Number Theory
Fall 2020

Assignment 1.1
Due September 2

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

Exercise 2. Let $a, b, c, d \in \mathbb{Z}$. Prove that if $a|b$ and $c|d$, then $ac|bd$.

Exercise 3. Let $a, b \in \mathbb{Z}$ and suppose a is divisor of b. Prove that if $a \neq 0$, then its complementary divisor is unique.

Exercise 4. Let $b \in \mathbb{Z}$, $b \neq 0$. For $a \in \mathbb{Z}$ define $r(a)$ to be the remainder when a is divided by b. Prove that for all $a_1, a_2, a_3 \in \mathbb{Z}$ one has

$$r(a_1 \cdot r(a_2 a_3)) = r(r(a_1 a_2) \cdot a_3) = r(a_1 a_2 a_3).$$