

Principia Problem Set

Due: January 29, 2020

For each problem, construct a proof which either proves or disproves the proposition. The difficulty here is that your proof must be a Principia Mathematica proof. Your answers must be typeset in latex, and if you use outside sources, you must cite your work (use Principia style references to refer to existing Principia theorems.) For full credit, you must attempt all of these problems. In addition to attempting all problems, you will be graded on your best 2 easier problems and your best 1 harder problems.

1 Easier (but still difficult) Problems

1. $a = b + 1 \rightarrow b = a - 1$
2. $a = 0$ and $b = a + 1$ implies that $b = 0$
3. if $a + b = b + c$ then $a = c$
4. if $a + b = b + c$ then $a = b$

2 Impressively Difficult Problems

1. The set of real numbers is uncountably infinite.
2. Multiplication is both commutative and distributive.
3. All positive integers greater than 1 are either prime or the product of primes, and the prime factorization of any composite number is unique. (This is the fundamental theorem of arithmetic.)