HW1  20 Points  Due Sep 2 (Box hw1 folder)

1) Evaluate the following:

   (a) $7503 \mod 81$
   (b) $(-7503) \mod 81$
   (c) $81 \mod 7503$
   (d) $(-81) \mod 7503$.

2) Use exhaustive key search to decrypt the following ciphertext, which was encrypted using a Shift Cipher:

   BEEAKFYDJKXUQYHYJIQRYHTYJIQFBQDUYJIIFUHCQD.

3) If an encryption function $e_K$ is identical to the decryption function $d_K$, then the key $K$ is said to be an involuntary key.

   Find all the involuntary keys in the Shift Cipher over $\mathbb{Z}_{26}$.

4) For $1 \leq a \leq 28$, determine $a^{-1} \mod 29$