



NUMBER THEORY I
SPRING 2018

ASSIGNMENT 1.1
DUE JANUARY 17

Exercise 1. Let $a, b, c, r, s \in \mathbb{Z}$. Show that if $a|b$ and $a|c$, then $a|rb + sc$.

Exercise 2. Prove that if $n \in \mathbb{N}$ is composite, then $2^n - 1$ is composite.

Exercise 3. Consider the *monoid* $M = \mathbb{N} \setminus \{2\}$. Show that the Fundamental Theorem of Arithmetic does not hold in M by verifying that $3 \cdot 8$ and $4 \cdot 6$ are distinct prime factorizations of 24 in M .