1. Solve the system of congruences

\[ x \equiv 5 \pmod{739} \quad x \equiv 6 \pmod{248} \]

2. Write out the multiplication table for \( \mathbb{Z}_{16}^\times \).

3. a) State the definition of equivalence relation.

b) For two integers \( a \) and \( b \), say \( a \sim b \) if \( 5 \mid (a^2 - b^2) \). Is this an equivalence relation?

4. State the definition of even permutation and list all the even permutations of \( S_4 \).

5. Suppose \( a, q, b \) and \( r \) are integers and that \( a = qb + r \). Suppose further that \( d \) is an integer and \( d \mid b \). Prove that \( d \mid a \) if and only if \( d \mid r \).