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Quiz 1

Math 74

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1. Write down the negation of the following statement: "For all $x \in \mathbb{R}$ such that $x \neq 1$, if the quantity $\frac{1}{x-1} > 0$ then $x > 1$."

There exists $x \in \mathbb{R}$ such that $x \neq 1$, and $\frac{1}{x-1} > 0$, but $x \leq 1$.

2. Two sets A and B are called *disjoint* if $A \cap B = \emptyset$. Show that if A and B are disjoint sets such that $A \subseteq B$, then $A = \emptyset$.

Let A and B be sets such that $A \subseteq B$ and $A \cap B = \emptyset$. Suppose that $x \in A$. Then $x \in B$, since A is a subset of B . Thus $x \in A \cap B = \emptyset$. Therefore, every element of A is also an element of \emptyset , so $A \subseteq \emptyset$. We have $\emptyset \subseteq A$ by a theorem in class, so $A = \emptyset$.

3. Write down the set of perfect squares using set-builder notation.

$$\{k^2 \mid k \in \mathbb{Z}\}$$