

Name:

Problem 0. Define the greatest common divisor of two integers a and b .

Problem 1. Use the Euclidean algorithm to write $(315, 525)$ as a linear combination of 315 and 525.

Problem 2. True or false? Justify your answer with a proof if it is true or a counterexample if it is false.

For any positive integers a , b , and d , if $au + bv = d$ for some $u, v \in \mathbb{Z}$, then $(a, b) = d$.

Problem 3 (Bonus). Consider integers $a > 0$ and $b > 0$. The *least common multiple* of a and b , denoted $\text{lcm}(a, b)$, is the smallest positive integer that is divisible by both a and b . Prove that

$$\text{lcm}(a, b) \text{gcd}(a, b) = ab.$$