

Set Theory
Quiz 2

Name: _____

You have 10 minutes to complete this quiz. 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**. Show your work, and give adequate explanations.

1. Assume that x is a set and explain why $x \cup \{x\}$ is a set. (Note: $x \cup \{x\}$ is different from x . For example, if $x = \{a, b\}$, then $x \cup \{x\} = \{a, b\} \cup \{\{a, b\}\} = \{a, b, \{a, b\}\}$.)

Assume that x is a set. Pairing x with itself we get that $\{x\}$ is a set. Pairing x with $\{x\}$ we get that $\{x, \{x\}\}$ is a set. The axiom of union yields that $\bigcup\{x, \{x\}\} = x \cup \{x\}$ is a set.

2. Write down a formula $\varphi(x, y)$ defining the class function $y = x \cup \{x\}$.

$\varphi(x, y)$ can be taken to be

$$\forall z((z \in y) \leftrightarrow ((z \in x) \vee (z = x)))$$