

## **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
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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 → (0 – 9) % 26 → (- 9) % 26 = 17 → R  
R → (17 – 9) % 26 → (8) % 26 = 8 → I  
P → (15 – 9) % 26 → (6) % 26 = 6 → G  
B → (1 – 9) % 26 → (- 8) % 26 = 18 → S  
X → (23 – 9) % 26 → (14) % 26 = 14 → O  
O → (14 – 9) % 26 → (5) % 26 = 5 → F  
E → (4 – 9) % 26 → (- 5) % 26 = 21 → V  
H → (7 – 9) % 26 → (- 2) % 26 = 24 → Y  
V → (21 – 9) % 26 → (12) % 26 = 12 → M  
J → (9 – 9) % 26 → (0) % 26 = 0 → A  
W → (22 – 9) % 26 → (13) % 26 = 13 → N  
M → (12 – 9) % 26 → (3) % 26 = 3 → D  
F → (5 – 9) % 26 → (- 4) % 26 = 22 → 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**