

Name: _____

Please show all work.

1. Suppose m and n are natural numbers. Prove that
 - (a) any common divisor of m and n divides $\gcd(m, n)$
 - (b) $\text{lcm}(m, n)$ divides any common multiple of m and n
2. Use the extended Euclid's algorithm to find the multiplicative inverse of 17 modulo 37
3. Determine for which natural numbers n we have $n! > 2^n$ and prove it by induction.
4. Prove that $\{1, -1\} \subseteq \mathbf{Z}$ is a multiplicative group and that it is isomorphic to \mathbf{Z}_2

| 1 | 2 | 3 | 4 | total (40) |
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