DISCRETE MATH
QUIZ 5

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. The Axiom of Regularity can be written with restricted quantifiers as:

$$(\forall x \neq \emptyset)(\exists y \in x)(x \cap y = \emptyset).$$

Rewrite it so that it does not use restricted quantifiers.

$\forall x \exists y((x \neq \emptyset) \rightarrow ((y \in x) \wedge (x \cap y = \emptyset)))$

2. Write "There exists arbitrarily large real numbers that are zeros of $\sin(x)$" as a formal sentence in prenex form. Then write the negation of this sentence in prenex form.

(a) $\forall x \exists z((z > x) \wedge (\sin(z) = 0)))$

(b) $\exists x \forall z((z \not> x) \vee (\sin(z) \neq 0)))$