

Mathematics 2200H – Mathematical Reasoning

TRENT UNIVERSITY, Fall 2021

Assignment Bonus Extra

Commutativity of +

Due by the end of the term, i.e. Wednesday, 8 December.

*May be submitted on paper or via Blackboard.**

Recall from class that addition on the natural numbers was defined by recursion with the help of the successor function S as follows:

- For all $n \in \mathbb{N}$, $n + 0 = n$.
- For all $n \in \mathbb{N}$, if $n + k$ has been defined, then $n + S(k) = S(n + k)$.

We showed in class that addition, so defined, was associative, but had trouble proving that addition is commutative. Your task on this assignment, should you choose to accept it, is to get this job done.

1. Show that addition on the natural numbers, as defined above, is commutative, *i.e.* $n + k = k + n$ for all natural numbers n and k . [10]

* All else failing, please email your solutions to the instructor at: sbilaniuk@trentu.ca