

Mathematics 2200H – Mathematical Reasoning

TRENT UNIVERSITY, Fall 2025

Assignment #3

Lengths

*Due on Friday, 26 September.**

Please read the handout *A Minimal System of Propositional Logic* before tackling this assignment.

1. Consider the formulas of our official system of propositional logic, \mathcal{L}_P , that do *not* have any instance of the connective \rightarrow . Determine, with proof, exactly what the possible lengths of such formulas are. [10]

NOTE. The length of a formula is its length as a string: the number of symbols of the language it contains, counting repetitions.

Number Man

(for the ghost of Johann Sebastian Bach)

He was born to wonder about numbers.

He balanced fives against tens
and made them sleep together
and love each other.

He took sixes and sevens
and set them wrangling and fighting
over raw bones.

He woke up twos and fours
out of baby sleep
and touched them back to sleep.

He managed eights and nines,
gave them prophet beards,
marched them into mists and mountains.

He added all the numbers he knew,
multiplied them by new-found numbers
and called it a prayer of Numbers.

For each of a million cipher silences
he dug up a mate number
for a candle light in the dark.

He knew love numbers, luck numbers,
how the sea and the stars
are made and held by numbers.

Carl Sandburg

* Please submit your solutions, preferably as a single pdf, via Blackboard's Assignments module. If that fails, please submit them to the instructor on paper or via email to sbilaniuk@trentu.ca as soon as you can,