**207 Chapter 3 Proof Questions**

**#1.**

Prove that the following two statements are not logically equivalent. In your proof, completely justify your answer.

(a) A real number is less than 1 only if its reciprocal is greater than 1.

(b) Having a reciprocal greater than 1 is a sufficient condition for a real number to be less than 1.

**Proof:**

Negative numbers are in the set of all real numbers and are less than one but their reciprocal is not greater than one, thus the first statement is false The second statement is only true for positive numbers. They’re not logically equivalent because the first statement is false

**#2.**

Prove that the following is a valid argument:

All real numbers have nonnegative squares.

The number *i* has a negative square.

Therefore, the number *i* is not a real number.

**Proof:**

H(X) = x has a nonnegative square

M(X) = x is a real number

i stands for the number i

For all x, if M(x) then H(x)

~H(i)

Therefore ~M(i)

This is modus tollens (Quantified form)