

Lectures 19 and 20

We started number Theory.

We discussed primality and introduced the Sieve of Eratosthenes.

We defined the greatest common divisor.

We described the Euclidean Algorithm for finding $\gcd(n, m)$, as well as for finding λ and μ such that

$$\lambda \cdot n + \mu \cdot m = \gcd(n, m)$$

Exercises for Lectures 19 and 20

1. Use the sieve of Eratosthenes to list all the primes from between 1 and 100. What is the largest prime that you have to sieve out?
2. Determine whether it is prime or not.

211 311 411 511

3. Find the prime factorization of 1776 (Patriot's Day is coming - **Up the Rebels!**)
4. Abraham Lincoln was inaugurated in 1861. Find the prime factorization of 1861.
5. The Bastille was taken in 1789. (**Viva la France! Viva la Liberté! Viva la Égalité! Viva la Fraternité! Viva la Guillotine...**oops...clunk.) Find the prime factorization of 1789.
6. Find all the common divisors of 60 and 160.
7. Find all the common divisors of 60 and 160.
8. Use the Euclidean Algorithm to find the $\gcd(247, 209)$.
9. Use the Euclidean Algorithm to find the $\gcd(111, 123)$.
10. Define the relation $D \subseteq \mathbb{N} \times \mathbb{N}$. Show that this relation makes \mathbb{N} a partially ordered set.