MTH 310: Homework 2

Due: January 25, 2019

1. Read Chapter 2 in Hungerford.
2. (a) Divide 5^2, 7^2, 11^2, and 27^2 by 8 and note the remainder in each case.
   (b) Formulate a conjecture about the remainder when the square of an odd integer is divided by 8.
   (c) Prove your conjecture. (It may help to first show that an odd integer may be written as one of $4k+1$ or $4k+3$ for some k.)
3. Use the Euclidean Algorithm to find $(24, 138)$ and $(143, 231)$.
4. (a) Prove that $(n, n+1) = 1$ for all $n \in \mathbb{Z}$.
   (b) What are the possible values of $(n, n+2)$ and $(n, n+6)$?
5. Do Hungerford Section 1.2 Problem B28.
6. Do Hungerford Section 1.2 Problem B18.
7. Do Hungerford Section 1.3 Problem 10.
8. Do Hungerford Section 2.1 Problem 3.
9. Do Hungerford Section 2.1 Problem 5.
10. Do Hungerford Section 2.1 Problem 14.