

Name: _____

Please show all work and justify your answers.

1. Find all natural numbers n such that $2n! < n^n$. Prove your conclusion by induction.
2. Use the Extended Euclid's Algorithm to find $\gcd(324, 148)$ and $s, t \in \mathbf{Z}$ such that $\gcd(324, 148) = 324s + 148t$. Show steps.
3. Prove that $\text{lcm}(a, b)$ divides any common multiple of a and b .
4. Prove that $5^{\frac{1}{3}}$ is irrational.

1	2	3	4	total (40)