

Foundations of Mathematics

Quiz 1

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**. When appropriate, show your work and give adequate explanations.

1. Identify the following axioms of set theory and rewrite the axioms using English words instead of mathematical symbols.

(a) $(\exists x)((\forall y)(y \notin x))$

(Axiom of the Empty Set) There is a set with no elements.

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

(Axiom of Extensionality) Any two sets, x and y , are equal if and only if they have the same elements.

2. Draw a formula tree for the following sentence. Circle the atomic formulas in the tree.

$$(\forall x)(\forall y)((x < y) \rightarrow (\exists z)((x < z) \wedge (z < y)))$$

