Assignment 5

Make sure to write complete proofs. Try to avoid skipping steps. Write clear sentences.

- 1. True or False: If the remainder of doing Euclidean Division of a by c is r, i.e. if a = qc + r with certain conditions on r, and the remainder of doing Euclidean Division of b by c is s, then the remainder of doing Euclidean Division of a + b by c is r + s. Prove or provide counter-example.
- 2. True or False: If gcd(a, b) = 1 and gcd(a, c) = 1, then gcd(a, bc) = 1. Prove or provide counter-example.
- 3. Using the Euclidean algorithm, find concrete numbers x and y such that 245x + 356y = 1.
- 4. True or False: For given a, b, if we can solve ax + by = c, then we can also solve ax + by = d for any $d \ge c$. Prove or provide counter-example.
- 5. True or False: The equation 2x + by = c has a solution for all c if and only if b is an odd number. Prove or provide counter-example.