Intro to Abstract Mathematics
Spring 2020

Assignment 7.3
Due March 18

Exercise 1. Let $a, b, c \in \mathbb{Z}$. Prove that if $ab|ac$ and $a \neq 0$, then $b|c$.

Exercise 2. Let $n \in \mathbb{Z}^+$. Prove that $X^n - 1 = (X-1)(X^{n-1} + X^{n-2} + \cdots + X + 1)$.

Exercise 3. Let $a, n \in \mathbb{Z}^+$. Prove that if $n \geq 2$ and $a \geq 3$, then $a^n - 1$ is composite.

Exercise 4. Let $n \in \mathbb{Z}^+$. Prove that if n is composite, then so is $2^n - 1$.