Math 2013 - Introduction to Discrete Mathematics

Exam #3 - 2015.12.01

Name: ______________________________

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1. Use the Euclidean Algorithm to compute $\gcd(275, 378)$.

2. Express the numbers $x = 275$ and $y = 378$ in prime factorization form.

3. Using *only* the prime factorization representation $\langle n_2, n_3, n_5, \ldots \rangle$ from problem 2, compute both $\gcd(275, 378)$ and $\operatorname{lcm}(275, 378)$.

4. Show that $7^{4k} \equiv 1 \pmod{100}$. [Hint: Remember $x^{a \cdot b} = (x^a)^b$]

5. Given that $7^{4k} \equiv 1 \pmod{100}$, find the last two digits of 7^{1942}. [Hint: $1942 = 1940 + 2$.]

6. If $n =$ 'LRRRLRRRR' and $m =$ 'LRRRLR' are two words in the Stern-Brocot tree, which one is *larger* in value? Explain your answer in detail for full credit, do not convert to actual numbers.

7. Convert the word $m =$ 'LRRRLR' from problem 6 to a rational number.