

## EGCO 476 – 1<sup>st</sup> Assignment

Submission – Thu 15<sup>th</sup> Sep 2022

Marking – 10%

### Math for Traditional Crypto

30. List all additive inverse pairs in modulus 20.
31. List all multiplicative inverse pairs in modulus 20.
32. Find the multiplicative inverse of each of the following integers in  $\mathbf{Z}_{180}$ 
  - a. 38
  - b. 7
  - c. 132
  - d. 24
36. Find all solutions to each of the following linear equations:
  - a.  $3x \equiv 4 \pmod{5}$
  - b.  $4x \equiv 4 \pmod{6}$
  - c.  $9x \equiv 12 \pmod{7}$
  - d.  $256x \equiv 442 \pmod{60}$

### Math for Asymmetrical Crypto

21. Find the results of the following.
  - a.  $5^{15} \pmod{13}$
  - b.  $15^{18} \pmod{17}$
  - c.  $456^{17} \pmod{17}$
  - d.  $145^{102} \pmod{101}$
22. Find the results of the following.
  - a.  $5^{-1} \pmod{13}$
  - b.  $15^{-1} \pmod{17}$
  - c.  $27^{-1} \pmod{41}$
  - d.  $70^{-1} \pmod{101}$