MATH 467 FACTORIZATON AND PRIMALITY TESTING, FALL TERM 2023, PRACTICE EXAM 1.

Note: Exam 1 will be 9:05-9:55, Wednesday 27th September 2023 Room 158 Willard

1. (25 marks) Prove that if $m \in \mathbb{N}$ and $n \in \mathbb{N}$, then there are integers a, b such that $\gcd(a, b) = m$ and $ab = mn$ if and only if $m|n$.

2. (25 marks) Find all pairs of integers x and y such that $922x + 2163y = 7$.

3. (25 marks) Prove that $1365|n^{13} - n$.

4. (25 marks) Prove that 23n-1 is never a perfect square.