARPQCB XO  
XWN VJW JAN CQANJCNWNM

**PLAINTEXT:**

THE RIGHTS OF EVERY MAN ARE DIMINISHED WHEN THE RIGHTS OF ONE  
MAN ARE THREATENED