

HOMWORK 4
DUE OCTOBER 6 IN CLASS

1. Let $A = \{x \in \{0, 1\}^* \mid x \text{ encodes a proof, in ZFC, that } 15251 \text{ is a prime number}\}$.

Assume that ZFC is sound, and is capable of expressing any ordinary mathematical reasoning, for example, about Turing machines and proofs. Answer the following questions with clear justifications.

- (a) Is A the empty language?
- (b) Is your answer to part (a) provable in ZFC?
- (c) Is A decidable?
- (d) Is your answer to (c) provable in ZFC?