DISCRETE MATH
QUIZ 1

Name:_____

You have 10 minutes for this exam. If you have a question, raise your hand and remain seated. In order to receive full credit your answer must be **complete**, **legible** and **correct**.

1.

(a) Give an example of a nonempty set A such that $A \subseteq \mathcal{P}(A)$.

$A = \{\emptyset\}$ works, since $\mathcal{P}(A) = \{\emptyset, \{\emptyset\}\}$ and $\{\emptyset\} \subseteq \{\emptyset, \{\emptyset\}\}$.

(b) Give an example of a nonempty set B such that B and $\mathcal{P}(B)$ are disjoint.

$A = \{7\}$ works, since $\mathcal{P}(A) = \{\emptyset, \{7\}\}$ and $\{7\} \cap \{\emptyset, \{7\}\} = \emptyset$.

2. What is Russell's paradox?

Russell's paradox is the observation that the collection $\mathcal{N} := \{x \colon x \notin x\}$ cannot be a set. (Reason: $\mathcal{N} \in \mathcal{N}$ is equivalent to $\mathcal{N} \notin \mathcal{N}$.)