1.) (12 points each) Analyze the logical forms of the following statements.

a.) If anyone gets less than 65% on the first exam then they should either come to my office hours or go to tutoring.

b.) If anyone in the dorm has a friend who has measles, then everyone in the dorm will have to be quarantined.

2.) (11 points) Translate the following statements into idiomatic English.

a.) \( \forall x(\neg \exists y L(x,y)) \rightarrow \neg H(x) \)
Where \( H(x):= x \text{ is happy} \), and \( L(x,y):= x \text{ loves } y \).

b.) \( \forall x[P(x) \land \neg(x = 2)] \rightarrow O(x) \)
Where \( P(x):= x \text{ is a prime number} \), and \( O(x):= x \text{ is an odd number} \).

3.) (15 points) Negate each statement and then reexpress the result as an equivalent positive statements.

a.) Everyone likes someone, but no one likes everyone.

b.) \( \forall a \in A \exists b \in B(a \in C \iff b \in C) \)

4.) (12 points) Decide whether the following statements true or false in the universe of discourse of whole numbers.

a.) \( \forall x(x < 7 \rightarrow \exists a \exists b \exists c(a^2 + b^2 + c^2 = x)) \)

b.) \( \exists x((x - 4)^2 = 25) \)