HW 1 CMSC 452. MAKE UP. DUE Feb 21- NO extensions

1. (0 points) What is your name? Write it clearly. Staple your HW. When is the midterm? Where is the midterm? When is the Final? IMPORTANT- I WANT TO MAKE SURE I HAVE YOUR CORRECT EMAIL ADDRESSES. I HAVE EMAILED ALL OF YOU USING WHAT I CURRENTLY THINK IS YOUR EMAIL ADDRESS BUT IF YOU DIDN'T GET IT THEN EMAIL ME ASAP TO GIVE ME YOUR REAL EMAIL ADDRESS.

2. (100 points) For each of the following sets say if its is

   - Empty
   - Finite but not empty
   - Countable (this implies NOT finite)
   - Uncountable

   And EXPLAIN your answer.

   NOTE: Throughout this HW $\mathsf{N} = \{1, 2, 3, \ldots\}$ s it does NOT include 0.

   (a) The set of all functions from N to N of the form $f(x) = ax + b$ where $a, b \in \mathsf{Q}$.

   (b) The set of all functions from N to N of the form $f(x) = ax + b$ where $a, b \in \mathsf{R}$.

   (c) The set of all functions f from N to N such that $(\forall y)(\exists x)[f(x) > y]$.

   (d) The set of all primes in N that are ≥ 100.

   (e) The set of all primes in N that are < 100.

   (f) The set of all roots of equations of the form $f(x) = ax + b$ where $a, b \in \mathsf{N}$ and $0 \leq a < b \leq 10$.

   (g) The set of all roots of equations of the form $f(x) = ax + b$ where $a, b \in \mathsf{N}$ and $a, b \geq 10$.

   (h) The set $A \times \emptyset$.

   (i) The set $\{(x, y) \in \mathsf{N} \times \mathsf{N} \mid x + y \leq 100\}$

   (j) The set $\{(x, y) \in \mathsf{Z} \times \mathsf{Z} \mid x + y \leq 100\}$