Collected Problems:

1. Let the arithmetic function $\tau(n)$ be defined to be the number of divisors of n. So $\tau(12) = 6$. Find $\tau(8)$ and $\tau(30)$.

2. Show τ is multiplicative. (Hint: Use what will proved in class on Thursday by Michelle.)

3. Let $n = p_1^{\alpha_1} p_2^{\alpha_2} \dots p_r^{\alpha_r}$ be the prime factorization of n. Give a formula for $\tau(n)$.

4. Using the Caesar cipher with key letter "N", encrypt the message "ATTACK AT DAWN"

5. The important message: JXYIY IJEEU QIO was enciphered using a Caesar shift. Try to decipher it without knowing the key.

6. Decrypt the message YLFQX PCRIT, which was encrypted using the affine transformation $C \equiv 21P + 5 (\text{mod } 26)$.

7. The two most common letters in a long ciphertext, encrypted by an affine transformation $C \equiv aP + b (\text{mod } 26)$ are W and B, respectively, then what are the most likely values for a and b?

Non-Collected Problems:

1. Decrypt the message "THE RIGHT CHOICE" using the affine transformation $C \equiv 15P + 14 (\text{mod } 26)$.

2. The two most common letters in a long ciphertext, encrypted by an affine transformation $C \equiv aP + b (\text{mod } 26)$ are X and Q, respectively, then what are the most likely values for a and b?