Math 6010 - Assignment 5

Due October 9, 2023

(1) Show that the following are primitive recursive predicates:
   (a) x divides y;
   (b) x is prime.

(2) Let P be a k-ary primitive recursive predicate. Show that

$$f(\bar{x}, y) := \mu(t < y)\ P(\bar{x}, t)$$

is primitive recursive.

(3) Show that the Diagonal Halting Problem

$$K := \{x \in \mathbb{N} \mid \varphi_x(x) \text{ is defined } \}$$

is computabely enumerable but not computable.

(4,5) Show that Σ^0_n for $n \in \mathbb{N}$ is closed under $\wedge, \vee$ and bounded quantifiers.