

Mathematics 2200H – Mathematical Reasoning

TRENT UNIVERSITY, Fall 2020

Assignment #2² + 2¹ + 2⁰

Cancellation

Due on Friday, 6 November.

1. Show that $+_{\mathbb{Z}}$ satisfies the cancellation law for addition, *i.e.* for all $a, b, c \in \mathbb{Z}$, $a +_{\mathbb{Z}} c = b +_{\mathbb{Z}} c$ implies that $a = b$. [6]
2. Show that $\cdot_{\mathbb{Z}}$ satisfies the cancellation law for multiplication, *i.e.* for all $a, b, c \in \mathbb{Z}$ with $c \neq 0_{\mathbb{Z}}$, $a \cdot_{\mathbb{Z}} c = b \cdot_{\mathbb{Z}} c$ implies that $a = b$. [4]

Hint: Having negatives makes **1** pretty easy. **2** is comparatively hard; it's worth remembering that if $[(s, t)]_{\sim} \neq 0_{\mathbb{Z}} = [(0, 0)]_{\sim}$, then we must have $s \neq t$, so either $s = t + S(k)$ or $t = s + S(k)$ for some $k \in \mathbb{N}$.

SOME RECOMMENDED HALLOWEEN READING

The Ballad of the Black Fox Skin, by Robert W. Service

A Tale of the Thirteenth Floor, by Ogden Nash

A Night in the Lonesome October, by Roger Zelazny