Week 2 Tuesday

Turn to someone sitting near you who you haven't met before (or who you haven't talked to much before), and introduce yourself!

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RVDOUFHLOSHVYPQ
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Then spend 5 minutes working together to decipher the above message, which was double encrypted: first using a Caesar cipher with a shift of 3 and then using rectangular transposition with the key word EARLY.

Modular Arithmetic, GCDs, Modular Inversion

1. What is $-13 \bmod 5$?

(A) 3

(B) 2

(C) -3

(D) None of the above

2. What is $5^{2021202220232024} \bmod 6$?

(A) 0

(B) 1

(C) 5

(D) None of the above

3. Which of the following integers is invertible mod 210?

(A) 3

(B) 4

(C) 5

(D) None of the above

4. Find an inverse of 54 mod 131, if possible.