

M405 Homework Assignment 7

Please hand these in Monday, July 23.

Section 5.4.

1. (Burton 1b.) Use Fermat's method to factor 10541.
2. (Burton 1c.) Use Fermat's method to factor 340663.
3. (Burton 3.) Factor the number $2^{11} - 1$ by Fermat's factorization method.

Section 6.1.

4. (Burton 2.) Use the result of Problem (6.1)1 (in Burton) to calculate $\gcd(12378, 3054)$ and $\text{lcm}(12378, 3054)$.
5. (Burton 5a.) Verify that $\tau(n) = \tau(n + 1) = \tau(n + 2) = \tau(n + 3)$ holds for $n = 3655$.
6. (Burton 5b.) When $n = 206$, show that $\sigma(n) = \sigma(n + 1)$.
7. (Burton 7a.) Prove that $\tau(n)$ is an odd integer if n is a perfect square.
8. (Burton 9.) If n is a square-free integer, prove that $\tau(n) = 2^r$, where r is the number of prime divisors of n .